The Positive Effects of Aid on Health Development Outcomes

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This study uses a combination of foreign aid data and development proxies to assess the value of health related foreign aid and the achievements of the global community during times of increased aid focus. It uses regression models to present a statistically significant relationship between aid and health outcomes, and then utilizes three case studies comparing similar countries in order to reinforce the argument, and account for any inconsistencies within the models. Both the models and the case studies support aid as an asset in the health development of a state, and the implication is that, if this is indeed the case, the Millennium Development Goals should be praised and renewed in some form.

Contents

Introduction

In the year 2000 the United Nations (UN) convened in New York for the Millennium Summit to discuss the role of the organization, and the role of global cooperation in the new century. By the end of the summit the countries of the world, and their leaders, had drafted and adopted the United Nations Millennium Declaration. The Millennium Declaration comprised of eight chapters and key objectives intended to encourage further cohesion in the advancement of international law, protection of human rights, and propagation of world peace.

Following the almost universal adoption of the Millennium Declaration, the UN added its considerable endorsement to a paper initially drafted by the Organization for Economic Cooperation and Development (OECD) concerning foreign aid (*OECD,* 1996). This paper described a number of developmental successes in the prior half-century and expresses its desire for OECD countries to continue looking forward, while outlining a number of goals and targets for OECD support. These goals focused on not only the economic well-being of developing countries, but also their social development and ability to pursue environmental sustainability. At the conclusion of the Millennium Summit, and in clear patronage of the newly agreed upon Millennium Declaration, the UN threw its full support behind the 1996 report. It rehashed some targets, added specifics, and broadened the scope of the OECD initiative, but it added a global brand to foreign aid and development. Prior to the Millennium Summit the UN published a document titled *A Better World for All,* which specified the seven goals of the radical new initiative for global development (*UN et al*, 2000). An eighth was added to measure the direct action of the donor countries themselves and the Millennium Development Goals (MDGs) were born.

By focusing on the accomplishments, the defeats, and the lessons learned throughout the duration of the Millennium time period, it is possible to assess the values of its various facets, and judge the potential merits of future efforts. When the leaders of the world meet in 2015 they will look back at the prior fifteen years, and discuss the next decade in global development. It will be crucial to have solid evidence that the most recent efforts were not in vain, and that their contributions to the project improved the health of recipients. If the MDGs can be considered the flagship push for global cooperative development, then assessments on health and human well-being will be vital to setting the stage for the next initiative.

Literature Review

The Nature of Foreign Aid

Unfortunately, not all press is good press with respect to the new directive. A number of sources question the Goals themselves, but there are even regular questions in regards to the effectiveness of foreign aid in the first place. While the more optimistic school of thought argues in favor of bearing a portion of the development burden, the other would suggest that the ends of foreign aid are rarely so positive, and that aid does as much harm as it does good. This more skeptical grouping claims that not only can many countries get into serious monetary trouble by accepting aid, but that aid is too regularly funneled to corrupt sources while the truly needy are left with nothing (*Easterly,* 2002; *Bardhan,* 1997). Some even go as far as to point out that aid could be used as a tool of the corrupt to maintain a certain, generally less commendable, status quo. The functional and logistical issues of development aid, coupled with this moral dilemma, present sufficient basis for the grounds of a debate as to the real net benefit of aid for recipient countries. Not only can an agency be unsure as to the final

destination of its donations but, even if successful, there is no guarantee that a project will be adequately maintained without ownership and adequate incentive (*Gibson & Andersson*, 2005). In short, without the right safeguards in play, it can be hard to know how positive of an impact aid can really have on a country or its people.

Public opinion believes that up to 25% of the US federal budget goes to foreign aid. It would prefer that just 10% of the budget was spend on aid purposes. As a matter of fact, less than 1% of the US federal budget goes to foreign aid (*World Public Opinion,* 2010). Because of this, and the aforementioned dilemma with aid itself, it is important that every step of the foreign aid process be analyzed for effectiveness.

Foreign Aid Effectiveness

The foreign aid effectiveness debate reached a peak in the years leading up to, and shortly after, the turn of the century. It was acknowledged by the global community that whichever side of the effectiveness debate one found oneself upon, it could be agreed that both donor and recipient countries could do better. Simply dumping money on a poor country would not work without significant support and standards. A number of studies were conducted to discover ways to ensure the money was well used.

A decade ago Burnside and Dollar revisited their working paper from the year 2000 and found strong evidence that the key determining factor for the effectiveness of foreign aid was the institutional quality and policy strength of recipients (*Burnside & Dollar*, 2004). This was not a new revelation, but it is a regularly echoed finding and was cited directly in a number of UN policy papers briefly after its release. Similarly it has been found that the promotion of democratic societies, and distribution to more liberal regimes, has a substantially greater effect

in the alleviation of certain developmental sectors (*Boone*, 1995). This would certainly be supported by the popular theory that institutional quality itself is a historic key to development in a country, regardless of foreign aid support (*Acemoglu & Robinson,* 2012).

In the *Samaritan's Dilemma* (*Gibson & Andersson,* 2005), it was determined that the most valid way to ensure the effectiveness of foreign aid was by ensuring that initiatives were sustainable, which broadly means that the projects themselves can be continued for a considerable time after initiation. To ensure this, it is explained that projects must encourage ownership and adequate incentive for the recipients to maintain a project. This is echoed and expanded upon by a number of sources, which add that countries must follow through with promises and also accept that there are inherent risks when donating (*Abdel-Malek,* 2011). Certain agencies such as SIDA (the Swedish arm of foreign aid) are found to be particularly good at ensuring these criteria are met and are thus considered particularly effective (*Gibson & Andersson,* 2005).

Although the above factors are among those held in highest regard, aid effectiveness is, of course, not so simple. A variety of ancillary factors play substantial roles in modern distribution or efficacy of aid to developing countries. The important thing is that the aid agencies themselves have actually been reading this literature and have been implementing standards and policies to reflect results, so as to best create a lasting impact.

Parallel Works

In addition to the more generalized studies, which seek to address the betterment of foreign aid, there have always existed a number of scholars and studies eager to gauge the impact of past aid efforts. In many ways this could be considered the base level and

fundamental consideration for agencies. It is one thing to suggest how NGOs and donor governments can best apply their aid, but quite another to ensure that they are actually listening to suggestions such as those presented by Burnside and Dollar, Gibson and Andersson, or Acemoglu and Robinson.

In 2006 Economist Mark McGillivray et al published a paper which consolidated a number of studies conducted over the prior fifty years and found a wide variance in results. Some studies strongly supported aid as a catalyst for growth, some said it was of no benefit, and others claimed resoundin g 'maybes'. This certainly helps to argue the case that aid is a tough target to pin down, but does not help much to actually answer the question regarding real benefit. However, he also noticed something important. Of the many papers and studies observed, a general shift in literature occurs upon the publishing of a major World Bank paper from 1998 by senior *Foreign Policy* fellow David Dollar and Harvard economist Lant Pritchett, which addressed aid in an in depth and meaningful manner. It seems that by having acknowledged the failures of donor programs, and assessing the changes that could be made, it is somewhat proven that research is being taken seriously. After the publishing of this paper practically all studies came to the consensus that at the very least, without aid, development and growth would be lower in developing countries.

In many ways the modern argument boils down to the disagreements of Columbia economist and prior director of the UN Millennium Project, Dr. Jeffrey Sachs, and the aforementioned Dr. William Easterly. While Sachs, champion of foreign aid and author of *The End of Poverty,* believes that "success in ending the poverty trap will be much easier than it appears" (*Sachs,* 2005), Easterly claims that "Big Plans will always fail to reach the beautiful

goal" (*Easterly,* 2006). The relationship, and the difference in ideals, that these men share very much embodies the continued stance on whether or not foreign aid can change the world as might be hoped, in the present form.

The Millennium Development Goals

As stated, the Millennium Development Goals set out by the UN in the year 2000 are eight objectives which the donor community seek to achieve by the year 2015. Substantial reduction of poverty and child mortality accompany a desire to drastically increase the primary education rate as key tenants, and examples, of the stated mission (*un.org/millenniumgoals*). Goal number eight focuses on donor countries rather than recipient countries in an attempt to encourage aid reform of the highly developed countries as well as the Least Developed Countries (LDCs). At face value the MDGs are a simple proposal for betterment but, more importantly, they almost act to call out the donor community and issue a challenge on a global scale. The hope, for obvious reasons, is that in an effort to rise to this challenge, aid agencies and other actors will apply what they have recently learned about aid and use this knowledge to kick-start a new age of development.

Because the goals concern a widely variable demographic of concern (the entire developing world), and a number of very different development goals, the MDGs themselves have come under considerable criticism, especially from popular sources. After hailing the directive as "The World's Biggest Promise" a number of reports have put the directive under considerable fire for being uneven and incomplete, among other criticisms (Easterly, 2002; BBC, 2010; *Independent,* 2010). Doubt has been cast on the validity of the effort. The loudest critics

point out that most goals will fall far short in certain parts of the world, and that from the onset the effort was doomed to be biased against the least developed, and most needy countries.

