Comparing Sustainable Development Aid and Need

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# Abstract

# Introduction

The efficacy of foreign aid, specifically “official development assistance” on the prospects of nations and individuals is a hotly debated question. Sachs, Easterly, and others have noted both the ability of aid to deliver transformative social change, while also outlining serious concerns such as dependency and ulterior motives (J. Sachs 2014). If aid has potential to be effective, however, of critical importance is the question of its correct allocation. One fair general principle with a relevant and intuitive basis for the evaluation of allocation is that aid should go to countries that have the greatest need for it. For example, in late 2019 the World Bank came under fire for assistance to China, which some argue, as an upper middle income country, did not “need” loans (Runde 2019).

In this paper, I explore any differences between multilateral and bilateral official development assistance allocations and “need” in terms of deficits in performance for the sustainable development goals. There is a history of such analysis for poverty, the Millennium Development Goals, and in fragmented areas of Sustainable Development. Here, however, I examine the current global sustainable development agenda by contributing a systematic analysis.

I make use of newly released data from the OECD’s SDG Financing Lab which uses machine learning to link aid data to SDGs via textual analysis of projects and covers all nations available in the Development Assistance Committee’s Creditor Reporting System from 2012 to 2017. To get a sense of need I use indicators included with the SDGs found in UN and World Bank macro data for a similar time span. These indicators are carefully selected to get a sense of the absolute scale of challenges on an aggregate or population-wide scale.

In terms of data analysis, I begin by computing a mismatch index between shares of aid and need and track this index across years and sectors. Taking a less subjective and ordinal, rather than cardinally robust approach to mismatch I also check a raw ranking of nations. In a regression specification, I check the ability of need to predict aid while also accounting for several other factors behind aid decisions such as the strength of policy and institutions in recipient countries. Finally, I examine cases of notable outliers in terms of situations of large disproportionalities and any potential explanations.

The results provide interesting insight into how funding priorities relate to need. They do not necessarily make a judgement about where aid should go, but instead check the judgement that is already implicitly made. For example, one means of interpretation is that of implied efficiency: if aid allocation is assumed to be optimal, then do donors hold “plausible” beliefs about efficacy?

Discuss results and conclusion further

# Literature Review

A large amount of work has been done on the efficiency of aid to eradicate poverty. Early work was done by Collier and Dollar, who used a series of regressions to determine the effect of aid on growth, and of growth on poverty alleviation under a headcount ratio, average poverty gap, or squared poverty gap (Dollar and Collier 1999). Results suggested that the poverty efficient allocation, accounting for policy and governance, was unambiguously under or over the actual allocation for 52/59 countries, suggesting a large mismatch. Other work focusing on poverty found that ODA per poor person is lowest where poverty is greatest (Improving ODA allocation for a post-2015 world n.d.). The concern for need in a variety of sectors covered in this paper is not the same as that of poverty efficiency based on growth for aid allocations. However, under a reasonable assumption of declining marginal efficacy or impact for aid, the concepts can become quite similar.

Aside from work on poverty, previous work has been done on the relevance of Millennium Development Goals using Tobit models to account for non-linear relationships between indicators and aid in the form of multilateral and bilateral commitments (Thiele, Nunnenkamp, and Dreher 2007). Controls were implemented for per capita income and governance, and systems with population and equal weightings for countries were considered. Out of MDG indicators considered in the areas of hunger, education, health, sanitation, and environment, only undernourishment and HIV/AIDs prevalence were found to influence respective aid allocations.

However, the Millennium Development Goals were seen by some to focus too much on improvements for poor countries, (J. D. Sachs 2012), so in 2015 a broader and more holistic range of priorities in the Sustainable Development Goals was established. Additional goals relative to the SDGs which can now be evaluated include those on growth and infrastructure and institutions, and sustainability considerations have been integrated into other targets. I consider the SDG agenda in a new time period and focus on aid disbursements rather than commitments.

