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**The Effect of Doctors without Borders on Low- and Middle-Income Countries
in Sub-Saharan Africa**

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in
Economics and Finance Department

By

Nathan Hayenga

Under the mentorship of Dr. Bill Yang

Abstract

This research studies the relationship between the activity of medical disaster-response humanitarian aid and the rate of growth in developing economies. Data of total annual GDP and Doctors without Borders (MSF) activity in 23 countries was analyzed over the years 2000-2014 with correlation and regression analysis. Under this analysis results are inconclusive, with a correlation of zero between MSF activity's within a country and change in that country's rate of GDP growth. A conclusive response was found on the comparison between GDP growth in countries MSF was active in compared to countries with no MSF activity, showing that countries in which MSF was active in had a lower average GDP growth rate. This shows that the situations which MSF involves itself with are disasters with effects on national GDP greater than the effect of the aid provided by MSF.

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Introduction

Doctors Without Borders is a international organization that has been devoted to humanitarian aid since its creation in 1971. The organizations official name is Medecines Sans Frontiers (MSF), but it is known by a localized name around the world, or by the acronym MSF. In 2015 MSF was active providing aid in over 60 countries, with over 36,000 active volunteers, primarily made up of medical professionals, structural and civil engineers, and administrators. The non-profit classified organization is based out of Geneva, Switzerland and has a budget of over \$700 million coming mainly from private and corporate donors.

The organization provides multiple forms of humanitarian aid, ranging from relief from human conflict zones such as Kosovo and Chechnya, and the genocides in Rwanda, to providing clean water and basic healthcare, medical training in developing areas, and epidemic and disease control in areas such as sub-Saharan Africa, Democratic Republic of Congo, Mozambique, Zimbabwe, etc.(Doctors Without Borders, 2016)

MSF is currently working against infectious diseases like Ebola, Cholera, Meningitis, HIV/AIDS, including lesser known diseases such as Chagas, which infects over six million people a year and kills over one hundred thousand. Aid is also rendered for parasitic diseases such as Malaria and Kala Azar. (Doctors Without Borders, 2016) In October of 2014 MSF had created six long term treatment centers for cases of Ebola alone, which they staffed with over six thousand volunteers.

Throughout its history MSF has claimed to be a de-territorialized organization, ignoring “states” under the core tenet of “neutrality”, allowing them to work across

national boundaries. MSF utilizes concept called “Medical Triage” claiming to create de-territorialized areas, which is in effect a form of re-territorialization into a traceable striated space (Debrix, 1998). This striated space overlaps with separated states, and is more closely aligned with the smooth spaces associated with different cultural and ethnic groups, groups that would otherwise be divided within different national borders.

MSF also provides services in basic health education, a service often provided by humanitarian-aid groups. However, while other groups have suffered controversies, such as the Catholic Churches response to preventing HIV/AIDS (Alsan, 2006B), MSF health education is considered the best as it is totally impartial. Studies have shown that women with higher levels of education can be up to 90% less likely to engage in behaviors favorable to the transmission of disease (Alsan, 2013).

A states level of economic development is dependent on two things, economic factors and non-economic factors. Economic factors include natural resources, capital accumulation, and a marketable surplus of agriculture (Chand, 2013). Non-economic factors however, include political freedom, social organization, and human resources (Chand, 2013). Human resources are factors made up of the level of education of the population, the degree of worker skill, and the health and lifespan of the region (Alsan, 2006A).

Africa is a region where the majority of economic factors are stable throughout the continent, but the non-economic factors, such as worker health and lifespan vary significantly. This in turn makes the continent an excellent candidate to showcase the

effect of medical care and general health on a nation's economy, the factors which are impacted directly by humanitarian-aid organizations such as MSF.

Literary Review

The effects of population health on economic growth and development has never been analyzed to show its effects on GDP. However, in a 2006 study by Alsan the effect of a population's health was analyzed in relation to Foreign Direct Investment, specifically in low and middle income countries in Africa.

Alsan's work theorized that "high rates of absenteeism or worker turnover due to morbidity and mortality can raise production costs and deter FDI" (Alsan, 2006A), with a further emphasis on the effects of infectious disease on FDI. The resulting study observed changes in FDI and life expectancy for seventy-four countries from 1980 through 2000, showing a relationship between the two where a one year life expectancy increases FDI inflows by just under ten percent (Alsan, 2006A).