Acknowledging these concerns, many have rushed to the MDGs defense. Although it seems true that many of the least developed countries will miss the broader goals, it would be unfair to completely disregard the MDGs as a result (*Millennium Goals*). Though he could not be said to be defending the MDGs per se (not a huge fan), Chicago economist William Easterly points out that the exact aims of the Goals themselves were always somewhat arbitrary, and this was not a great secret. More importantly he argues that to define all that has been achieved in the countries of concern as either a "success" or a "failure" based solely on said goals is quite unfair. The required levels of growth necessary to have ever had a chance to reach some goals would have been nothing short of miraculous, and ultimately unrealistic. Perhaps they ought to have been afforded a slightly altered set of goals, but progress in the LDCs has really been quite good, for this reason the MDGs and the LDCs deserve considerable praise rather than criticism. To directly quote: "Africa has enough problems without international organizations and campaigners downplaying African success when it happens" (*Easterly,* 2009).

Aid Statistics

Although foreign aid effectiveness is something of a moving target, its analysis is at least benefitted by virtue of being quantifiable and measurable. A fundamentally powerful, if new, tool in the modern aid analyst's arsenal is the database of AidData.org, a joint project between social scientists from Brigham Young University, the College of William and Mary, and Development Gateway (*Aid Data)*. The online portal and database has sought out and logged

(theoretically) every instance of foreign aid for the last thirty years with each individual instance

of aid as the unit of analysis. Similarly, the UN has kept extensive data, over an even longer time

period, on a variety of valuable statistics and indicators (*World Bank*). These public databases

can be used to establish relationships between the sets of data, and have considerable

potential to serve as proxies in establishing the credibility of aid as a causational factor for

development, and support the MDGs. It is only in the past decade that the *World Bank* has

really attained the capacity to survey all countries, so it is to be expected that upcoming studies

will be better informed and of a higher quality than ever before.

Hypothesis

Through data analysis this study will assert that if developed countries make focused

efforts on foreign aid in the health sector, then domestic healthcare statistics in developing

countries are improved when compared with those receiving lesser levels of aid. By doing so it

will be shown that the 15 year Millennium Development Goals have been worth the trouble,

and that such initiatives must continue to be undertaken.

Methodology

This study will chiefly address the hypothesis in two stages. The first will be a regression

analysis of the health development proxy statistics of Under Five and Maternal Mortality rates

in LDCs between the years 1990 and 2010. These indicators from the *World Bank* will be

compared to foreign aid data provided by *Aid Data* over the same period so as to ascertain a

quantifiable relationship between the independent and dependent variables. For the vast

majority of this paper the focus will be on Least Developed Countries so as to address the claim

that they are the most regularly marginalized, and so as to act as a partial control in analysis. In

addition to actually controlling for population density, countries with populations of fewer than 350,000 people will be excluded to reduce the likelihood of population skewed data. Additional controls within the regression analysis will include Polity Score, primary education, GDP, and geographic situation. Under the assumption that progress is not instantaneous, the regression will lag, comparing development to aid levels five years prior.

Due to the ineffability of certain variables, and the immeasurability of others, it is also of value to utilize case studies to tackle the subject from an alternative angle and try to curtail any possible discrepancies. This study will compare three pairs of states, which shared considerable similarities in the 1990s (Rwanda & Burundi; Benin & Togo; Mali & Niger), and observe their levels of health development over twenty years. For the most part, though otherwise similar, these dyads experienced very different levels of foreign aid over the surveyed time period. The analysis will focus on health development proxy data and attempt to reconcile progress in these areas with increased levels of health aid.

Although it is not technically part of the data or analysis, there will be additional facts and figures related directly to the Millennium Development Goals offered in the discussion of this paper. They will not have the academic clout of a regression model, nor the anecdotal value of the case studies, but the hope is that they will serve to clarify and support the hypothesis in a consistent manner. For the most part they will analyze the progress made since the inception of the MDG initiative in a broader (though still LDC oriented) sense.

A full explanatory list of all data sets and variables used in all areas of research can be found in Appendix *Figure (App C).*

Regression Models

Data

Figure (Reg 1): Regression model, Under Five Mortality vs Health Aid Average

```
Linear regression                                 Number of obs =       163
                                                  F(  8,    42) =     11.49
                                                  Prob > F      =    0.0000
                                                  R-squared     =    0.3533
                                                  Root MSE      =     43.11

                                          (Std. Err. adjusted for 43 clusters in country)
```

u5mortalityaverage	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
healthaidaverage	-1.324902	.4261471	-3.11	0.003	-2.184902	-.4649026
polityaverage	-.227757	1.274782	-0.18	0.859	-2.800371	2.344857
primaryeducationavg	.0948275	.2498176	0.38	0.706	-.4093248	.5989797
gdppcavg	.0009328	.0107481	0.09	0.931	-.0207579	.0226234
landlocked	19.77231	12.5656	1.57	0.123	-5.586103	45.13072
populationdensityavg	-.0237136	.0193161	-1.23	0.226	-.0626951	.0152679
africancountry	46.20352	10.10028	4.57	0.000	25.82032	66.58672
year	-2.534719	.667559	-3.80	0.000	-3.881908	-1.187531
_cons	5186.234	1335.125	3.88	0.000	2491.843	7880.626

By performing a regression analysis on developmental progress it is possible to see a relationship emerge between health outcomes and health aid. *Figure (Reg 1)* displays the relationship between Under Five Mortality in the observed Least Developed Countries and registered Health Aid between 1990 and 2010. The model is controlled for in terms of Polity Score, Primary Education, GDP per capita, population density and landlocked status. The year is also controlled for as evidence is indisputable that the world is getting better as a whole in regards to health outcomes (*Baker* chapter 6, 2014). In the regression itself, data has been taken using five year averages.

It should be noted that the regression has omitted dummy variables on a country level in favor of a regional African control. There are a few reasons for this. Not only does the

abundance of dummy variables when contrasted with the number of actual observations mean

that the available degrees of freedom become incredibly limited but, for similar considerations,

a number of countries within the dataset end up omitted. The result, ultimately, was an

overstatement of the existing dummies in the greater context of the regression. This is atoned

for, in part, by clustering the countries, and also by adding the African regional variable which is

very statistically significant. For transparency's sake it must be indicated that when using the

country level dummy variables, tested outcomes were substantially different and did not aptly

support the hypothesis. It is quite conceivable that it did not fit the expected result for the

reasons mentioned above, but the Stata chart can be found in the Appendix if it is of interest in

Figure (App E).

Another incredibly important facet of this regression is the lagging aspect of the

dependent variable which is pushed **back** five years (conversely it could be said that all

independent variables are pushed forward five years). Fundamentally this is in order to reflect

the delayed repercussions of aid on actual observable results, but it is also important to the

controls such as Polity Score and education levels for the same reason.

Figure (Reg 2): Regression model, Maternal Mortality vs Health Aid Average

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Linear regression                                    Number of obs =      163
                                                     F(  8,    42) =     9.68
                                                     Prob > F      =   0.0000
                                                     R-squared     =   0.2664
                                                     Root MSE      =   351.02

                                    (Std. Err. adjusted for 43 clusters in country)

                                 Robust
maternalmortalityr~e     Coef.    Std. Err.      t     P>|t|    [95% Conf. Interval]