There has also been fragmentary and non-systematic exploration of allocations and need for individual sectors or sustainable development goal areas, with mixed findings. For example, the allocation of food aid (in line with SDG 2 concerning hunger) has been shown to be driven by not just demand, but also supply side factors (Qian and Nunn 2015). Health aid has been found to be responsive to country needs in terms of child and infant mortality and HIV prevalence through a larger number of projects and average aid value by donor (Lee and Lim 2014). A regional analysis of water and sanitation ODA commitments versus the share of global population without improved sources found potential overfinancing in Western Asia and North Africa and potential underfinancing in Central and Southeaster Asia (UN-Water and World Health Organization 2017). Gender gaps in health and education have been found to be associated with larger allocations of aid in those sectors and overall (Dreher, Gehring, and Klasen 2015). In my work I instead try to take a more systematic approach for each of the goals. One key advantage is that of comparability between goals and priorities in terms of the level of matching.

Finally, detached from any particular development goals, past work has also examined bilateral sectoral allocations of aid across the sectors of food, health, humanitarian aid, transport, communications, energy, education, and debt relief from the 1970s to 2000s (Kasuga 2008). Need was determined for each country and sector on a quantile basis with 20 quantiles for performance on World Development Indicators. Recipient aid was found to generally fit recipient needs well using Spearman’s rank coefficients which do not assume that the relationship between aid and need is linear (similar to the check of ranking in this paper). Food, health, and STD control aid were relatively well allocated, but education and debt relief were not. I use updated SDG sectors, cover multilateral aid and more bilateral agencies, and test assumptions more complex than rank ordering over a different time period.

# Data

My main source for data on foreign aid

* + Aid
    - The OECD SDG Financing Lab (The SDG Financing Lab n.d.)
      * Root data source: OECD DAC CRS reporting
        + Guide to usage: <http://www.oecd.org/dac/stats/crsguide.htm> (Technical Guide to terms and data in the Creditor Reporting System (CRS) Aid Activities database - OECD n.d.)
      * The lab has used machine learning (textual analysis) of projects to sort CRS data on aid into SDG areas for numerous countries from 2012-2017 (Linking Aid to the Sustainable Development Goals – a machine learning approach 2019)
        + Additional guidelines for usage: <https://www.oecd-ilibrary.org/development/linking-aid-to-the-sustainable-development-goals-a-machine-learning-approach_4bdaeb8c-en>
      * Addresses multidimensionality of aid with respect to goals aside from simple sectoral allocations in earlier work
      * Focus on official development assistance (from the public sector), as it is the most likely to be influenced by the sustainable development goals and targeted based on need
        + Although oda may have a political motive, private finance is likely to have a profit motive
      * Flows or net aid? Would need to calculate net aid
      * There is data on ODA gross disbursements and commitments
        + Better to work on disbursements since this represents the actual amount distributed and commitments are not always achieved, but it would also be easy to switch over to/also check commitments
  + Need
    - The UN Statistics Division lists numerous SDG indicators for each goal (Overview — SDG Indicators n.d.). There is also a database of SDG metrics and series (Measuring progress towards the Sustainable Development Goals - SDG Tracker n.d.).
    - Choose indicators which can be interpreted with mind to following:
    - Principle defining “need”: where possible, use aggregate measures of deficit, a rough benchmark for the economic cost of solving a problem for a country
      * Examples: cost required to solve poverty
      * Population weighting in terms of ratios/rates
    - Poverty
      * SDG 1 (no poverty)
      * Top indicators include $1.90 headcount ratio, average poverty gap (particularly useful multiplied by the count of poor to represent the cost of eradicating poverty with perfect targeting), squared poverty gap, which are all readily available from WBOpenData (World Bank Open Data | Data n.d.)
    - Shared Prosperity
      * SDGs 8 (decent work and economic growth), 9 (industry, innovation, and infrastructure), 10 (reduced inequalities)
      * Candidate indicators include annualized average consumption/income growth for the bottom 40% of the population, income share held by lowest 20%, Gini Indices, Total Unemployment Rate (ILO estimate)- use labor force participation instead? Total number unemployed (World Bank Open Data | Data n.d.)
      * Infrastructure
    - Sustainability
      * SDGs 7 (affordable and clean energy), 11 (sustainable cities and communities), 12 (responsible consumption and production), 13 (climate action), 14 (life below water), 15 (life on land)
      * Candidate indicators include Total Greenhouse Gas Emissions (and Per Capita), Renewable Energy Consumption (% of total consumption) (World Bank Open Data | Data n.d.)
      * Material footprint per GDP (Indicator 8.4.1 n.d.)
    - Check as many goals as time allows, add 2-6, 16, 17
    - Could be paired with data tracking progress towards goals on indicators to look at efficacy (Measuring progress towards the Sustainable Development Goals - SDG Tracker n.d.)
    - One other notion of “need” on a sectoral basis could be distance from targets in percentage terms (— SDG Indicators n.d.) (certain page number of this report; need to find again)
  + Other Factors (regression controls)
    - Institutions
      * Governance indicators available on WBOpenData (World Bank Open Data | Data n.d.)
    - Democracy
      * Polity IV (PolityProject n.d.)
  + Closest to meeting goals: <https://www.sustainabledevelopment.report/>