The increases in FDI are best explained by the fact that healthy workers are simply able to be more productive, and that extremely unhealthy workers are unable to produce at standard levels. This study also showed that "poor health can lead to low wages, which in turn keeps health and nutrition levels low, thereby creating a poverty trap" (Alsan, 615). Meanwhile children in healthier countries show better concentration and higher academic standards, allowing them to build more human capital and become higher income adults (Bhargava, 2001B). Beyond that fact, better general health and health standards in a county also allow workers to have a much lower absentee rate, granting them much more work experience for the same given time period of a worker

with much higher absentee rates, showing the exact opposite of the aforementioned “poverty trap”.

Data and Methodology

The theorized relationship and basis of this paper is that an increase in Medicines Sans Frontiers expenditure in a country will increase the countries yearly rate of GDP growth. This relationship would show the overall relationship between humanitarian aid expenditures and the increased productivity of a country, showing the benefits of this aid in the context of a world economy as an investment for high-income countries, such as the United Kingdom, the United States, and other high-income countries dependent on international trade.

Sub-Saharan Africa has been a recipient of global welfare since the end of its colonial period and is a region where MSF has been active since its inception. For any given year MSF is active in up to twenty countries in Africa alone, which encompasses all of the forms of humanitarian aid that MSF provides. This study focuses on the level of MSF involvement in Burundi, Cameroon, Chad, Ethiopia, Guinea, Kenya, Liberia, Lesotho, Madagascar, Mali, Mauritania, Mozambique, Niger, Nigeria, Sudan, Swaziland, Uganda, Zambia and Zimbabwe. These nation’s wealth and style of economy ranging from service to agrarian to manufacturing showing the general effects of MSF without limiting it to a single type of situation. The countries Benin, Botswana, and Tanzania are used as a control group due to the total absence of MSF in these countries over the 14 year time period. The control group is spatially diverse to account for the large size and

variety of countries contained in Africa and better reflect average economic growth of the continent without MSF interference.

Data for GDP and average lifespan is from the World Banks data sets. Data for MSF expenditure is gathered from the Doctors without Borders annual US non-profit filings, and as such was only available from the year 2000 until 2014, limiting the range of the study.

Variable Explanation

MSF Expenditures is the dollar amount Doctors without Borders spent in any given region for a year, and is adjusted for inflation using 2005 as a base year.

Within our model it is used as the independent variable and the “investment” put into the resident economies healthcare. For the application of the comparison MSF Expenditures will be as a percentage of the total GDP of the countries in question.

Gross Domestic Product is the GDP of the countries for any given year adjusted for inflation to a base year of 2005 as per the World Bank. GDP is treated as the dependent variable for the purpose of the study to show a reflection on economic development after the influx of medical humanitarian aid from MSF.

The assumption is that a country’s GDP, and therefore its productivity, is a reflection on economic and non-economic factors, and that these non-economic factors are represented as labor. To test this hypothesis we used the Cobb-Douglas Production Function:

$$Y = AL^{\beta}K^{\alpha}$$

The Cobb-Douglas function is a way to measure output as Y, while L is labor, and K is capital. Labor is the total number of work hours logged in a year, by the entirety of a country's population, while capital is the total real value of all the machinery, equipment, buildings, etc. at work in the country. With regards to MSF this does not adequately explain the relationship between the country's population's health and its output, so we added H as the measure of a population's health. This variable is what is impacted by MSF's activities, and provides a new equation of:

$$Y = AL^{\beta}K^{\alpha}H^{1-\alpha-\beta}$$

For the purposes of the test Y is the dependent variable, representing the tested country's yearly GDP, while H is the independent variable and is a measure of health dependent on the amount of activity provided by MSF in a year.

To test for a relationship between the independent and dependent variable we conduct a correlation analysis, using a Pearson product-moment correlation coefficient to test for the relationship between H (health) and Y (gross domestic product), with P as correlation coefficient, and Cov as the covariance:

$$P_{YH} = \frac{Cov(H_1, H_n)}{Y_1, Y_n}$$

Following the establishment of some level of correlation a linear regression is used to test the predictability of the expected increase in the rate of growth of GDP, dependent on MSF expenditure as a percentage of GDP. For testing growth rate we use a

simple linear regression equation where R_{HY} is the slope of the regression line showing the relationship between H (health) and Y (gross domestic product):

$$R_{HY} = \frac{\overline{HY} - \bar{H}\bar{Y}}{\sqrt{(\overline{H^2} - \bar{H}^2)(\overline{Y^2} - \bar{Y}^2)}}$$