   healthaidaverage   -7.006142   2.791064    -2.51    0.016   -12.63874   -1.373547
      polityaverage   -18.35381   7.065646    -2.60    0.013   -32.61286   -4.094755
 primaryeducationavg    .4701239  2.003518     0.23    0.816   -3.573139    4.513387
            gdppcavg   -.0878668   .0589872   -1.49    0.144   -.2069078    .0311741
           landlocked   136.4061  99.95948     1.36    0.180   -65.32027   338.1325
populationdensityavg   -.1433688   .1245018   -1.15    0.256   -.3946236    .1078859
       africancountry   252.9982  100.0659     2.53    0.015    51.05702   454.9393
                 year  -13.69751   5.000348   -2.74    0.009   -23.78862   -3.606399
                _cons   28071.09   9966.542    2.82    0.007     7957.8    48184.39
```

Figure (Reg 2) above shares most characteristics with its earlier counterpart except that instead of analyzing Health Aid's impact on Under Five Mortality, it instead looks at Maternal Mortality rates over the same time period. Maternal Mortality is actually only measured by the World Bank every five years, so it is a true value rather than an average like the dependent variable of the prior model.

Although life expectancy is an important dependent variable that is entitled to considerable attention, it probably warrants more lag than either of the above models to really get a good gauge of impact and it therefore not modeled.

Regression Analysis

Both the Under Five and Maternal mortality models paint a picture which supports the hypothesis that health aid leads to health improvements. Both display considerable levels of statistical significance and both show negative coefficient values, indicative of reduced mortality levels when confronted with higher levels of health development aid.

Because both dependent variables in these models are stated in a "per live births" constraint (per 1000 for Under Five, per 100,000 for Maternal), the impact analysis is best achieved by looking at an individual country and applying this model in a hypothetical sense - otherwise it is hard to really determine the importance of what this model is saying. According to the *World Bank* the state of Angola in 2010 had 19,550,000 occupants (almost exactly average for LDCs), and a crude birth rate of 46 births per 1000 people (*World Bank*). This means that in 2010 approximately 900,000 babies were born. Unfortunately Angola, as an LDC, has a high Under Five Mortality rate and 182 kids in 1000 do not live to see the age of five (*World Bank*), or 163,800 of those 900,000 in larger terms. According to this model, a health aid donation of an additional $1 per capita in 2005 ($19.55 million dollars) would have lowered that 182 to about 180.7 in 2010. Had the additional dollar been spent in 2005, 1200 of those lives in 2010 might have been saved. Perhaps it is too much for donors to stomach, but at $19.55 million dollars each of those 1200 lives is valued at approximately $16,300. The international standard calculates that one year of "quality life" could be worth up to $129,000 in the developed world (*Lee et al,* 2008).

The same thought process can be applied to the model of Maternal Mortality. Angola in 2010 had a Maternal Mortality rate of 530 per 100,000 live births. Assuming the same 900,000

babies, 4770 women must have died in childbirth in 2010 Angola. If the second model is to be followed, then 63 fewer women lose their lives in childbirth with that same single dollar.

In some regards these numbers do not feel especially positive. In the grand scheme of things, with percentages involved, neither 1200 children nor 63 mothers is particularly mind-blowing. But with a little added perspective it is quite easy to see how vital aid really is to these countries, and a few extra factors highlight the fact that aid is not a moot point. First, it is worth remembering that the same $1 is spread over both models. One dollar per capita saves 1200 children **and** 63 mothers, not 1200 children **or** 63 mothers. In all likelihood this dollar stretches even further. Though not analyzed it should be assumed that other factors of health, such as sanitation and immunization, additionally feel the dollar's impact, and though the delay may prove too great to analyze here, life expectancy should also increase with the same dollar.

Secondly, though it may be a fault of the model, it is important to remember that aid and development happen on a rolling basis. Countries do not give aid at five year increments and expect the results exactly five years later. It was earlier mentioned that, following the model, 182/1000 Under Five deaths drops to 180.7 between 2005 and 2010, however some of this aid would have come into effect earlier, and some later. As it is, five years could simply be considered the crux of the impact. Lives would likely be saved and improved both before and after the observed year by either shorter term, or longer term projects.

It is also worth considering that, meagre though foreign aid tends to be, a single dollar would be on the low end of actual per capita donations. In 2005 Angola received roughly $5.3 per capita, which is 6000 children's lives and 378 mothers' for just that year, in addition to any ripple effects that may exist. As referenced earlier by the article of *World Public Opinion* in

2010, actual donations are fairly meagre. The US donates less than 1% of its budget to foreign aid projects. $5.3 per capita, in the grand scheme of things, is still hardly anything.

These foreign aid donations, of course, accompany any funding put forward by the government at hand, and any technological advances which may reduce costs or generally improve health outcomes within a country. If the model is to be followed precisely, foreign aid as has been tracked was responsible for only 31% of Angola's reduction in Under Five Mortality rates between 2005 and 2010 (at a reduction of 1.3 lives per 1000 births per dollar, the model would suggest that aid was responsible for a drop of 6.9 deaths per 1000 live births, or 31% of Angola's actual progress, which was 204/1000 to 182.4/1000 - a drop in 21.6 deaths per 1000 live births). Aid might help, but the brunt of the development burden still lies within the countries themselves.

The functionality of these governments is just one variable which is more difficult to account for within a model of this kind, and admittedly lends it some degree of weakness. It joins a whole slew of variables which do not fit well into the model for reasons of unquantifiability or overcomplexity. Noteworthy among these is the decision making process of donor countries, the impacts they might have on the donor process, and the effects they may have on a country. For example, a donor may choose to give money because a country is doing particularly well or because it is doing particularly poorly in a certain area. Or, perhaps, aid might be given with different levels of conditionality depending on the perceived strategic importance of the recipient country and the amiability of the recipient government.

It is for these reasons, among others, that a regressive model alone is insufficient. By looking also towards case studies it is possible to compare and contrast similar countries with

similar situations, and similar geographies. Though no two countries are likely to be perfect

matches, it is of value to investigate the impacts of aid on health development from a different

angle so as to curtail as many concerns as possible.

Case Studies

Rwanda and Burundi: Case Study Data

Figure (Case 1A): Rwanda and Burundi Demographic Comparison in 1990

1990 Statistical Comparison	Rwanda	Burundi
HDI	.238	.291
GDP per Capita	$357	$200
Population	7214696	5605873
Majority Religion	Christianity	Christianity
Primary Completion Rate	43.06	40.57
Life Expectancy	33	47
Maternal Mortality Rate	1400	1300
Under Five Mortality Rate	151.8	170.8
HIV Incidence Rate	.92	.61
Polity Score	-7	-7
Official Language	Rwanda-Rundi	Rwanda-Rundi
Location	Central Africa	Central Africa
Landlocked	Yes	Yes

In 1990, on paper, Rwanda and Burundi were as similar as realistically imaginable. Using

CIA and *World Bank* statistics it is apparent that they shared a language, a religion, and a

geographic border. Neither had a population living, on average, on more than $1 a day, and

both had HDIs scraping the bottom of the barrel. As is demonstrated by *Figure (Case 1A)* the

health statistics, the ones of concern in this particular study, were similarly abysmal. 15-17% of

all children born in the country were expected to die before the age of five, Maternal Mortality

was among the bottom five countries in the world and HIV incidence rates matched the average

for Least Developed Countries across the globe. Rwanda suffered from an average life expectancy of 33 years of age, while Burundi might have considered its life expectancy something to brag about at 47.

