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Does Globalization Improve Quality of Life?

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"Globalization means we have to re-examine some of our ideas,

And look at ideas from other countries,

From other cultures, and open ourselves to them.

And that's not comfortable for the average person."

Herbie Hancock

American Composer

"Globalization means that the rich and powerful now have new means

To further enrich and empower themselves at the cost of the poorer and weaker,

We have a responsibility to protest in the name of universal freedom."

Nelson Mandela

President of South Africa, Nobel Prize Winner

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Introduction

We have seen the world become a more interconnected place with the rise of technology and international trade. Research is still undecided about what effects it will have on a country's culture and way of life when that countries' trade is more open to the outside world. Various organizations and researchers have used a calculated "openness" level of a country's trade and output to determine the influence of trade on that country's economy.

But there are more pressing problems facing our world than just economic "openness." For example, approximately 3.1 million children die from hunger each year (WorldHunger.org). In a world where many policy makers are worried about the expansion of free trade and cheaper foreign labor, I am not certain how a country's strivings to reach this goal of more "open" economy will or will not give their citizens a better quality of life. I will attempt to gain insight into that question using the United Nation's millennium development goals.

The United Nations has created 8 Millennium Develpment Goals, which it hopes will drive their efforts toward a better world for those in poverty and suffering. These goals include:

1) Eradicate Extreme Poverty and Hunger
2) Achieve Universal Primary Education
3) Promote Gender Equality and Empower Women
4) Reduce Child Mortality
5) Improve Maternal Health
6) Combat HIV/AIDS and Malaria
7) Ensure Environmental Sustainability
8) Global Partnership for Development.

The outcome of these goals shows us a glimpse into the lives of people in that country. For example, in countries with low levels of child mortality and high levels of gender equality, we would expect people to be wealthier and healthier, thus contributing to a more productive economy.

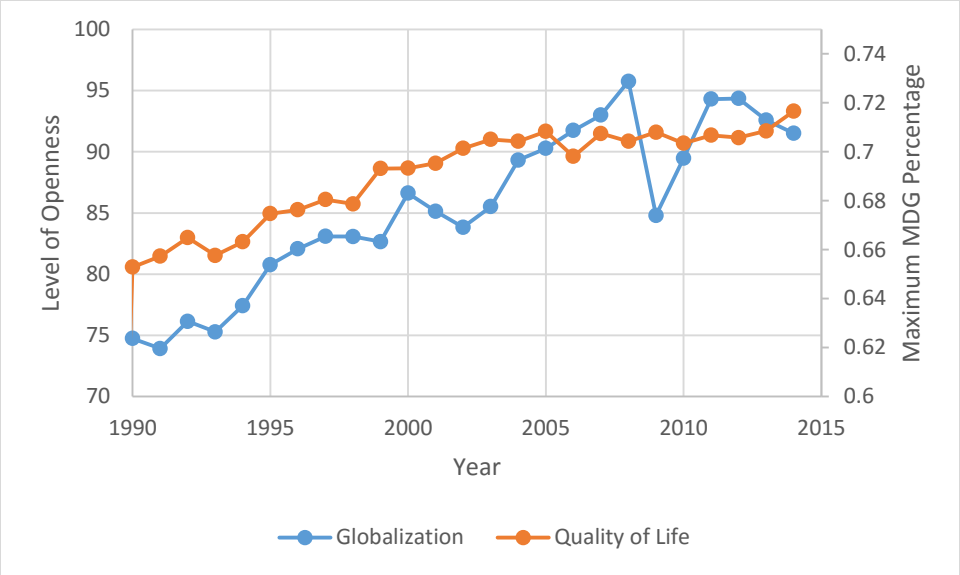

Figure 1. Graph of Quality of Life and Globalization from 1990 to 2014

Figure 1 depicts that as globalization, openness, increases, I saw an increase in quality of life as well. This graph is a depiction of what is perceived by many to be true of globalization: that as our world becomes more globalized, I should likewise expect to see quality of life increase.

But when I look at the data, how do these goals measure up with openness? In countries with what I consider "great" levels of each of the goals, will I see an equally high level of openness? To determine this relationship, I must see how well each of the goals in a particular country would do at predicting their specific openness level.

Data Collection

To collect my data, I first found the level of "openness" a country has by calculating their exports plus imports over their GDP. This means that I will be judging countries solely using the ratio of what they are trading with others over their total production. I pulled the imports and exports as percent of GDP from the World Bank's World Development Indices database and summed the two indicators.

For my independent variables, I used each one of the UN's millennium goals as a starting point for one variable and pulled all my data from The World Bank's World Development Indices. For the goal related to extreme poverty and hunger, I have taken the people practicing open defecation as a percent of the population. The next goal is to achieve universal primary education, and for this I have collected the reported primary completion rate as a percentage of the relevant group. It is worth noting that this can be reported over 100 percent because of over-aged and under-aged students. Next for the gender equality goal, I have gathered the percentage of labor force made up of females. For the goal of reducing child mortality, I took the mortality rate for children under age 5 per 1,000 live births. For the goal of improving maternal health, I have compiled the maternal mortality ratio. For the goal of combatting HIV and malaria, I assembled health expenditure as a percentage of total GDP. I have chosen not to include the goal of environmental sustainability for two reasons. First it is too difficult to quantify. More importantly, the other 7 goals have a focus on betterment of people but the environmental sustainability of countries is less directly affecting individuals' well-being. For the goal of global partnership for development, I retrieved the average interest on new external debt commitments. The World Bank provided this as a good indicator of how that country is working with other countries to ensure mutually beneficial debt commitments and to reduce international debt commitments overall.

For the controls for my analysis, I have also pulled from the World Bank's Economic Indicators. I pulled internet users per 100 people, inflation, population, population growth, pupil to teacher ratio for upper secondary education, GDP, lower secondary completion rate as a percentage of the relevant group, government consumption expenditure, foreign direct investment as percentage of GDP, life expectancy at birth in years, political stability, region, CO2 emissions in metric tons per capita, and net official development assistance and aid

received. These controls allow me to tease out the effects of other factors in my model and just evaluate openness and my quality of life statistic.

Economic Model

To begin creating my economic model, I looked at two studies related to the concept of economic "openness." The first was a study of the relationship between openness and economic growth, and used a log form of exports and imports, along with foreign direct investment, to denote what they defined as openness (Muhammad, 2012). They used the log form to find significance using their definition of openness, thus I will use a log form as well. The second was a study testing the relationship between energy consumption and trade openness, which they defined as the sum of exports and imports over population (Nasreen, 2014). I chose to use the summation over GDP instead because I am not trying to measure relative to population, but relative to economic output of each country's economy.

The MDGMAX is a calculated column of the maximum percentage, in comparison to other countries, of seven of the Millennium Development Goals. This then would represent the best that country is doing on any of the Millennium Development Goals.

Average interest on new external debt commitments is not difficult to connect to trade levels. I would theorize that as the interest of potential debt commitments goes down I would be more likely to take on more debt as a business or country. Aseidu studied the relationship between openness and foreign direct investment, detailing a clear relationship between the two (Aseidu, 2004). Aseidu suggested that countries where we see better interest rates also tended to have the lowest tariffs, best infrastructure, and better investment climate overall. Thus, I should expect to see a negative association between interest and openness level.

With regard to the primary completion rate, a study found that public expenditures per student, something my completion rate would be a similar indicator to, was statistically significantly associated with increases in the summation of imports and exports over GDP, the same metric I used (Keller, 2008). Keller also stated that education indirectly affects success on other millennium development goals and "promotes openness".