# Methodology

* + Compute sum of mismatches between aid and “need”
    - Compare shares of aid and shares of need for all countries
    - For each indicator, compute the sum over all countries i of
    - * Absolute deviation
      * Also calculate net deviation with parentheses, not absolute value
    - Large country: probably a large share of aid and large share of deficit, hence heavier weighting
      * Try equal weighting for each country versus population/share weighting above? The absolute value difference as a percentage of share of deficit or share of aid: divide each sum term by share of deficit or aid
  + Compute sum of squared mismatches
    - Clearly weighs larger deviations more
  + Track these sums by sector and year
  + Also compute aggregates over all sectors and over all countries
  + Raw ranking: order countries by aid and by need
    - Spearman’s rank coefficient?
  + Regression and controls
    - Test model predicting foreign aid based on need (share of indicator deficit)
    - Consider using country and year fixed effects since there is panel data
    - For each indicator, country i, year t

*Share of Aidit = ai + at + b(Share of Need/Deficit)it+ c(Controls)it + eit*

* + - Include controls for democracy, institutions
    - Include (if available) control for any other factors informing “efficacy”
    - Include interaction terms
    - Try sum over all indicators
    - Try nonlinear models: logs, tobits
    - Try just regressing aid on indicator/deficit
      * Sensitive to weighing countries by population or equally
  + Search data for outliers
    - Point out specific cases where implied need and aid vary to a large degree

# Results

* + Produce and discuss time series, other graphs of indices
  + Discuss any regression results and significance
  + Discuss disproportionate country and sector pairs
    - Implied efficiency: Under an assumption of optimal allocation, what is the implied relative marginal benefit, and is it plausible
    - For example, assume India has a poverty share of 20% but only receives 10% of poverty reduction aid. If there is an optimal allocation, is it assumed every dollar is twice as effective in India? Is this plausible as the optimum allocation/difference in efficiency?
  + Discuss disproportionate sectors and countries in aggregate
  + Discuss overall allocation among countries and sectors
    - Which sectors receive the most funding, particularly relative to progress towards targets- is something revealed about preference or relative importance of goals
  + Analyze before/after sustainable development goals era: was there a change in priorities or allocations?

As is present in most analyses of aid, there is the caveat of potential reverse causality. It could be that aid leads to significant improvements on sustainable development indicators; “misallocations” to countries with little need are tremendous success stories. The time scales involved in such an interpretation and analysis of what we know about the efficacy of aid make such an explanation seem less plausible; an immediate (within a year) and large impact does not seem likely, but here I leave the causal statistical analysis to rule out such a story completely to other work using instrumental variables and other methods to other studies.

Aid is set by country and then by sector? <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3053363>

Fungibility is expected to be limited in this approach, as sectoral allocations matter

Explaining deviations from need:

Aside from just being a complement of policy in terms of having an impact, aid may be used as a reward to encourage good policy (Collier and Dollar 2004). Multilateral aid may be allocated based on shortfalls of domestic resources, a sense of need not based on just the scope of the problem, but also on capabilities (Maizels and Nissanke 1984). Bilateral aid is often not dispersed according to need, but rather according to political and strategic considerations (Alesina and Dollar 1998).

SDGS for rich and poor countries; but aid not for rich and poor countries?

# Conclusion

* + Implications
  + Directions for future research

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