Although neither country would be considered anything other than "unsatisfactory", it might be said that Burundi was actually the superior country in terms of living conditions. It had the slightly higher HDI, a slightly smaller population, and a superior life expectancy. Coupled with the infamous Rwandan genocide just a few years after this data was taken, one might imagine that Burundi would have pulled ahead in a noteworthy manner. However this was not the case. As a matter of fact, while Burundi has largely stagnated, Rwanda appears to have forged ahead in the 20 year period. Major highlights of *Figure (Case 1B)* include an HDI and Life Expectancy rate which nearly doubled, an Under Five Mortality rate which was slashed in half, and an HIV Incidence rate which has dropped by almost 90%. It has beaten Burundi almost across the board, failing to make a clean sweep only because it was edged out by 1% in HIV Incidence rates.

Figure (Case 1B): Developmental Differences between Rwanda and Burundi (1990 – 2010)

1990 Stats			2010 Stats			Sector Improvement	
Rwanda	Burundi		Rwanda	Burundi		Rwanda	Burundi
.238	.291	HDI	0.453	0.381		90.34%	30.92%
$357	$200	per Capita GDP	$519	$226		45.38%	13%
43.06	40.57	Primary Completion Rate	52.81	50.83		22.64%	25.28%
33	47	Life Expectancy	62	53		87.87%	12.76%
1400	1300	Maternal Mortality Rate	390	820		72.14%	36.92%
151.8	170.8	Under Five Mortality Rate	63.6	93.6		58.1%	45.2%
.92	.61	HIV Incidence Rate	0.13	0.08		85.87%	86.89%

Benin and Togo: Case Study Data

Figure (Case 2A): Benin and Togo Demographic Comparison in 1990

1990 Statistical Comparison	Benin	Togo
HDI	.342	.404
GDP per Capita	$369	$472
Population	5001271	3787602
Majority Religion	Various	Various
Primary Completion Rate	18.65%	36.37%
Life Expectancy	53	56
Maternal Mortality Rate	600	660
Under Five Mortality Rate	179.4	146.4
HIV Incidence Rate	.1	.27
Polity Score	-7	-7
Official Language	French	French
Location	West Africa	West Africa
Landlocked	No	No

A second interesting dyad is that of Benin and Togo which, just like Burundi and

Rwanda, share a significant number of similarities (*Figure (Case 2A)*). Each share a border, a

language, and a wide array of religious beliefs in West Africa. Each began the period of analysis

with decidedly poor Polity ratings, and each has a population similar to that of present day Los

Angeles. In some ways they outperformed both Rwanda and Burundi in 1990 (higher HDI, lower

maternal mortality etc.) but each is still considered a Least Developed Country.

Despite these similarities, as with the prior example, the years between 1990 and 2010

saw one country make leaps and bounds while the other seemed to merely saunter along. As

shown by *Figure (Case 2B)* Benin saw its GDP rise by 87% and HDI increase by 33%. Benin's

Under Five Mortality rate and Maternal Mortality rate shrank substantially by 46.66% and

38.44% respectively. Unsurprisingly its Life Expectancy increased by six years – a stark contrast

to that of Togo which actually shrank by almost 2%. Much as in the prior example Benin outpaced its counterpart in most every sector. The only area it where did not surge past Togo was (interestingly) in relative reduction in HIV incidence, and presumably this is only the case because in 1990 Benin was already only dealing with one fifth of the incidence rate of the LDC average – which is quite impressive. Its real, numerical HIV incidence rate remains lower than that of Togo and it remains somewhat exemplary in the field.

Figure (Case 2B): Developmental Differences between Benin and Togo (1990 – 2010)

1990 Stats			2010 Stats			Sector Improvement	
Benin	**Togo**		**Benin**	**Togo**		**Benin**	**Togo**
.342	.404	**HDI**	.467	.460		36.54%	13.86%
$369	$472	**per Capita GDP**	$690	$503		87.00%	6.57%
18.65%	36.37%	**Primary Completion Rate**	64.84%	71.25%		247.67%	95.90%
53	56	**Life Expectancy**	59	55		11.32%	-1.79%
600	660	**Maternal Mortality Rate**	370	480		38.33%	27.27%
179.4	146.4	**Under Five Mortality Rate**	95.7	92.9		46.66%	36.54%
.1	.27	**HIV Incidence Rate**	.07	.18		30.00%	33.33%

Mali and Niger: Case Study Data

Figure (Case 3A): Mali and Niger Demographic Comparison in 1990

1990 Statistical Comparison	Mali	Niger
HDI	0.232	0.218
GDP per Capita	$315.13	$340.2
Population	7964066	7753907
Majority Religion	Islam	Islam
Primary Completion Rate	12%*	17%
Life Expectancy	46	44
Maternal Mortality Rate	1100	1000
Under Five Mortality Rate	254.2	327.3
HIV Incidence Rate	.17	.06
Polity Score	-7	-7
Official Language	French	French
Location	West Africa	West Africa
Landlocked	Yes	Yes

*Estimate based on 1988 and 2000 data

The third and final case study shows the similarities between the countries Mali and Niger. Both share a border in West Africa, both are landlocked, and both are considered LDCs. *World Bank* data once again shows that it is clear that the two countries share far more than simple geographic location. Not only do they share a religion but in 1990 they had exceptionally close population levels, wealth metrics, and human development scores.

As seen in *Figure (Case 3B),* unlike the prior cases this one actually presents itself as a rather more muddled story. Many aspects of Mali have pushed past those of Niger. Its HDI and GDP are now drastically superior, and its primary completion rate increased five-fold. However in regards to health statistics Niger seems to have seen the greater improvement. While Mali can boast a greater reduction in Maternal Mortality rates, Niger has performed more effectively in Under Five Mortality, Life Expectancy and HIV incidence. This muddled picture is probably

not a complete rarity, but it does at least serve to support the idea that success can be a mixed

hamper.

Figure (Case 3B): Developmental Differences between Mali and Niger

1990 Stats			2010 Stats		Sector Improvement	
Mali	**Niger**		**Mali**	**Niger**	**Mali**	**Niger**
0.232	0.218	**HDI**	0.398	0.323	71.60%	48.16%
$315.13	$340.2	**per Capita GDP**	$672	$360	113.33%	5.88%
12%*	17%	**Primary Completion Rate**	62%	41%	414.25%	140.47%
46	44	**Life Expectancy**	55	58	19.57%	31.81%
1100	1000	**Maternal Mortality Rate**	600	690	45.45%	31.00%
254.2	327.3	**Under Five Mortality Rate**	137.1	123.5	46.07%	62.27%
.17	.06	**HIV Incidence Rate**	.05	.01	70.58%	83.33%

*Estimate based on 1988 and 2000 data

Case Analysis

The important question posited by these cases, and indeed this paper as a whole, is: why have some of these countries succeeded while others have failed?

Conventional wisdom as supported by Easterly in *Why Nations Fail*, and indeed by a vast majority of scholars, might pinpoint institutional strength and political liberty as being a chief driving factor in these sorts of improvements. It stands to reason that a more accountable government, a more representative government, would be more likely to care for its peoples than one which is otherwise inclined – especially in the field of health services. Indeed this is (again) supported by a great number of studies and critiques of failed states (*Kenny,* 2011; *Al-Ali*, 2013). Certainly as a rule of thumb this absolutely has to be the case, however, there are always other exciting factors at play in the social sciences and on a global stage which have potential to muddle this. Some of these factors are not necessarily quantifiable, and some of

these factors have potential to be somewhat abstract, and the result is that countries do not always perform as expected, even when considering an omnipresent variable like governance and institutional strength.

Fact of the matter is that in these cases a more free institutional government has not consistently guaranteed superiority. Rwanda for example experienced a *Polity* rating of -4 at absolute best throughout this period when compared to Burundi's present score of 6 and, arguably, of the case countries presented, Rwanda has seen the best improvements. The interchangeably successful Mali and Niger have an equally unusual variance in governmental prowess, and the picture painted remains somewhat confusing. Although Mali moved up into the "democratic" region of Polity in the early 1990s, and its HDI/GDP improved greatly, this leap in freedom and accountability did not translate directly to health statistic success. In fact, Niger saw greater improvements in three out of the four health related statistics being investigated, despite having a government which managed to fluctuate in and out of democratic standing multiple times in twenty years. The only case which supports the theory of democratic governance leading to developmental successes is that of Benin and Togo. This hardly presents itself as suitable material with which to confirm a theory, and if one looks up to the prior regressive models at the impact of Polity Score on health outcomes the result is very mixed. While the Maternal Mortality model shows a statistically significant, strong correlation between democracy and development, the Under Five Mortality model shows next to no statistical significance whatsoever. With further prodding a more refined model might be developed, but the present models, and the case studies above, do not present a particularly strong case for Polity Score impacting health outcomes.

Figure (Case 4): Aid Data for Country Pairings