Where poverty is concerned, a study used the World Bank's percent of people living below a poverty line and used the summation of imports and exports over GDP, concluding that openness "might be associated" with poverty levels, hence I expect that I will see a minimal association if at all (Figini, 2006).

I believe that women in the labor force might not be associated with openness, because these were the findings of a study that used the same female labor force percentage and log of my openness calculation (Gray, 2006). That said, their model used fewer years and countries than I have gathered for this analysis. Gray notes that there was a 0.6 percent increase in women in the labor force for every one percent increase in female population and that female illiteracy might play a larger factor in this statistic, which then makes the data less associated with gender equality because those with more skill will likely get more jobs. Another study also using log of the sum of imports and exports over GDP showed an association between "openness" and gender equality in the work force (Meyer, 2005).

A study related to the goal of decreasing infant mortality showed an association between higher export commodity concentration and higher infant mortality, which means I can expect as the level of "openness" increases that infant mortality will decrease (Jorgenson, 2004). I also learned from Jorgenson that education was their strongest negative association to infant mortality. While there are few reputable studies looking at the connection between maternal mortality rate and openness specifically, Jorgenson also notes that maternal and infant mortality results worked in tandem in his data set. I can expect these two factors to be connected in my data as well, perhaps to the point of having a multicollinearity issue.

A report looking at the association of HIV with economic growth and trade noted the relationship of HIV to the economy was complex because HIV decreases economic growth but that economic development may increase or decrease HIV at the same time (Bonnel, 2000). Bonnel used an OLS regression to identify a statistically significant relationship between GDP growth and many variables including HIV prevalence, but few studies have successfully examined just HIV and any measure of GDP or economic growth because of this complex relationship. I expect to see this same complexity in my data because Bonnel proposes the connection may be both a cause and effect of economic trade and growth.

For my analysis, I added several control variables that I felt were important to include in my model. The first is a set of region fixed effects, which is coded to be one of the following country regions: 1) Asia 2) Central America/Caribbean 3) North America 4) South America 5) Europe 6) Oceania 7) Africa 8) Middle East. Just as Barro's study of economic growth, I used Asia as my first region in the model (Barro, 1991). Following in Barro's example I controlled for

secondary education completion rate, population, population growth, literacy rate, student-teacher ratio, GDP, consumption expenditure by the government, and political stability. Yet another reason to include political stability in my model comes from Alberto Alesina who wrote that political instability statistically significantly reduced economic growth. (Alesina, 1996) Alesina also controlled for education level and region as I did. Barro wrote in another paper about inflation and economic growth that, "although the adverse influence of inflation on growth looks small, the long-term effects on standards of living are substantial." (Barro, 1995) Because of this quote and his research into real GDP in relation to inflation, I chose to include inflation in my model as an additional control variable. Though there are other models that build controls related to economic growth and openness, Barro set the model most researchers were citing and following thus I trust the use of the controls I have decided to use based off of his papers and the work of Alesina.

I decided to run my model for a sample including every country, Asian countries, and African countries respectively. The whole world is to ensure I am using the most data available to me and to be able to apply my conclusions worldwide. Running the same model with only Asia and Africa will allow me to see if only looking at the difference in effects in Asia or Africa specifically. I decided to use Asia and Africa because they had the most observations and were the most interesting to me to study in contrast with each other considering they are two of the most donated-to regions and two regions dealing with a lot of changes due to globalization. Just running a fixed effects model is different than running Asia and Africa separately because by running them separately I am evaluating the difference in each effect individually in Asia in comparison to Africa.

Beyond just running these three regressions, I also decided to explore the minimum MDG for all the data I had. This yielded a regression with 438 observations and one that tells a story of the worst a country is doing on any MDG instead of best, and gleans some interesting conclusions.

Data Dictionary

Data Name	Data Definition
COUNTRYNAME	Country Name
YR	Year
REG	Region (1-8)
REG1	Asia
REG2	Central America/Caribbean
REG3	North America
REG4	South America
REG5	Europe
REG6	Oceania
REG7	Africa
REG8	Middle East
EXPORT	Exports as percentage of GDP
IMPORT	Imports as percentage of GDP
OPENREG	Openness
LOGOPEN	Log of Openness
CODE	Country Code
NET	Internet users per 100
MG1	People practicing open defecation as % of population
MG2	Reported primary completion rate
MG3	Percentage of labor force made up of females
MG4	Mortality rate for children under age 5 per 1,000
MG5	Maternal mortality ratio per 100,000 live births
MG6	Health expenditure, total as % of GDP
MG8	Average interest on new external debt commitments
MDGMAX	Maximum percentage (compared to other countries) of all of the MDGs
MDGMIN	Minimum percentage (compared to other countries) of all of the MDGs
MDGAVG	Average percentage (compared to other countries) of all of the MDGs
INFL	Inflation (annual %)
POP	Population Total
POPGR	Population Growth (annual %)
EDU	Pupil-Teacher Ratio, Upper Secondary Schools
GDP	GDP
SECEDU	Secondary completion rate (% of age group)
AID	Development assistance and official aid received
EXP	Life expectancy at birth in years
CO2	CO2 emissions in metric tons per capita
FDI	Foreign Direct Investment, net inflows
CONS	Government Consumption Expenditure (% of GDP)
STAB	Political Stability/Absence of Violence Percentile Rank by WGI

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
YR	9,997	1990.998	14.1437	1967	2015
COUNTRYNAME	0				
CODE	0				
STAB	3,344	48.42994	29.03749	0	100
REG	9,997	4.70121	2.344024	1	8
REG1	1,617	1	0	1	1
REG2	1,225	1	0	1	1
REG3	196	1	0	1	1
REG4	588	1	0	1	1
REG5	2,254	1	0	1	1
REG6	784	1	0	1	1
REG7	2,647	1	0	1	1
REG8	686	1	0	1	1
EXPORT	7,390	36.5477	25.46817	.0053768	230.269
IMPORT	7,390	42.91124	27.75152	.0156225	424.8172
OPENREG	7,390	79.45894	49.36098	.0209992	531.7374
LOGOPEN	7,390	1.823779	.2819697	-1.677797	2.725697
NET	4,508	19.53512	25.83222	0	98.32361
INFL	7,889	35.57598	454.067	-31.90475	26762.02
POP	9,944	2.63e+07	1.06e+08	6102	1.37e+09
POPGR	9,938	1.759313	1.582801	-10.95515	17.62477
EDU	1,486	15.74911	10.45685	4.42453	322.1524
GDP	8,019	1.70e+11	8.57e+11	8824448	1.80e+13
SECEDU	3,330	59.70696	32.60451	.23964	206.6042
CONS	7,119	16.33268	7.706742	0	156.5315
FDI	6,744	3.755695	13.46918	-82.8921	466.5622
EXP	9,081	64.28453	10.93033	19.26551	83.5878
CO2	8,282	4.583576	7.503317	-.0202922	99.84044
AID	6,964	4.78e+08	8.71e+08	-1.02e+09	2.53e+10
M8	4,947	.2191787	.1696126	0	1
M6	3,755	.2030075	.0869327	.0119471	1
M4	8,745	.1785781	.1776856	.0045739	1
M5	4,758	.0867481	.1233563	.0010345	1
M3	4,519	.7124738	.1733906	.1709272	1
M2	4,238	.4225829	.1452154	.008214	1
M1	4,658	.141765	.2160459	0	1
MDGMAX	9,049	.5413302	.2619545	.0041145	1
MDGMIN	7,503	.1165511	.1394667	.000018	1
MDGAVG	9,081	.2598302	.1241982	0	1
_merge	9,997	2.346904	.4760087	2	3

Figure 2. Summary statistics for each of my variables

My summary statistics, shown in Figure 2, tell me a lot about the nature of the data I am collecting. For example, some of my variables, particularly life expectancy and population had over 9,000 observations out of 9,997 possible points. This number is because I am measuring 50 years of data on 204 countries. I know that a lot of these statistics are hard to find for certain countries, but the impoverished countries who may have trouble retrieving data do not have any reason to be excluded from my study just because I was unable to recover data from them. That said, precautions were made to ensure my data was one of the most complete sets within each millennium goal. Furthermore, my data is very sparse or nonexistent from 1967-1980, especially

for certain metrics like Internet usage, so as I continue I should be aware of how making comparisons at different time frames might alter or more clearly identify relationships.