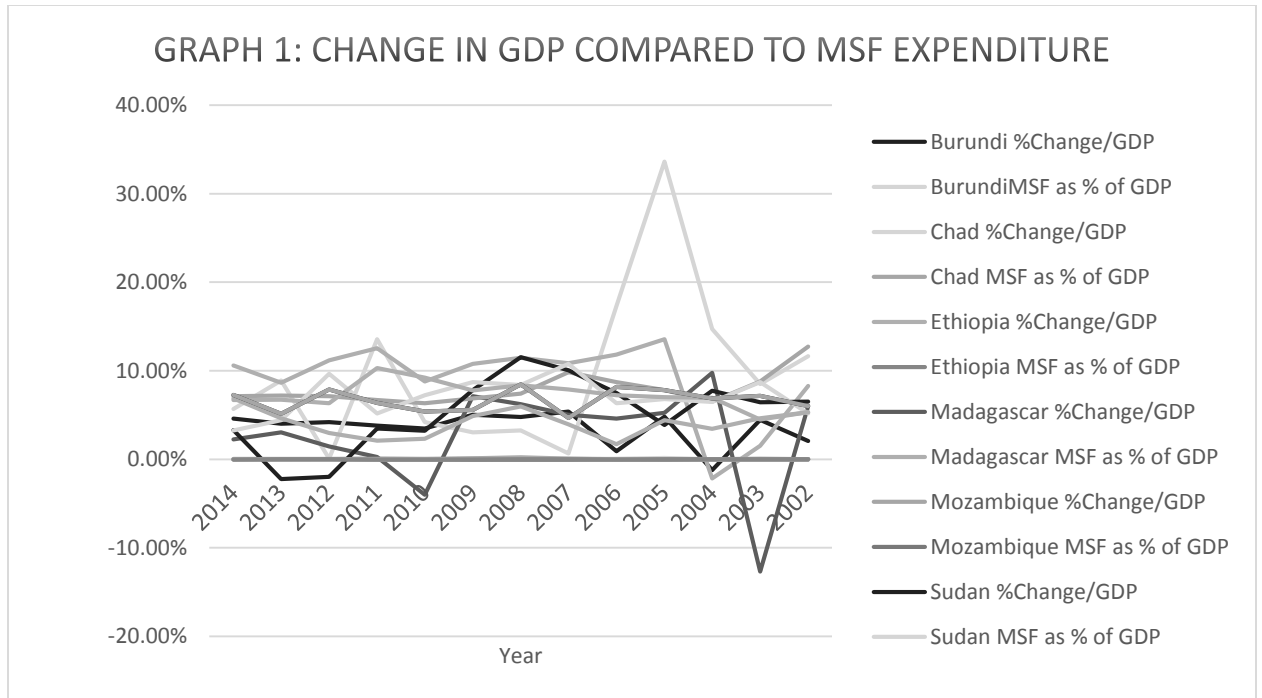
Results

Table one shows the correlations for each country in the series, as well as the average correlation across the series of countries.

Table One: Results for African Test Group

Country	Correlation	Country	Correlation
Burundi	0.001200	Mauritania	-
Cameroon	-	Mozambique	0.000012
Chad	-	Niger	0.000064
Ethiopia	0.000215	Nigeria	-
Guinea	0.000121	Sudan	0.000109
Kenya	0.000113	Swaziland	-
Liberia	0.000586	Uganda	0.000271
Lesotho	-	Zambia	0.000178
Madagascar	0.000100	Zimbabwe	-
Mali	-	Average	0.000156

The total correlation for the test group is .000156, which is the equivalent of no correlation. According to the study there is no direct relationship between MSF's activity and expenditure within a country and the change in that country's GDP growth rate. This is made apparent in Graph 1, which shows the lack of cohesiveness between the dependent and independent variables.



The only conclusive data from the study that the average growth in nations where MSF operates is lower than the average growth in economies where MSF is not present. This shows that the types of events which draw the attention of MSF also have secondary effects harming the local economies.

Conclusion

By attempting to show the beneficial relationship between GDP growth rate and MSF's expenditure in a country we show that there is no relationship at all. This is likely caused by the fact that MSF is primarily a disaster recovery humanitarian-aid organization, and that the events that would cause the organization to get involved are the type that wreak havoc on local economies. (Events such as earth quakes, localized conflicts and human-rights abuses, and outbreaks of infectious diseases). These types of events affect far more than just the H of the models, they also affect the L and K of the

models, making any correlation from an isolated factor of economic development impossible.

A better source of medical humanitarian aid would be any organizations that are less disaster-relief centered, and have a more long term focused. Organizations that would likely exhibit the same limitations for measuring like MSF would be FEMA, Children's Disaster Service, and the American Red Cross. Whereas more applicable health centric organizations would be those with a much longer duration of activity, those with a more preventative medicine focus such as the Bill and Melinda Gates Foundation, and Unicef, or charities focused on medical research, like Medical Research Charities.

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