Rwanda	Burundi	Average Aid Granted (1990 – 2010)	Benin	Togo	Average Aid Granted (1990 – 2010)	Mali	Niger
$73.36	$48.73	**All Aid**	$66.22	$43.93	**All Aid**	$76.90	$40.71
$2.61	$1.00	**Education**	$4.47	$2.50	**Education**	$6.13	$2.14
$9.92	$3.82	**Health**	$6.19	$2.68	**Health**	$5.74	$3.31

What these cases do point towards, very directly, is the impact of aid on health outcomes, *Figure (Case 4)*. When tasked with finding pairings of countries as similar as possibly can be in 1990, the presence and magnitude of aid has been a singular factor of major separation between them. Between 1990 and 2010 Rwanda received roughly 160% more health aid than its counterpart Burundi, while Benin received more than 130% more aid than Togo. In both of these instances the donor nations were rewarded by results drastically greater in the country which received more aid.

It might be considered that although aid is of substantial benefit in the health field, this strong relationship does not seem to extend to HIV. This could be because foreign aid genuinely does not have an impact in this department or, more likely, it could be argued that for the most part all countries have done reasonably well in this department on their own. It was discussed in the earlier regression analysis that aid does not make up the majority of progress in developing countries, and that is probably how it ought to be. The goal of aid is to help, not to bear the whole burden. Perhaps the countries have found some sort of winning formula that reduces the necessity and impact of foreign aid in this particular department. The simple *Figure (App D)* in the appendix lends further credence to this idea.

Admittedly, the dichotomy of Mali and Niger does not support the hypothesis quite as well as the prior case studies has. Although Mali received about 73% more health aid than Niger, and though both its HDI and GDP improved far beyond that of Niger, the direct health outcomes did not perform as well as expected. While most statistics were reasonably close in comparison, Mali saw greater improvement in only Maternal Mortality, while Niger made greater strides in Life Expectancy, Under Five Mortality, and HIV incidence. Explanations for this might look back to the earlier reasoning that donor countries do not donate evenly to all countries, or perhaps Niger enacted some very effective programs in order to attain its success. Either way, it is a challenge to argue that this particular case aptly supports the hypothesis.

That being said, two out of three case studies strongly supporting the hypothesis is not an insignificant piece of data. Though largely unaddressed within this paper, which favors more direct health proxies, a greater level of aid was unanimously associated with greater improvements in both HDI and GDP. Aid is very clearly having an impact on Least Developed Countries, and the idea of cutting it off would spell disaster for these states.

Discussion

The Impact of Foreign Aid

Based on the above models and case studies it seems clear that health based foreign aid is more than capable of having a considerable impact on a developing country. The Easterly camp against big foreign aid plans probably has a number of good points. Aid could certainly be managed better and directed in a more utilitarian manner than the present. It is also fair to assume that certain foreign aid initiatives may occasionally cause more issues than they solve. However, as a whole, big foreign aid seems to be a reasonably beneficial factor. It would be

mistaken to suggest that donor countries completely cut off support. Foreign aid efforts ultimately play into a larger game, and though the end game is of course development, the greater idea could be said to be equality, unity, and globalization.

By proving that aid is an asset to LDCs, this paper serves a greater purpose in justifying the Millennium Development Goals of the past 15 years. By supporting the fact that aid is indeed a benefit, the MDGs gain an increased degree of legitimacy, even in the face of skepticism. If it can be irrevocably proven that donor aid is fundamental to a country's growth then there is no reason that the next fifteen years shouldn't embrace a new push towards a new set of goals.

Criticism and Concern

To review, chief criticisms of the Millennium Development Goals include:

1. *Seemingly arbitrary definitions of success.*
2. *Unrealistic goals and expectations.*
3. *An unreasonable bias against the Least Developed Countries.*
4. *Ineffectiveness of Big Plans.*

Although an unfortunate percentage of the population may believe it, the United Nations is not an all-powerful, all-knowing empire. It has neither the time nor resources to give every corner of the world the attention it either needs or deserves. This applies to peacekeeping and diplomatic missions as well as those concerning foreign aid. The UN must lean heavily on member states to advance its agenda, and it is presumably with this consideration in mind that the organization must have issued the Millennium Development Goals directive.

The Goals are not an instance of the United Nations taking the reins and committing the entirety of its (pitiful) budget to foreign aid effort. Nor is it a case of using its non-existent hard power to force its member states to save the children. Rather, the drafting of the goals was the issuing of a challenge to developed countries. A call to arms. When the committee sat down to write up the resolution they did not do so with the expectation that the Goals would be fully realized. When they were ratified in New York at the turn of the century it would probably be fair to suggest that the signatories expected certain levels of "non-completion" from the LDCs. Everyone involved in the process was more or less aware of this, and it is really important to see that there is so much more than the binary "success" or "fail" options at play.

Addressing the Concerns

By acknowledging that the United Nations' primary aim was to get the international community on board with a new aid initiative, it is understandable that the authors would choose to set goals which may appear to be hastily thought out. There was arguably no point in getting hung up on the specifics of each individual country, especially in a modern time, so rapidly evolving and changing. Had that been the case, critics would surely have pinpointed the countries that seemed less likely to reach goals and made the same arguments as they do today. More importantly, donor countries may have taken note of the seemingly easier countries and neglected the more challenging ones so as to achieve more "successes". The broad nature of the goals at least tempers this potential issue to a degree.

Because of this broadness, the goals have a habit of seeming a little arbitrary and chunky. This is not really a matter of dispute. Considering the above statements, one might point out that it would be a challenge to really make goals that really fit into any kind of

adequate equation or algorithm over such a broad spectrum of countries and issues. The Goals themselves are relatively simple, and in being so they are much easier to get a real grip upon and actively tackle. It is important to reiterate that the Goals are a challenge set forth to the world, not a scientific breakdown or analysis. There is no overt plan of attack or command structure, just goodwill. The closer analysis suggests that while the Goals may be arbitrarily outlined, they need not really be anything more.

The next major criticisms of the Goals argue that the specific numbers themselves are too difficult to achieve on a global level, especially in the least developed corners of the world. Because of the aforementioned broadness of the goals, it is claimed, the plausibility of LDCs keeping up is absurd. The result expected by these same critics is that the LDCs would be prone to marginalization and avoidance. This is an issue which risks being compounded by another aforementioned issue which is that donor countries may be more prone to invest in a country which it sees as having potential for "success". Unfortunately the binary nature of the MDGs does make this a possibility. Even more unfortunately, the critics are correct. While a high number of countries have seen high levels of "success" over a wide spectrum of goals, the LDCs of the world have seen far lower rates of realization. Those who see the MDGs as farcical use this fact as a major rallying point but, while technically correct, they are missing the whole point of the Goals.

As Easterly states, in order for Africa to meet many of these targets they would have had to have been "attained with progress that is nearly without historical precedent from other regions or in Africa itself" (*Easterly,* 2009). The point which the critics are missing is that the primary aim of the MDGs is the proliferation of aid to countries which need it, and the