Fixed Effects Model

When searching for what I can make constant in my model, three options emerge for fixed effects models. The first is the country, the second is year, and the third is region. When running the regression with fixed effects for the year, the r squared was not significantly different than my original model. The variables openness, population, GDP, and political stability all have an effect on the MDG maximum percentage. But, there is too much variation taken out by the years that I should not trust this model. When I run the same regression with fixed effects for country, I see a significantly higher r squared value which makes me question the validity of a model with such a high r squared. The variables of region and consumption expenditure each have an effect on the MDG maximum percentage. When running fixed effects for country and region, I see variables omitted by STATA and an obvious problem with the regression. When I ran a regression of year and country, I see an r squared over 85% which is too high to be a good model, I have pulled so much variation out of my model it is no longer reliable. When I run the regression with fixed effects for region and year I see variables that have an effect on MDG maximum percentage are openness, region Central America/Caribbean, region Africa, GDP, secondary education, and stability. Obviously I cannot run a regression with all three because it pulls out variation for every year and every country and leaves no variation for the model, with an unbelievable over 90% r squared. I settle with a regression of just fixed effects for region because it is the only one that seems to not have too much variability pulled out. Every country, every year, or both simply pull out more variation than I am comfortable with and inflate my r squared. Working with fewer than 200 observations is too few to have fixed effects for both year and country. Hence, I decide to include fixed effects for region seeing as it is the only option for fixed effects that does not cut my sample size too small.

Maximum MDG Whole World Tests

Source	SS	df	MS	Number of obs	=	494
				F(20, 473)	=	20.62
Model	3.99956233	20	.199978116	Prob > F	=	0.0000
Residual	4.5862211	473	.009696028	R-squared	=	0.4658
				Adj R-squared	=	0.4432
Total	8.58578343	493	.017415382	Root MSE	=	.09847

MDGMAX	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LOGOPEN	-.0032401	.0333534	-0.10	0.923	-.0687792	.062299
NET	.0003334	.0003925	0.85	0.396	-.0004378	.0011045
INFL	.0006357	.0005429	1.17	0.242	-.000431	.0017025
POP	-9.05e-11	5.04e-11	-1.79	0.073	-1.90e-10	8.62e-12
POPGR	-.016497	.0057744	-2.86	0.004	-.0278437	-.0051503
EDU	.0018642	.0007803	2.39	0.017	.000331	.0033974
GDP	2.55e-14	1.19e-14	2.13	0.033	2.01e-15	4.89e-14
SECEDU	.0000736	.0003362	0.22	0.827	-.0005869	.0007342
CONS	-.0017782	.0005081	-3.50	0.001	-.0027765	-.0007798
FDI	.0041463	.0011172	3.71	0.000	.0019511	.0063415
EXP	-.0103894	.0013327	-7.80	0.000	-.0130081	-.0077707
CO2	-.0008889	.0018603	-0.48	0.633	-.0045444	.0027665
AID	-1.94e-11	8.77e-12	-2.21	0.027	-3.66e-11	-2.16e-12
STAB	.0009862	.0002669	3.70	0.000	.0004618	.0015105
REG						
2	-.0691641	.0163784	-4.22	0.000	-.1013476	-.0369807
4	.0019297	.0186824	0.10	0.918	-.034781	.0386404
5	.0327465	.018537	1.77	0.078	-.0036785	.0691715
6	-.2082615	.0515399	-4.04	0.000	-.309537	-.1069861
7	-.0711263	.0184629	-3.85	0.000	-.1074058	-.0348469
8	-.1174077	.0234415	-5.01	0.000	-.16347	-.0713453
_cons	1.435412	.1162902	12.34	0.000	1.206903	1.663921

Figure 3. Maximum MDG Model with All Countries Included

$$\text{Quality of Life} = B_o + B_1\text{Globalization} + B_2\ \text{Region} + B_3\ \text{Inflation} + B_4\ \text{Population} + B_5\ \text{Population Growth} + B_6\ \text{Secondary Completion Rate} + B_7\ \text{GDP} + B_8\ \text{Education} + B_9\ \text{Consumption Spending} + B_{10}\ \text{Political Stability} + B_{11}\ \text{Foreign Aid} + B_{12}\ \text{Emissions} + B_{13}\ \text{Life Expectancy} + B_{14}\ \text{Foreign Direct Investment} + B_{15}\ \text{Internet Usage} + E_i$$

The model above is estimated across all 204 countries in the dataset. The r squared is 47% and I see some significance for a few of my controls and regions but no significance for the

effect on globalization on maximum MDG percentage. Before diving into the analysis, it is necessary to run through some checks on the data itself.

The first check I ran is multicollinearity, which occurs when two or more of my variables are highly correlated with each other. STATA did not drop any of my variables so I did not have a perfect multicollinearity issue. The first test imperfect multicollinearity is a correlation matrix with every variable I used, shown in Figure 4. I am looking for correlation coefficients above 0.8 and saw that none of my coefficients are above 0.8. The closest is life expectancy and openness at 0.798, but this is not above 0.8 technically and even then is not something that would warrant removal of one of my variables.

	MDGMAX	LOGOPEN	NET	INFL	POP	POPGR	EDU
MDGMAX	1.0000						
LOGOPEN	0.0523	1.0000					
NET	-0.1082	0.2094	1.0000				
INFL	0.0270	-0.0183	-0.0626	1.0000			
POP	0.0353	-0.2801	-0.0261	-0.0025	1.0000		
POPGR	-0.0940	-0.0666	-0.2284	0.0037	-0.0375	1.0000	
EDU	0.0724	-0.1568	-0.2581	0.0282	0.0629	0.0867	1.0000
GDP	0.0672	-0.1700	0.2400	-0.0107	0.3362	-0.1196	-0.0456
SECEDU	0.2160	0.2463	0.5308	-0.0294	0.0705	-0.4560	-0.4394
CONS	-0.0583	0.2408	0.1307	-0.0130	-0.1020	-0.0772	-0.0104
FDI	0.0694	0.2394	0.0965	-0.0146	-0.0354	-0.0418	-0.0326
EXP	-0.0480	0.2451	0.5735	-0.0288	0.0383	-0.3594	-0.3161
CO2	-0.1512	0.1850	0.3617	-0.0219	-0.0259	0.1690	-0.2331
AID	0.0583	-0.2083	-0.0761	-0.0059	0.3338	0.0667	0.1327
STAB	-0.0639	0.3337	0.5086	-0.0686	-0.1656	-0.2435	-0.2664

	GDP	SECEDU	CONS	FDI	EXP	CO2	AID
GDP	1.0000						
SECEDU	0.2317	1.0000					
CONS	0.0109	0.1022	1.0000				
FDI	-0.0237	0.1135	0.0104	1.0000			
EXP	0.2104	0.7987	0.1322	0.0847	1.0000		
CO2	0.1694	0.2886	0.1359	0.0199	0.4102	1.0000	
AID	0.0638	-0.0906	-0.0766	-0.0694	-0.0575	-0.1303	1.0000
STAB	0.0692	0.4190	0.1937	0.1254	0.5235	0.3838	-0.3466

	STAB
STAB	1.0000

Figure 4. Correlation Matrix for Testing Multicollinearity

The next test is using the Variance Inflation Factor. I am looking for a VIF above 5, wherein I have an imperfect multicollinearity issue. I do not have any variables over 5, but life expectancy is at 4.42, which I would expect because of the analysis I just ran.