realization of real development within said countries. "Success" and "Failure" may be important, but all they really are is semantics and ways for countries to pat themselves on the back. Real development and real aid is less focused on winning and losing and more focused on collective growth. By issuing the MDG challenge the UN has successfully inspired this mode of thought, and the LDCs have benefitted substantially from the millennium directives.

Monetization of Aid and the Definition of "Success"

To explain how LCDs have benefitted from the MDGs, it is of benefit to looks towards the monetary aspect of aid itself. Though money is not as important as proper planning and incentive, it is still important. The eighth Goal directly addresses this matter and is the only one which rests entirely with the developed world (see *Figure (App B)*). It has been shown in this paper that increased levels of donation lead to increased impact in the health field. Thus, it stands to reason that by encouraging aid, the eighth Goal has potential to create tremendous benefit.

Figure (App F) clearly shows that the world experienced a substantial change in its apportionment of aid in the year 2000, the same year that the MDG initiative was adopted. The graph is split on year, and the two halves couldn't be more different or tell a more positive story. The blue half, the decade before the initiative, shows deeply stagnated foreign aid numbers. Although certainly it is nice that donor countries were willing to give the equivalent value of roughly $3.68 per person each year to LCDs throughout the decade for health purposes, the number had clearly stagnated and was showing little sign of increasing or growing. This is despite economic growth of 27.6% in OECD member countries (*World Bank*).

Clearly foreign aid initiatives were languishing, but the year 2000, and the MDG initiative, appears to have been the kick in the buns that donor countries really needed in order to reignite their efforts. The decade after the signing saw substantial annual growth in foreign aid and, in real terms, by observing the trendline, the commitment from donor nations to LDCs can be seen to have gone up on average by more than 160% in the following decade (*Aid Data*). This is despite a crippling global recession and two major wars in the Middle East. From this data it is absolutely apparent that the LDCs have avoided marginalization and have received really substantial levels of attention from donor nations since the year 2000. Not only are their causes not so lost as they may occasionally appear, but donor countries have clearly stepped up to commit themselves to the challenge. Although monetization of the goals is certainly not the sole factor of concern, it should be apparent that the MDGs have at least inspired the revival of aid.

LCDs: On Route to "Failure"?

Obviously the fact that developed countries are willing to throw more money at LDCs is a guarantor of neither aid effectiveness nor success in the MDGs. It has already been shown that foreign aid can be (and is) effective in development, but it must also be shown that the recent funding increases are sufficient to attain the goals they have set out to complete. Bluntly put, they are not. Critics are absolutely correct in saying that many LDCs will not reach "success" status but, as has been stated a couple of times already, the amount of aid to be given would have to have been truly astronomical for countries to attain broad-based "success". Fact of the matter is that LDCs must dig their ways out of far deeper holes than their

more developed counterparts, and doing so takes far more time and money than the MDGs ultimately could have targeted.

However, after looking over the numbers, it seems incredibly unfair that the international community, and these LDCs, are being deemed failures for missing the mark. *Figure (App G)* shows that although they are not on track for "success", LCDs have made substantial progress towards the stated goals, and are not showing signs of slowing down. Statistics show that MDG #4 (Under Five Mortality) is 65.3% complete in LCDs, while MDG #5 (Maternal Mortality) is about 64.1% complete. If the trendlines are to be believed (as they should be, the R^2 value is very high) then by 2015, the proposed year of MDG finalization, the completion rate of each will be around 80% in Least Developed Countries. To some this may be pleasantly surprising, to others it may be underwhelming, but what it means, in actual numbers, is that since 1990 Least Developed Countries have managed to reduce average Under Five Mortality rates from 170.89 to 93.68 per thousand, and average maternal mortality rates from 954.65 to 483.44 per hundred-thousand births. Impressed or not by the semantics of a "success" or "failure", it is absolutely undeniable that LDCs have made major strides in development over this relatively short period of time. Each factor of concern has been reduced by more than half and this should be considered a win for global development. During the regression analysis it was theorized that foreign aid had been responsible for about 31% of Angola's health progress. This should certainly not be taken at face value, the model is admittedly quite rough, but if it is to be considered vaguely valid then foreign aid, and the MDGs, are responsible for the saving and improvement of many thousands, if not millions, of lives.

To avoid appearing either hypocritical or contradictory, it is important to step back and look at *Figure (App G)* from a slightly different angle. Despite the earlier proof that foreign aid is of significant benefit, there are those who might look at the same figures and point out that growth was happening in LDC problem areas before the MDG initiative even begun. Even the earlier analysis of the regressive models pointed out that foreign aid was likely responsible for a minority of actual lives saves. This is quite true. Developing countries, even the LDCs, are capable of advancing themselves to an extent, but it is important to realize how impactful a boost from the global community can be.

Obviously, Under Five Mortality cannot speak for the entirety of health development, but it serves as a good example. It would be entirely possible to show similar results for a majority of the goals, but the graph gets messy and the message becomes repetitive. *Figure (App H)* serves as an example of the difference that can be made with the addition of global cohesiveness on a matter. The decade before the initiative saw Least Developed Countries move towards MDG #4 completion at roughly 2.4% per year. This is fine and reasonable, but pales when compared with the rate of 4.2% every year after the MDG initiative began. These are statistics matched by an improved rate of public health foreign aid. In the 1990s health aid averaged roughly $2.9 per capita but grew substantially to almost $5 in the following decade (*Aid Data*). Had the LDCs been allowed to continue at the pace they had been stuck at, they would be expected to reach maybe 57.5% of the MDG target by 2015. Had the global community pitched in at MDG rates a decade prior, there is a good chance that the standard among LDCs would be the coveted "success" even before 2015.

Conclusion

Both regressive models clearly show a relationship between foreign development aid and health outcomes within a country. Although at first glance the relationships seem to be somewhat small, it is important to observe the bigger picture and recognize the true impact of aid. By analyzing the greater impact of a single donated dollar per capita within a developing country it soon becomes clear that thousands of lives are saved every year already by foreign aid efforts in the health field.

Additionally, by pinpointing the key differences between similar countries with sustained foreign aid efforts and those without, it has been shown that aid as a whole is more than capable of having a constructive impact on a recipient country. The case studies presented, for the most part, show a clear break between countries which have benefitted from considerable levels of aid, and those which have not.

By using this data it has also been shown that despite a number of complaints and accusations of bias, the LDCs saw a substantial increase in foreign aid after the Millennium Aid Goals were declared and adopted. As the LDCs saw an increase of foreign aid they are also shown to have started development at an increased pace and rate, once again lending a degree of credence to the notion that foreign aid has a positive impact developing countries.

Bearing these proofs in mind it is clearly a fallacy to suggest that the MDGs have been unsuccessful in these countries just because they did not meet the impossibly high statistics suggested for a broad spectrum of countries. Objectively and semantically, no, a majority of LDCs did not attain the sought after "success" that would have looked so impressive on their websites. But ultimately, it has to be assumed that no one in the global community, not even

Jeffrey Sachs, thought this would be the case. The sustained levels of growth required to meet said goals would have been the stuff of legend. It may be a subjective point of view, but it would fully appear that the LDCs have in fact made great strides for their peoples in the last couple of decades. Obviously there are still a number of exceptions, and obviously these countries are still fighting for stability every single day, but in LDCs since 1990, GDP and primary education rates have doubled, HDI has gone up by a third, and both Under Five and Maternal Mortality rates have effectively been halved. Each of these constitutes either a life changing or life making development for the countries in question and it is absurd that these countries would be dubbed "failures" as a grouping. Without foreign aid efforts none of these statistics would be anything like so impressive. When the global donor community reflects upon itself in 2015 it ought to be proud of its accomplishments and use the lessons it has learned to continue its crucial aid efforts.

Though it is not a new step, the next step in this process has to be an attempt to analyze aid efforts on a more individual and sectional basis, so as to identify areas of greatest success and areas which could use improvement. It is important that both donor countries and recipient countries are following the advice of the academic community and using their resources most effectively. The above study has demonstrated the values of both foreign aid and therefore the MDG initiative, but there is always room for both growth and refinement of application. Research along these lines would have to analyze the aid efforts of the last few years as well as those of the more distant past.

It would also be interesting to more closely assess the time lag between aid application and actual results. Although the regression study in this paper addressed averaged values at

five year intervals, it would be preferable to see where the true peak of aid effectiveness lies, and the breadth of the curve on either side of said peak. By doing so the value of that one dollar per person could be analyzed over multiple years, not just one.

Databases and tools have only become functionally complete within the past decade, and the MDGs have provided the global community with lots of new cases and data. For the most part this data has not been picked at yet, and it would be very interesting to start conducting new studies on more modern aid. In doing so it is more likely that academics can begin to prescribe even more effective methods for aid and development so the next major aid initiative can be even more powerful.

The Millennium Development initiative ends this year, 2015. Assuming the global consensus agrees with this finding, or at least those like it, there may be a new push for aid and development. It should come as little surprise that Dr. Sachs has foreseen this and is already seeking "a set of 10 concise Sustainable Development Goals to help guide the world during 2015-2030" (*Sachs*, 2014).

Figure (App A): LCDs as of 2014 (UNCTAD, 2014)
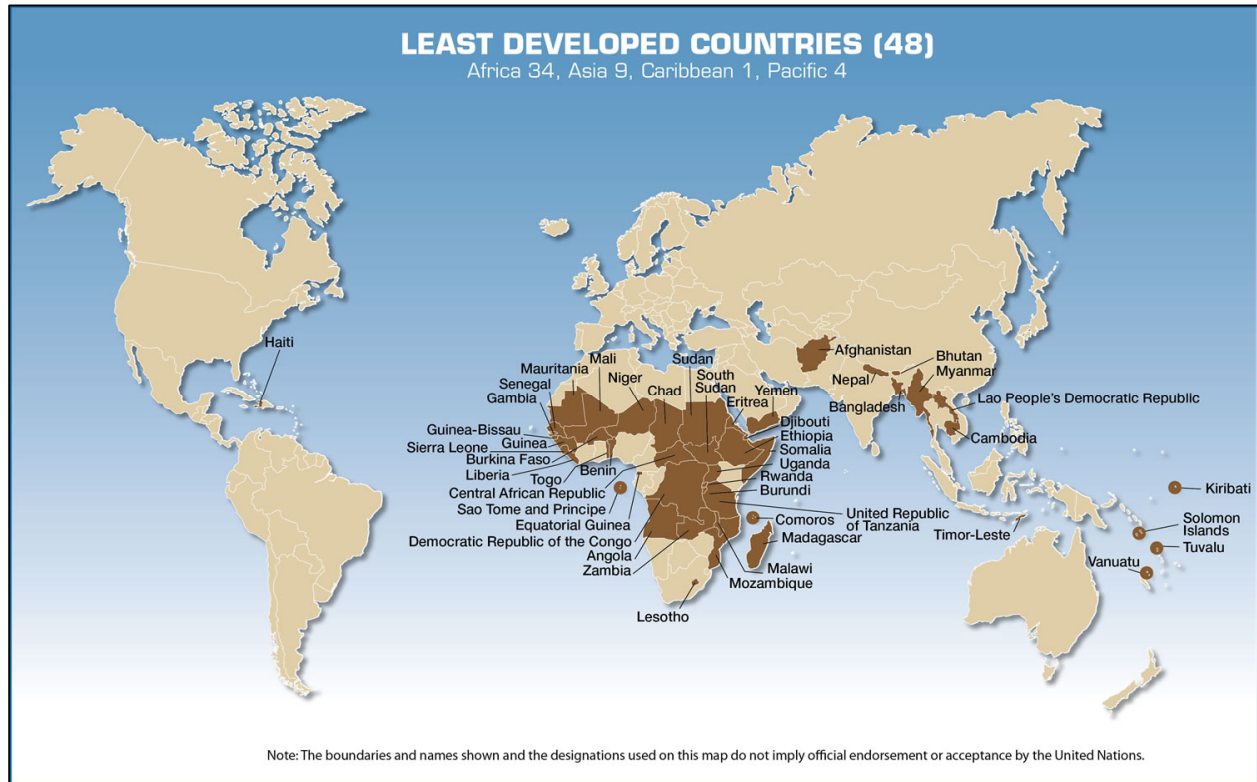
http://unctad.org/en/PublishingImages/LDC_map_1500x936.jpg

As shown by Figure (App A), some countries have actually graduated from the LDC label since 1990. These countries are Botswana, Cape Verde, The Maldives and Samoa. Neither The Maldives nor Samoa are included in this study for population purposes, but it might be noted that both Botswana and Cape Verde were among the top aid recipients between 1990 and 2010 (see Figure (App I) below).

Figure (App B): The Millennium Development Goals (UN, 2000)

1. Eradicate Extreme Poverty and Hunger
   A. Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day.
   B. Achieve full and productive employment and decent work for all, including women and young people.
   C. Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

2. Achieve universal primary education
    A. Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.
3. Promote gender equality and empower women
    A. Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015.
4. Reduce child mortality
    A. Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.
5. Improve maternal health
    A. Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio.
    B. Achieve, by 2015, universal access to reproductive health.
6. Combat HIV/AIDS, malaria and other diseases
    A. Have halted by 2015 and begun to reverse the spread of HIV/AIDS.
    B. Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it.
    C. Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.
7. Ensure environmental sustainability
    A. Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.
    B. Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.
    C. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.
    D. By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers.
8. Develop a global partnership for development
    A. Develop further an open, rule-based, predictable, non-discriminatory trading and financial system.
    B. Address the special needs of the least developed countries.
    C. Address the special needs of landlocked developing countries and small island developing States.
    D. Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term.

Figure (App C): Data Sets and Variables

- **The World Bank:** A majority of statistics used in this paper are taken from the data archives of this UN financial institution. Although it has a number of roles, its primary focus is on the development of impoverished states to which it provides loans and advisement. Its Open Data Initiative has made its data easily publically accessible and it is unquestionably the best source for annual indicators on a wide variety of topics.
  - ➢ **Under Five Mortality Rate:** The mortality rate of children under the age of five per 1000 live births.
  - ➢ **Maternal Mortality Rate:** The mortality rate of women who die in pregnancy or within 42 days of pregnancy termination per 100,000 live births. This is a modeled indicator using a World Bank regression model.
  - ➢ **Life Expectancy:** The number of years a newborn is expected to live if prevailing patterns of mortality persist throughout the newborn's life.
  - ➢ **Primary Completion Rate:** The measurement of age appropriate students who complete the last grade of primary school divided by the total students of appropriate graduation age.
  - ➢ **Population:** The number of people within a country.
  - ➢ **Population Density:** The average number of people living on each square kilometer of land in a country.
- **Millennium Development Goals Indicators:** The primary data used by the MDG initiative and UN to gauge success in the Goals. Lists all eight areas of focus and the many indicators attached to them on a country by country basis.
  - ➢ **HIV Incidence:** The number of new HIV infections in a population during a certain year expressed as a percentage of the adult population.
- **United Nations Statistical Division:** The parent organization of the MDG Indicator data group, the UN Statistical Division is a data collection group with various departments focusing on a wide array of data acquisition.
  - ➢ **GDP per Capita:** A standard GDP per capita measure in US dollars. Preference is shown to the UNSD dataset rather than the World Bank for reasons of data completeness. The data which exists in both is reasonably similar.
- **United Nations Human Development Program:** Another parent of the Millennium Development Goals, the UNDP acts as an advocate for development. It provides training, advice, and monetary support to developing countries.
  - ➢ **HDI:** The Human Development index provides a numerical value to rank countries into development tiers and assess quality of life. To ascertain the statistic it chiefly takes into account life expectancy, education, and income.

- **Polity IV Project Score:** Numbers from this extensive database go as far back as the year 1800 in some instances and grade the quality of democracy within a country in terms of competitiveness and openness. A score of 10 indicates a near perfect democracy, while a -10 indicates the opposite.
- **Aid Data:** A massive undertaking which seeks to catalog every instance of foreign aid over the past 100 years. It separates each instance into a certain category (such as health or education or transport). This study utilized the millions of data points in such a way which combined the individual points into groupings by year, country and category. By correctly filtering a pivot table in Microsoft Excel the groupings emerge and can be broken down. The data is then divided by the population of each relevant country in each relevant year to ascertain aid per category per person.

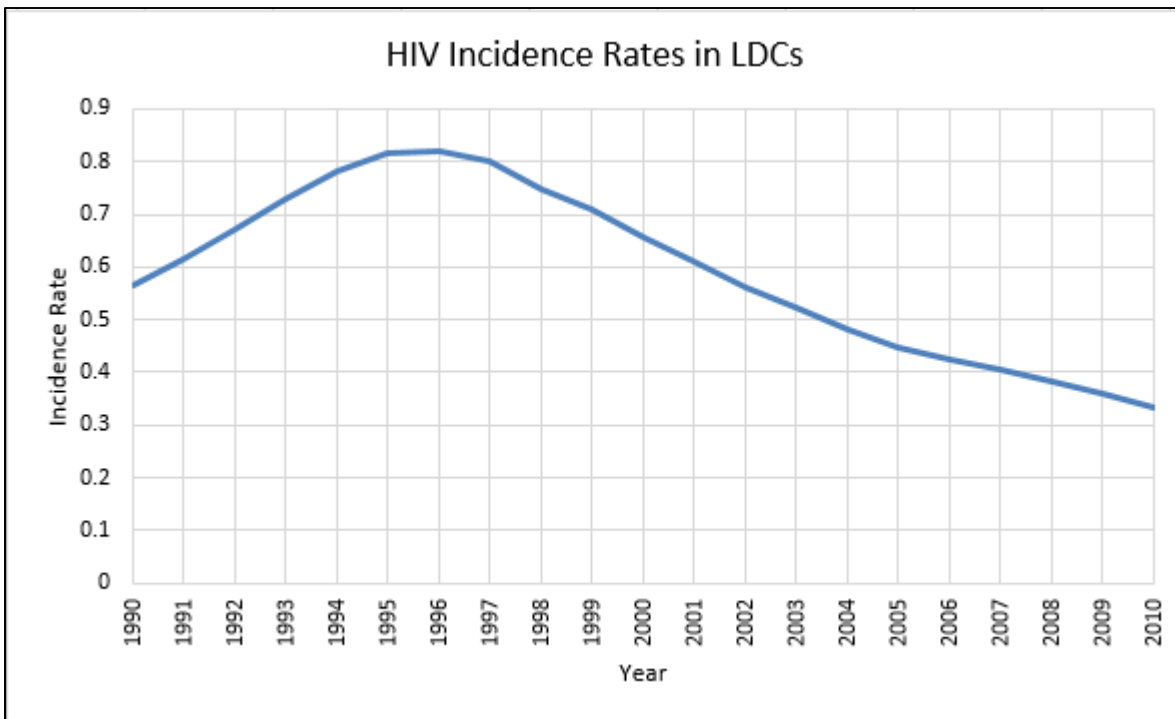*Figure (App D): HIV Incidence in LDCs*

Figure (App D) shows the incidence rates of HIV in least developed countries between the years 1990 and 2010. The peak of this graph is clearly before the year 2000, the year of the MDG initiative. This in mind, and bearing in mind the additional fact that aid has a delayed impact, it might be assumed that countries began to strongly reform in this particular area before the major international push.

Figure (App E): Data Regression with Dummy Variables