Variable	VIF	1/VIF
LOGOPEN	1.85	0.541990
NET	2.18	0.458635
INFL	1.16	0.860734
POP	4.38	0.228109
POPGR	2.52	0.396246
EDU	1.40	0.715191
GDP	4.00	0.250127
SECEDU	3.47	0.288415
CONS	1.20	0.830086
FDI	1.30	0.770772
EXP	4.42	0.226086
CO2	2.03	0.491784
AID	1.86	0.538246
STAB	1.75	0.571210
REG		
2	2.12	0.471065
4	1.82	0.550935
5	2.61	0.383371
6	1.09	0.919979
7	2.76	0.362076
8	2.32	0.431411
Mean VIF	2.31	

Figure 5. Variance Inflation Factor Table for Testing Multicollinearity

If I had a problem with multicollinearity, I still would likely do nothing because dropping a variable would give me omitted variable bias, which I want to avoid. I would simply collect more data in the hopes of remedying the problem.

Serial correlation occurs when error term observations are correlated with each other. I do not want to find a positive or negative correlation between these terms; ideally I want zero correlation in my error terms. When I look at my residuals, they seem to be merging to zero as the estimates of MDG or quality of life increase. This would mean that as my quality of life is higher I am seeing a better estimate of openness. However, the scatterplot alone is not enough to diagnose a clear serial correlation issue.

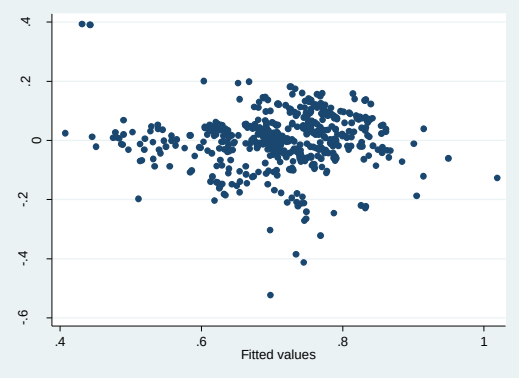

Figure 6. Residual Scatterplot to Evaluate Potential Serial Correlation Issues

In order to diagnose a serial correlation issue for certain, I must run a Durbin-Watson test. The null hypothesis of this test is no positive serial correlation and the alternative hypothesis is positive serial correlation. I first have to find upper and lower bounds for my statistic, in which I cannot conclude for certain if there is a serial correlation issue; this range is 1.79314 to 1.91059. My Durbin-Watson statistic was 0.901 thus my statistic is lower than the bounds so I reject the null that there is no positive serial correlation. My Durbin-Watson statistic is far below the bounds and I know I have a large serial correlation issue. Later I will discuss how I have decided to resolve this issue.