```
Linear regression                                      Number of obs =      163
                                                       F(  5,    42) =        .
                                                       Prob > F      =        .
                                                       R-squared     =   0.9254
                                                       Root MSE      =   17.013

                                          (Std. Err. adjusted for 43 clusters in country)

                                 Robust
   u5mortalityaverage |    Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]

       healthaidaverage |   .5985791   .3539468    1.69   0.098    -.1157144    1.312873
           polityaverage |  -.3561819   .7861059   -0.45   0.653   -1.942608    1.230244
      primaryeducationavg |  -.0357282    .145285   -0.25   0.807    -.3289251    .2574687
                gdppcavg |  -.0073647   .0075115   -0.98   0.332    -.0225234     .007794
              landlocked |   14.92391     80.425    0.19   0.854    -147.3803    177.2281
    populationdensityavg |  -.0439487   .0773343   -0.57   0.573    -.2000157    .1121182
                   con1 |  -21.69406   11.35519   -1.91   0.063    -44.60976    1.221636
                   con2 |   68.55559   81.93593    0.84   0.407    -96.79781     233.909
```

Figure (App E) shows the Under Five Mortality Rate regression table with the inclusion of country based dummy variables (42 in total) rather than the African regional control. The model has less statistical significance, but does not support the hypothesis.

Figure (App F): The Evolution of Aid Giving between 1990 and 2010

LCD Health Aid Granted per Capita per Year

$y = 0.7707x - 2.8192$

$y = 0.1764x + 2.6214$

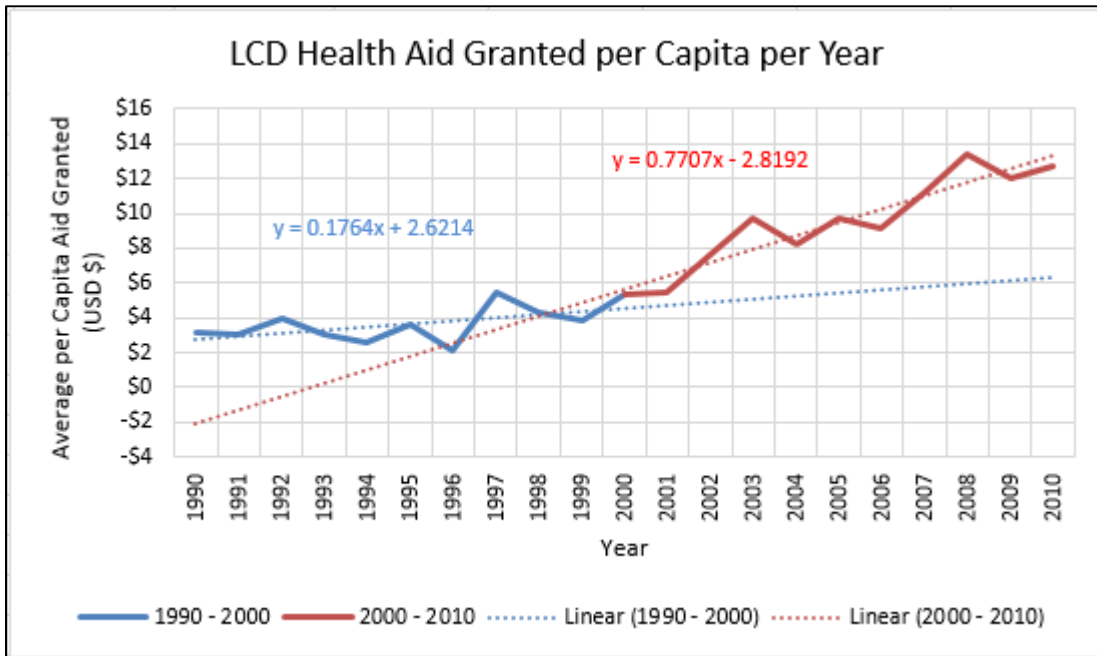Legend: 1990 - 2000 — 2000 - 2010 ········ Linear (1990 - 2000) ········ Linear (2000 - 2010)

  Figure (App F) shows the amount of total health aid given, on average, per capita each year between 1990 and 2010 to Least Developed Countries. The blue portion of the graph signifies the first 10 years and the red shows the last 10 years. The trendlines are indicative of the same groupings. The dotted blue line shows the predicted aid if the world were to maintain 1990 – 2000 levels of growth and maintenance. The red trendline shows the growth since the year 2000, the start of the MDG initiative.

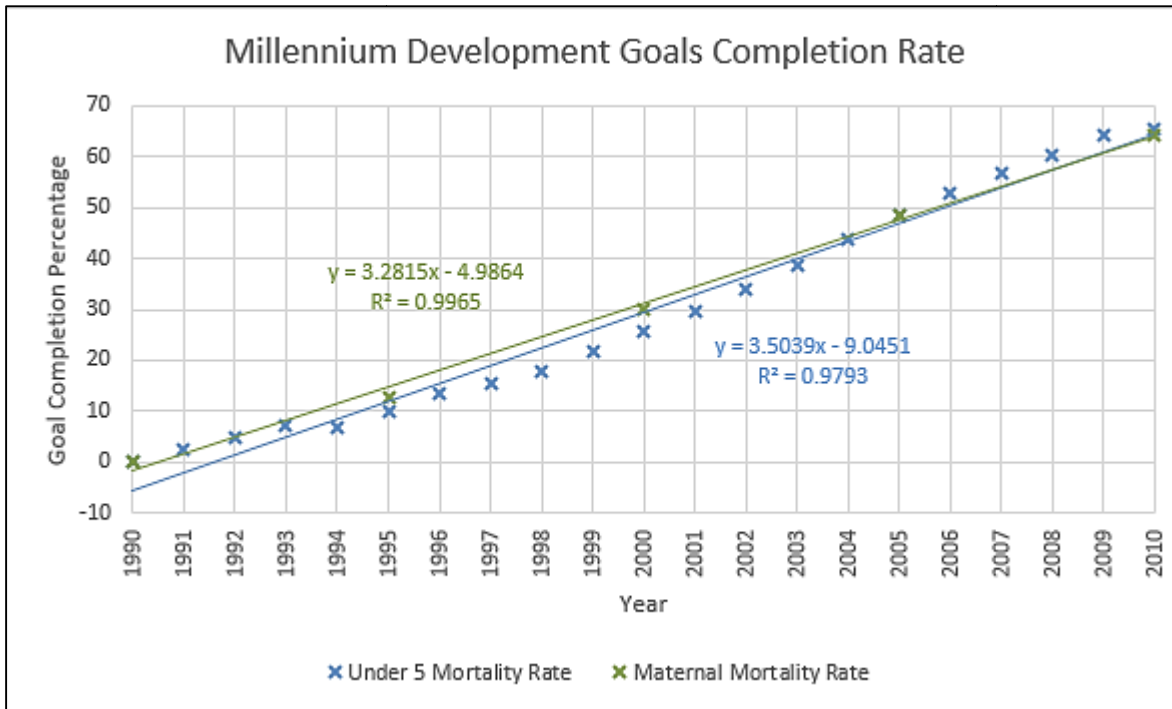**Figure (App G): Progress of the MDGs in LCDs**

Figure (App G) shows the progress of both Under Five and Maternal Mortality rates in Least Developed Countries since 1990. These are key tenets of MDGs #4 and #5 respectively.

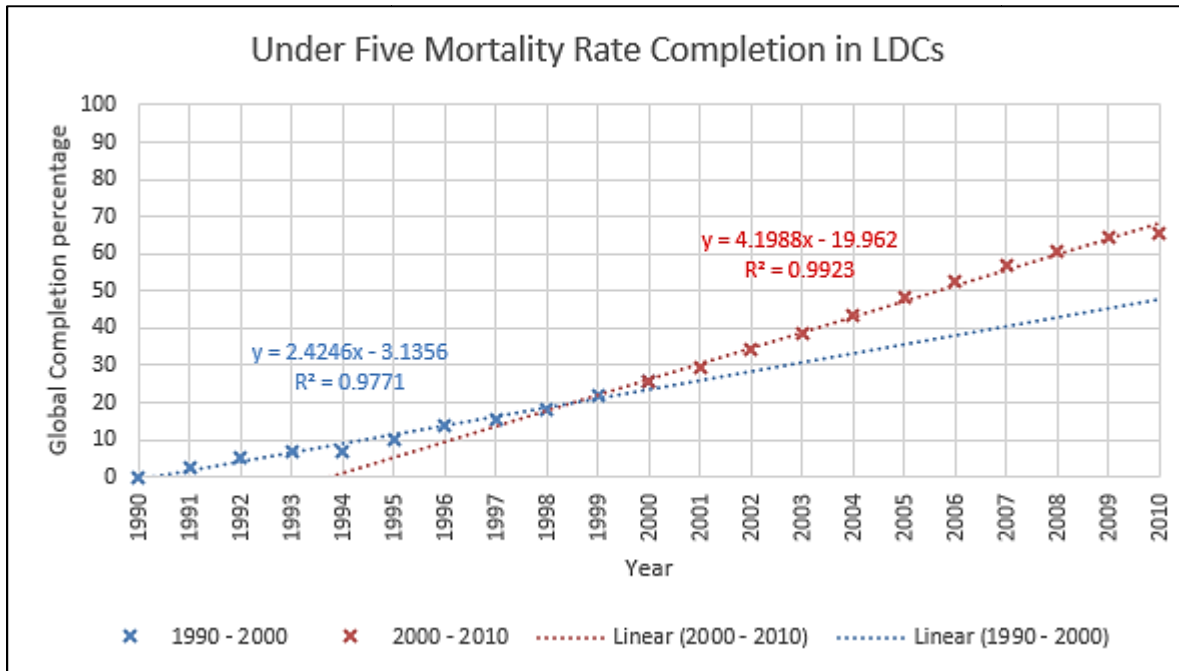**Figure (App H): The Effect of MDG Implementation on LDCs**

Figure (App H) shows the change of progress made by LDCs on the matter of Under Five Mortality in the year 2000, the year of MDG signing. It compares the completion rates in the decade before the declaration (1990 – 2000) and the completion rates in the decade after (2000 – 2010).

Figure (App I): Aid Distribution to LDCs between 1990 and 2010
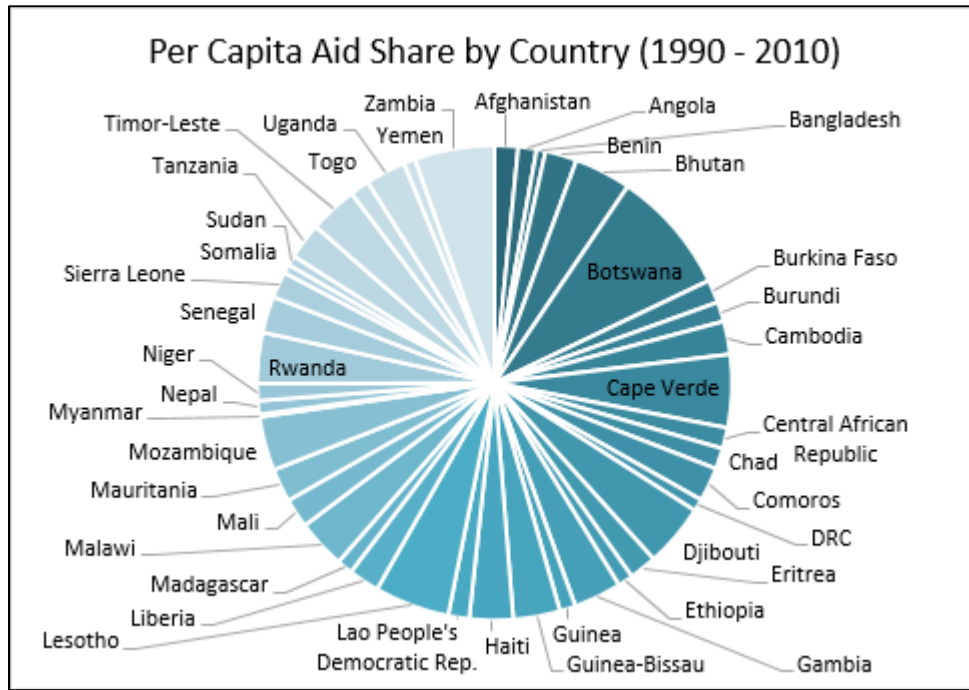

Per Capita Aid Share by Country (1990 - 2010)

Figure (App I), though not strictly mentioned in the paper, shows the distribution of health aid to Least Developed Countries in the 20 year period this study primarily focuses upon. For context, the average was about $6.6 per year, the largest benefactor was Botswana with $24 per year, and the smallest benefactor of foreign aid was Myanmar with just $.5 per year.

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