Next, I will need to examine if I have a heteroscedasticity issue. Heteroscedasticity is violated when the error terms in my regression do not have a constant variance. If this problem is pure it is a function of the data, and if it is impure I have a problem with my model, likely omitted variable bias. The first test for potential correlation with an unknown cause is a White Test and it looks for heteroskedastic behavior from any source. Since the null probability is 0.000 I reject the null hypothesis that there is no heteroscedasticity in my model. Thus I infer that I have clear heteroskedastic behavior.

```
White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(198)     =    371.36
         Prob > chi2   =    0.0000

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	371.36	198	0.0000
Skewness	35.82	20	0.0162
Kurtosis	5.89	1	0.0152
Total	413.07	219	0.0000

Figure 7. White Test Results to Evaluate Heteroscedasticity Issues

To resolve my serial correlation and heteroscedasticity issue, I ran a regression using the robust cluster estimator using clusters on country code. This yielded my final regression and analysis.

Linear regression

Number of obs	= 494
F(17, 102)	= .
Prob > F	= .
R-squared	= 0.4658
Root MSE	= .09847

(Std. Err. adjusted for 103 clusters in COUNTRY)

MDGMAX	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LOGOPEN	-.0032401	.0658691	-0.05	0.961	-.1338911	.1274109
NET	.0003334	.0005115	0.65	0.516	-.0006812	.001348
INFL	.0006357	.0005739	1.11	0.271	-.0005027	.0017741
POP	-9.05e-11	1.11e-10	-0.82	0.416	-3.10e-10	1.29e-10
POPGR	-.016497	.012084	-1.37	0.175	-.0404657	.0074716
EDU	.0018642	.0015941	1.17	0.245	-.0012977	.0050262
GDP	2.55e-14	1.88e-14	1.35	0.179	-1.18e-14	6.28e-14
SECEDU	.0000736	.0006823	0.11	0.914	-.0012797	.001427
CONS	-.0017782	.0007739	-2.30	0.024	-.0033131	-.0002432
FDI	.0041463	.0013914	2.98	0.004	.0013864	.0069062
EXP	-.0103894	.0024623	-4.22	0.000	-.0152733	-.0055055
CO2	-.0008889	.0022994	-0.39	0.700	-.0054499	.003672
AID	-1.94e-11	1.63e-11	-1.19	0.236	-5.16e-11	1.29e-11
STAB	.0009862	.0005116	1.93	0.057	-.0000285	.0020008
REG						
2	-.0691641	.0298541	-2.32	0.023	-.1283796	-.0099486
4	.0019297	.0369646	0.05	0.958	-.0713894	.0752488
5	.0327465	.0451928	0.72	0.470	-.0568931	.1223862
6	-.2082615	.0308863	-6.74	0.000	-.2695244	-.1469987
7	-.0711263	.0459774	-1.55	0.125	-.1623222	.0200696
8	-.1174077	.0453621	-2.59	0.011	-.2073833	-.0274321
_cons	1.435412	.2194865	6.54	0.000	1.000061	1.870762

Figure 8. Final Analysis for Maximum MDG and All Countries Included

Primarily, I see in Figure 8 that there is no effect between globalization and quality of life, maximum MDG. Consumption expenditure had a statistically significant effect on quality of life. For every one unit increase in consumption expenditure I saw a 0.0018 decrease in quality of life, maximum MDG percentage. Foreign direct investment had an effect on quality of life: for every one unit increase in FDI I saw a 0.004 increase in quality of life. This may seem like a small difference, but a one standard deviation change in FDI would result in the quality of life difference between living in Turkey and Luxemburg. Many studies consider FDI to be another measure of globalization, hence I can say that even though my globalization statistic had no effect on quality of life I did see one with FDI. Thus, I know a small change can mean big quality of life differences for the average person living in a given country. Life expectancy had

an effect on quality of life. This effect was the most significant of any I saw with this regression: for every one unit increase in life expectancy I saw a 0.01 decrease in maximum MDG percentage. Furthermore, political stability had an effect on quality of life, for every one unit increase in political stability I saw a 0.001 increase in quality of life.

I only had three regions with statistically significant effects on quality of life. My regions differ from just running the regression with only countries from that region because the region effects parse out the difference in quality of life all other factors and controls held constant in comparison to the first region, Asia. Region 2, Central America and the Caribbean showed an effect with a 0.069 decrease in quality of life. Region 6, Oceania, saw an effect with a larger decrease in quality of life of 0.21. Lastly, Region 8, the Middle East, saw an effect of a 0.12 decrease in quality of life as well. It is worth noting here that all of my region effects that were significant were negative, which tells me that all regions except for Asia, the default region, and North America which was excluded have a lesser quality of life compared to Asia.

Maximum MDG Asia Tests

Below is my first regression using the same model with only the Asian country dataset.

Source	SS	df	MS	Number of obs	=	105
				F(14, 90)	=	7.34
Model	.862138332	14	.061581309	Prob > F	=	0.0000
Residual	.755299585	90	.008392218	R-squared	=	0.5330
				Adj R-squared	=	0.4604
Total	1.61743792	104	.015552288	Root MSE	=	.09161

MDGMAX	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LOGOPEN	.0542736	.0708273	0.77	0.446	-.0864373	.1949844
NET	-.0015383	.0012282	-1.25	0.214	-.0039783	.0009016
INFL	.0025461	.0021836	1.17	0.247	-.001792	.0068843
POP	3.98e-11	7.08e-11	0.56	0.576	-1.01e-10	1.80e-10
POPGR	-.0875792	.0175121	-5.00	0.000	-.1223702	-.0527883
EDU	.0036714	.0018985	1.93	0.056	-.0001002	.0074431
GDP	4.25e-15	1.67e-14	0.25	0.800	-2.89e-14	3.74e-14
SECEDU	-.001482	.0008609	-1.72	0.089	-.0031923	.0002283
CONS	-.0020494	.0006148	-3.33	0.001	-.0032707	-.0008281
FDI	.0036671	.0058449	0.63	0.532	-.0079448	.015279
EXP	-.0020513	.0040287	-0.51	0.612	-.010055	.0059523
CO2	-.007479	.0065551	-1.14	0.257	-.0205018	.0055437
AID	-7.50e-11	2.43e-11	-3.09	0.003	-1.23e-10	-2.68e-11
STAB	.0013302	.0005833	2.28	0.025	.0001714	.002489
_cons	.9727556	.2724444	3.57	0.001	.4314973	1.514014

Figure 9. Maximum MDG Model with only Asian Countries Included

Before I can analyze these results I have to determine if there are any issues I need to be aware of. This will occur through running the same tests for multicollinearity, serial correlation, and heteroscedasticity I ran for the full sample of countries.

	MDGMAX	LOGOPEN	NET	INFL	POP	POPGR	EDU
MDGMAX	1.0000						
LOGOPEN	0.0817	1.0000					
NET	-0.0752	0.1856	1.0000				
INFL	0.0746	0.0494	-0.0640	1.0000			
POP	0.0160	-0.3301	-0.0386	-0.0360	1.0000		
POPGR	-0.3029	0.0585	-0.1353	-0.0905	-0.0779	1.0000	
EDU	0.0434	-0.3990	-0.4132	0.0780	0.0048	0.1939	1.0000
GDP	0.0606	-0.1535	0.3278	-0.0283	0.4068	-0.2598	-0.2823
SECEDU	0.2636	0.2502	0.4861	0.0455	0.0301	-0.3061	-0.5664
CONS	-0.0114	0.1415	-0.0033	-0.0090	-0.0579	0.0148	0.0875
FDI	0.2120	0.3607	0.1672	-0.0417	-0.1221	-0.0863	-0.0650
EXP	0.2117	0.3780	0.6544	0.0074	0.0567	-0.2131	-0.5132
CO2	-0.0070	0.2758	0.4745	0.0045	-0.0764	0.0547	-0.5185
AID	-0.1638	-0.3762	-0.1314	-0.0568	0.4767	0.0939	0.1388
STAB	0.1628	0.3347	0.4998	-0.0423	-0.1921	0.0318	-0.5130

	GDP	SECEDU	CONS	FDI	EXP	CO2	AID
GDP	1.0000						
SECEDU	0.2198	1.0000					
CONS	0.0256	0.0983	1.0000				
FDI	-0.0985	0.2103	-0.0321	1.0000			
EXP	0.3162	0.7556	0.0247	0.2615	1.0000		
CO2	0.1371	0.1837	0.0412	0.2647	0.3696	1.0000	
AID	0.0310	-0.1158	-0.1656	-0.1978	-0.0778	-0.2217	1.0000
STAB	0.1316	0.3125	0.0599	0.2186	0.5472	0.6078	-0.3441

	STAB
STAB	1.0000

Figure 10. Correlation Matrix with All Variables Included

The above correlations tell me that I do not have a significant multicollinearity problem because none of my correlations were nearing or above 0.8.

Variable	VIF	1/VIF
POP	8.42	0.118791
GDP	7.73	0.129351
AID	4.57	0.218666
EXP	4.44	0.225043
NET	4.07	0.245570
CO2	4.03	0.248046
SECEDU	3.82	0.261637
LOGOPEN	3.21	0.311731
STAB	2.47	0.404294
POPGR	2.34	0.427237
FDI	1.97	0.507765
EDU	1.74	0.573994
INFL	1.50	0.665346
CONS	1.40	0.715139
Mean VIF	3.69	

Figure 11. Variance Inflation Factor Table to Evaluate Multicollinearity Issues

I also looked at the Variance Inflation Factors in Figure 11 and saw I had a multicollinearity issue, meaning a factor over 5.0, with GDP and Population but I do not feel this is a big enough problem to remove variables and introduce omitted-variable bias into my regression. So I should continue to the rest of my tests.

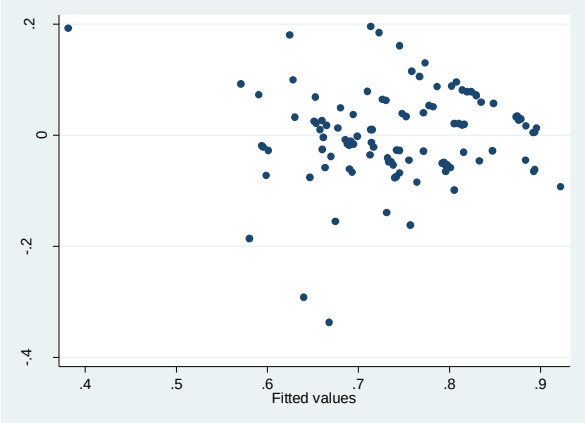

Figure 12. Residual Scatterplot to Evaluate Potential Serial Correlation Issues

The above residual plot in Figure 12 tells me I may have an issue with serial correlation because of the way my residuals seem to merge to zero as the estimates of MDG increase, meaning that as my quality of life is higher I am seeing a better estimate of openness. The scatterplot alone is not enough to diagnose a clear serial correlation issue so I must examine the Durbin-Watson statistic. I first have to find upper and lower bounds for my statistic, in which I would not be able to detect if there is a serial correlation issue. Using the table of upper and lower bounds, and using the N=100 line because I have 105 observations, the range for my statistic is 1.335 to 1.765. My Durbin-Watson statistic was 0.632. Thus, my statistic is lower than the bounds of uncertainty and I reject the null that there is no positive serial correlation. My Durbin-Watson statistic is far below the bounds and I know I have a large serial correlation issue. Later I will discuss how I have decided to resolve this issue.

Next I need to evaluate if I have a heteroscedasticity problem using the White test. As you can see in Figure 13 below, I have a p value of 0.45 thus I do not have a heteroscedasticity issue.

```
White's test for Ho: homoskedasticity
        against Ha: unrestricted heteroskedasticity

        chi2(104)     =    105.00
        Prob > chi2   =    0.4541

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	105.00	104	0.4541
Skewness	24.76	14	0.0371
Kurtosis	2.49	1	0.1144
Total	132.25	119	0.1917

Figure 13. White Test Results to Evaluate Heteroscedasticity Issues

Since I only have a serial correlation issue, I used robust standard errors, which ensure that I have less of a change in my effect analysis due to the serial correlation I observed than I would have had with my initial standard errors from my first regression.

```
Linear regression                               Number of obs     =        105
                                                F(11, 90)         =          .
                                                Prob > F          =          .
                                                R-squared         =     0.5330
                                                Root MSE          =     .09161
```

MDGMAX	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LOGOPEN	.0542736	.0734285	0.74	0.462	-.0916049	.2001521
NET	-.0015383	.0011396	-1.35	0.180	-.0038024	.0007257
INFL	.0025461	.0018446	1.38	0.171	-.0011186	.0062108
POP	3.98e-11	7.81e-11	0.51	0.612	-1.15e-10	1.95e-10
POPGR	-.0875792	.0239315	-3.66	0.000	-.1351234	-.0400351
EDU	.0036714	.0019007	1.93	0.057	-.0001047	.0074475
GDP	4.25e-15	1.55e-14	0.27	0.785	-2.66e-14	3.51e-14
SECEDU	-.001482	.0008626	-1.72	0.089	-.0031956	.0002316
CONS	-.0020494	.0004506	-4.55	0.000	-.0029446	-.0011542
FDI	.0036671	.0057402	0.64	0.525	-.0077369	.0150711
EXP	-.0020513	.0028772	-0.71	0.478	-.0077674	.0036647
CO2	-.007479	.0077709	-0.96	0.338	-.0229173	.0079592
AID	-7.50e-11	2.30e-11	-3.27	0.002	-1.21e-10	-2.94e-11
STAB	.0013302	.000484	2.75	0.007	.0003686	.0022918
_cons	.9727556	.2217545	4.39	0.000	.5322016	1.41331

Figure 14. Final Regression for Maximum MDG with only Asian Countries

Primarily, I see in Figure 14 that there is no effect between globalization and quality of life, the same as I saw for regression including the whole world. Population growth had a statistically significant effect on quality of life. For every one unit increase in population growth I saw a 0.09 decrease in quality of life, maximum MDG percentage. Education had an effect on quality of life: for every one unit increase in pupil-teacher ratio in upper secondary schools I saw

a 0.004 increase in quality of life. This is interesting because I saw that secondary education completion rates had a negative 0.0015 significant effect on quality of life. Consumption expenditure had the most significant effect on quality of life: a 0.002 decrease in quality of life as consumption expenditure increases by one unit. Aid from foreign countries had an effect on quality of life, but though this effect was significant it was nearly zero in its change. It is important to note that as aid increased, quality of life decreased. Finally, political stability had an effect on quality of life, for every one unit increase in political stability I saw a 0.001 increase in quality of life, the exact same change I saw when I evaluated the same model with the whole world included. I did not have any regions to evaluate due to the fact I were only examining one region in my regression.

Maximum MDG Africa Tests

Source	SS	df	MS	Number of obs	=	98
				F(14, 83)	=	12.79
Model	1.70515224	14	.121796589	Prob > F	=	0.0000
Residual	.790158287	83	.009519979	R-squared	=	0.6833
				Adj R-squared	=	0.6299
Total	2.49531053	97	.025724851	Root MSE	=	.09757

MDGMAX	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LOGOPEN	.0612929	.0781437	0.78	0.435	-.0941318	.2167175
NET	.0023878	.0017159	1.39	0.168	-.0010249	.0058006
INFL	.0004166	.0009273	0.45	0.654	-.0014278	.0022611
POP	1.70e-09	1.74e-09	0.98	0.331	-1.76e-09	5.17e-09
POPGR	.0262091	.0159634	1.64	0.104	-.0055414	.0579596
EDU	.007288	.0017229	4.23	0.000	.0038613	.0107148
GDP	-1.70e-12	6.91e-13	-2.46	0.016	-3.07e-12	-3.22e-13
SECEDU	.0012927	.0007619	1.70	0.094	-.0002227	.002808
CONS	-.0015506	.0018148	-0.85	0.395	-.0051601	.0020589
FDI	.0022063	.0016816	1.31	0.193	-.0011383	.005551
EXP	-.0118897	.0027388	-4.34	0.000	-.0173371	-.0064423
CO2	-.0183033	.016447	-1.11	0.269	-.0510158	.0144091
AID	2.91e-11	3.06e-11	0.95	0.344	-3.17e-11	8.98e-11
STAB	.0010868	.0007445	1.46	0.148	-.0003939	.0025675
_cons	1.049123	.2463498	4.26	0.000	.5591434	1.539103

Figure 15. Maximum MDG Model with only African Countries Included

I begin by running correlations to test for multicollinearity issues.

	MDGMAX	LOGOPEN	NET	INFL	POP	POPGR	EDU
MDGMAX	1.0000						
LOGOPEN	0.0007	1.0000					
NET	-0.3765	0.1592	1.0000				
INFL	0.0433	-0.0185	-0.0360	1.0000			
POP	0.0810	-0.2420	0.1781	0.0400	1.0000		
POPGR	-0.0404	-0.0302	-0.3128	0.0360	0.0147	1.0000	
EDU	0.4731	-0.1247	-0.1499	0.2317	0.1556	0.2225	1.0000
GDP	-0.0552	-0.0852	0.4456	-0.0064	0.6387	-0.1025	-0.0340
SECEDU	0.0190	0.4407	0.6003	-0.0239	0.1088	-0.4242	-0.2363
CONS	-0.1504	0.3586	0.1158	-0.0310	-0.1967	-0.0426	0.4184
FDI	0.0923	0.3764	0.0314	-0.0089	-0.0670	0.0056	-0.0054
EXP	-0.2200	0.2875	0.4928	-0.0324	0.0869	-0.0782	-0.2971
CO2	-0.2254	0.2096	0.3394	-0.0181	0.0386	-0.1301	-0.3508
AID	0.1162	-0.1541	0.0867	-0.0053	0.5445	0.0590	0.1779
STAB	-0.0638	0.3701	0.1799	-0.0795	-0.3763	-0.2900	-0.3514

	GDP	SECEDU	CONS	FDI	EXP	CO2	AID
GDP	1.0000						
SECEDU	0.3643	1.0000					
CONS	-0.0449	0.2074	1.0000				
FDI	-0.0546	0.1762	0.0544	1.0000			
EXP	0.2426	0.6807	0.1420	0.0635	1.0000		
CO2	0.4156	0.5357	0.1307	0.0138	0.3981	1.0000	
AID	0.2572	-0.0119	-0.0868	-0.0468	0.1011	-0.1038	1.0000
STAB	-0.1536	0.4728	0.2634	0.0791	0.3498	0.2997	-0.2676

	STAB
STAB	1.0000

Figure 16. Correlation Matrix for All Variables

I do not see any correlations above 0.8 so I verify these findings by running a VIF analysis.

Variable	VIF	1/VIF
POP	9.34	0.107077
GDP	4.57	0.218678
EXP	4.36	0.229359
AID	4.02	0.248625
NET	3.64	0.274675
SECEDU	3.57	0.280040
CO2	3.29	0.303625
POPGR	2.30	0.434108
CONS	2.28	0.439372
EDU	1.95	0.512529
STAB	1.94	0.516534
LOGOPEN	1.92	0.521936
FDI	1.28	0.778917
INFL	1.26	0.790518
Mean VIF	3.27	

Figure 17. Variance Inflation Factor Table to Evaluate Multicollinearity Issues

I see that population is above my 5.0 threshold for VIFs, but this does not mean it is grounds for removing population and causing omitted-variable bias. Hence, I should continue to my next potential issue: serial correlation.

To evaluate if I have a serial correlation issue I first examine the residual scatterplot. Below I see that I appear to have the same issue I have had with the first two regressions with a tightening of residuals around zero as my MDG increases. I should look at my Durbin-Watson test to confirm. My Durbin-Watson test gives me a value of 1.0163, which is less than the range of 1.335 to 1.765 (N=100 because I had 98 observations). This tells me I certainly have a serial correlation and should make the appropriate changes in how I run my final regression for Africa to remove this from having sway in my effects.

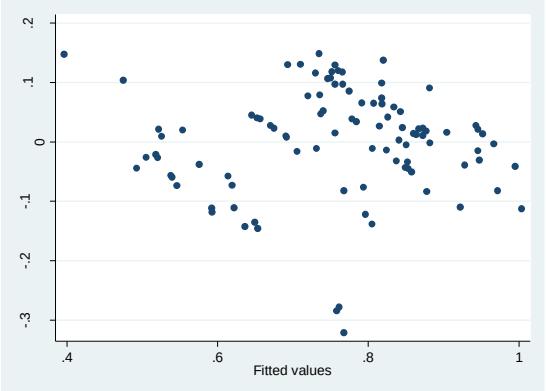

Figure 18. Residual Scatterplot to Evaluate Potential Serial Correlation Issues

The White test below for heteroscedasticity had a p value of 0.45, which tells me that I do not appear to have a heteroscedasticity problem and should continue keeping only serial correlation in mind.

```
White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(97)     =     98.00
         Prob > chi2  =    0.4525

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	98.00	97	0.4525
Skewness	26.02	14	0.0257
Kurtosis	2.29	1	0.1305
Total	126.31	112	0.1680

Figure 19. White Test Results to Evaluate Heteroscedasticity Issues

Keeping serial correlation in mind, in my final model I used robust standard errors.

```
Linear regression                               Number of obs     =         98
                                                F(12, 83)         =          .
                                                Prob > F          =          .
                                                R-squared         =     0.6833
                                                Root MSE          =     .09757
```

MDGMAX	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LOGOPEN	.0612929	.0806012	0.76	0.449	-.0990198	.2216055
NET	.0023878	.0012087	1.98	0.052	-.0000162	.0047919
INFL	.0004166	.0008086	0.52	0.608	-.0011916	.0020249
POP	1.70e-09	1.46e-09	1.16	0.248	-1.21e-09	4.61e-09
POPGR	.0262091	.0141328	1.85	0.067	-.0019004	.0543186
EDU	.007288	.0015761	4.62	0.000	.0041533	.0104228
GDP	-1.70e-12	7.12e-13	-2.38	0.019	-3.11e-12	-2.81e-13
SECEDU	.0012927	.0007799	1.66	0.101	-.0002585	.0028438
CONS	-.0015506	.001533	-1.01	0.315	-.0045997	.0014985
FDI	.0022063	.0013828	1.60	0.114	-.0005441	.0049568
EXP	-.0118897	.0031453	-3.78	0.000	-.0181456	-.0056338
CO2	-.0183033	.0127343	-1.44	0.154	-.0436314	.0070247
AID	2.91e-11	2.50e-11	1.16	0.248	-2.06e-11	7.87e-11
STAB	.0010868	.0007339	1.48	0.142	-.000373	.0025466
_cons	1.049123	.3009375	3.49	0.001	.4505708	1.647676

Figure 20. Final Regression for Maximum MDG with only African Countries

Just as I saw when the model was run with data from the whole world and Asia alone, I see that there is no effect between globalization and quality of life. Internet usage had a positive 0.002 effect on quality of life. Population growth had a statistically significant effect on quality of life. For every one unit increase in population growth I saw a 0.03 increase in quality of life, maximum MDG percentage. This was the reverse effect of what I saw with my maximum MDG Asia regression. Education had an effect on quality of life: for every one unit increase in pupil-teacher ratio in upper secondary schools I saw a 0.007 increase in quality of life, nearly twice the effect in Asia. GDP had a negative effect on quality of life, but so little of an effect even though it is statistically significant I should not put much weight on the implications. Consumption expenditure and education had the most significant effects on quality of life. Consumption expenditure had a 0.01 decrease in quality of life as consumption expenditure increased by one unit.

Minimum MDG World Tests

I will not go into detail on the tests run for minimum MDG regression using all of my data and all available countries. As with Africa and Asia, I had an issue with serial correlation and no issues with either multicollinearity or heteroscedasticity. Hence, in the same fashion I ran the regression with robust standard errors, which you can see below.

```
Linear regression                               Number of obs     =        438
                                                F(17, 417)        =          .
                                                Prob > F          =          .
                                                R-squared         =     0.2293
                                                Root MSE          =     .07456

------------------------------------------------------------------------------
             |               Robust
      MDGMIN |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    LOGOPEN |   .0806099   .0419678     1.92   0.055    -.0018849    .1631048
        NET |   -.000538   .0002892    -1.86   0.064    -.0011065    .0000304
       INFL |  -.0008404   .0004626    -1.82   0.070    -.0017497    .0000688
        POP |  -3.86e-11   2.48e-11    -1.56   0.120    -8.74e-11    1.01e-11
      POPGR |   .0109766   .0059577     1.84   0.066    -.0007343    .0226875
        EDU |   .0021817   .0008613     2.53   0.012     .0004887    .0038747
        GDP |   2.46e-15   4.47e-15     0.55   0.582    -6.33e-15    1.13e-14
     SECEDU |   -.000191   .0001927    -0.99   0.322    -.0005698    .0001879
       CONS |  -.0014128   .0004816    -2.93   0.004    -.0023594   -.0004663
        FDI |  -.0005942   .0008623    -0.69   0.491    -.0022891    .0011007
        EXP |   .0018741   .0020362     0.92   0.358    -.0021285    .0058767
        CO2 |       .0004    .001846     0.22   0.829    -.0032287    .0040287
        AID |   5.55e-12   3.34e-12     1.66   0.097    -1.01e-12    1.21e-11
       STAB |   .0005861   .0003326     1.76   0.079    -.0000677    .0012398
            |
        REG |
          2 |  -.0801256   .0302042    -2.65   0.008    -.1394972   -.0207541
          4 |  -.0419835   .0174082    -2.41   0.016    -.0762023   -.0077647
          5 |  -.0549355   .0151174    -3.63   0.000    -.0846514   -.0252196
          6 |  -.0977499   .0291105    -3.36   0.001    -.1549715   -.0405283
          7 |  -.0205356   .0104621    -1.96   0.050    -.0411006    .0000293
          8 |  -.0887784   .0296546    -2.99   0.003    -.1470694   -.0304874
            |
      _cons |  -.2222373   .2089905    -1.06   0.288    -.6330435    .1885688
------------------------------------------------------------------------------
```

Figure 21. Final Regression with Minimum MDG and All Countries Included

Unlike my other three regressions, I did see a statistically significant effect between globalization and quality of life. For every one unit increase in globalization I saw a 0.08 increase in quality of life, the minimum MDG or the worst that country was doing on any of the eight MDGs. Internet usage had a significant and negative effect of 0.0005 on quality of life. Inflation had a negative and significant effect as well, to the order of 0.0008, negligible when you consider how inflation was measured in this regression. Population growth had a positive and significant effect on quality of life, a 0.01 increase in quality of life for every one unit

increase in population growth. Education had a positive and significant effect of 0.002 on quality of life. Consumption expenditure had a negative and significant 0.001 effect on quality of life; meaning as government consumption expenditure increases, I can reasonable expect my minimum MDG percentage to decrease, lowering the quality of life I would expect to see for an average person living in Asia all other factors held constant. Foreign aid had a significant and positive effect, but it was so small it became negligible when examined in context. Political stability had a 0.0006 positive effect, so as political stability increased I saw my minimum MDG percentage and quality of life increase as well.

Region Analysis

Region	**Effect on Minimum MDG Percentage**	**Effect on Maximum MDG Percentage**
Central America and Caribbean	-0.08***	-0.069**
South America	-0.04**	0.002
Europe	-0.05***	0.033
Oceania	-0.10***	-0.208***
Africa	-0.02**	-0.071
Middle East	-0.09***	-0.117**

* 0.10 significance level

** 0.05 significance level

*** 0.001 significance level

Figure 22. Regional Analysis Table

The table above shows the effect on quality of life, as measured by maximum or minimum millennium development goal percentage, across global regions. It compares the regions to Asia, the arbitrarily omitted category. North America does not appear because no North American country receives Official Development Assistance (ODA), causing it to drop from the sample. I see that Asia has the highest quality of life, all other variables held constant. The most dramatic of these quality of life differences is Oceania for both the maximum and minimum statistic with a close second being the Middle East for both as well. These statistics tell me that quality of life, defined by minimum MDG, in Oceania is 0.10 percent less just because of being in that region, all variables held constant. For maximum MDG this is a 0.21 percent difference. The closest regions to Asia are South America and Europe. I expected South America to be a higher MDG than Asia, but saw it was smaller for minimum MDG and non-significant for maximum MDG percentage. This is an example of how a fixed effects model helps me parse out the differences across regions.

Policy Recommendations

My analysis leads to a few practical recommendations for policy makers at the international level. The first being that education had an effect on quality of life: for every one unit increase in pupil-teacher ratio in upper secondary schools I saw a statistically significant increase in quality of life. Africa saw average gains in quality of life nearly twice the magnitude of Asia. This would tell me that if, and this is a large assumption on the part of the policymaker, money would make the same difference in pupil-teacher ratio in upper secondary schools, we should definitely put that money towards education in Africa. The direction of causality in these results is not clear. Pupil-teacher ratio might lead to improved quality of life, or another omitted variable could be causing both quality of life and pupil-teacher ratio. The statistically significant effects I identify in the model are real correlations, but as with any model, correlation does not imply causation.

Internet usage had a positive effect on quality of life in Africa, which may speak to the potential that the Internet provides in the African region to spur knowledge sharing, capital investment and banking, and more business opportunities and growth. Someone interested in making a difference in the lives of the African people should consider increasing access to the Internet into their potential methods of increasing the quality of life of the African people. One important note about this is that this does not mean that every person in Africa needs a computer or phone with Internet access, but instead that the people as a whole would benefit from access to the Internet. For example, a person could access a micro-loan, glean information for a business they hope to start, or look up how to prevent some common ailments in their region. These would all be possible through access to Internet as infrequently as once a month and would all have direct impacts on the maximum MDG in time.

This research primarily looked at one measure of globalization: openness. This measure, exports plus imports over gross domestic product, only gives me one perspective of globalization. I only saw an effect between minimum MDG percentage and this openness statistic. However, another measure of globalization is foreign direct investment. For this measure I saw an effect between maximum MDG percentage and this statistic, both significant effects were positive. This suggests that foreign direct investment, investment from the outside world in corporate interests, might help a country improve their highest of the eight Millennium

Development Goals, but not improve the quality of life of their most impoverished citizens. This would make sense because businesses would see development and work might also begin to finally eradicate a problem a country was working on and near eradicating. My openness statistic is positively correlated with the minimum MDG which might imply an increase in exports or imports will likely provide more jobs to the poorest people in a country. This would help to increase the lowest millennium development goal by providing jobs and cheap medical or household goods to the poorest individuals.

The most interesting takeaway for me is that for my maximum and minimum MDG percentages for the whole world data set I saw that political stability had a positive and significant effect on quality of life. Reverse causality is also a possibility here, but is yet another reason to promote stable governments. Statistical significances of this type can be dangerous, as they can be used to promote the overthrow of unstable regimes. We often discuss political stability as a fear in a populous but rarely as something that has a statistical effect on the quality of life, maximum or minimum MDG percentage, of its citizens. Though this could be used to spur action into other countries, this data does tell me that there is something beyond correlation to the higher quality of life in more politically stable countries. I believe the international community should use this data not to begin conflicts, but as a reminder of the importance of working proactively to diminish the possibility of political unrest and promote practices that stabilize and balance powers.

This type of empirical analysis puts some people off but can make the difference when speaking candidly and accurately about the difference you hope to make in the daily lives of the regions people. I believe this type of analysis has an important place in politics and deserves more recognition and acceptance.

Further Study

It is my goal that someone be able to use my work to build and create a more complete and definitive analysis on this topic. I hope that in the future I would be able to add more countries into my model, but that can only happen with another iteration of more careful data selection for maximum observations. As time goes on, I believe the United Nations and World Bank will be retrieving more complete data and I would have more years to study. Obviously, getting data from regions like sub-Saharan Africa is difficult. I would like to be able to more thoroughly go through each of the 8 regions I studied and look at the effects therein. I would like to look into what the average MDG statistics would yield with respect to an effect between globalization and quality of life. My work would also benefit from more controls, but I believe I have saturated every major area that my controls needed to cover.

The length of time I pulled data from was just the maximum number of years with reliable data for my variables but I think it would add to my analysis to run a regression before and after a major international event such as the formation of the European Union or fall of the Soviet Union. I would have to pull more reliable data from the past, which would likely mean rethinking how I calculated my quality of life statistic. However, looking at the difference in effect between globalization and quality of life before and after a major event might tell me something about the pace and influence of globalization. This effect could be further divided into regions, for example looking at the effect of globalization on quality of life before and after 9/11 in the Middle East.

I believe some of the most interesting conclusions came from the parts of the model related to education. That may mean that my work would serve as a good springboard for someone who was interested in studying the effects on education because of globalization, specifically literacy rates, a variable I had to remove due to multicollinearity issues. In conclusion, there are many potential branches from my research and opportunities to glean more of the effect of globalization.

Conclusions

Variable	Maximum – Whole World	Minimum – Whole World	Maximum – Asia	Maximum-Africa
Openness	-0.003	0.081*	0.054	0.061
Internet Usage	0.000	-0.001*	-0.002	0.002*
Inflation	0.001	-0.001*	0.003	0.000
Population	0.000	0.000	0.000	0.000
Population Growth	-0.016	0.011*	-0.088***	0.026*
Pupil-teacher Ratio	0.002	0.002**	0.004*	0.007**
GDP	0.000	0.000	0.000	0.000**
Secondary Education	0.000	0.000	-0.001*	0.001
Consumption Expenditure	-0.002**	-0.001***	-0.002***	-0.001
FDI	0.004***	-0.001	0.004	0.002
Life Expectancy	-0.010***	0.002	-0.002	-0.012***
C02 Emissions	-0.001	0.000	0.007	-0.018
Foreign Aid	0.000	0.000*	0.000***	0.000
Political Stability	0.001*	0.001*	0.001***	0.001

***** 1% Significance Level**
**** 5% Significance Level**
*** 10% Significance Level**

Figure 23. Coefficients and Statistical Significance of All Four Models

Figure 23 above details the effects of my variables on quality of life as measured by maximum or minimum MDG percentage. I also can evaluate the most significant effects using this table, as well as evaluate the effects between different data sets or minimum MDG percentage. I have already detailed the effects I saw from a statistical significance standpoint in my analysis section; this section will be used to detail some of the connections between effects or particularly strong effects in a real world context.

I only saw a significant effect between openness and quality of life when I used the minimum instead of maximum MDG; likewise I only saw a significant effect between FDI and quality of life when I used the maximum MDG statistic. This is a reflection of the differences caused when globalization is measured differently, more information about the policy implications can be found in my policy recommendations section.

Consumption expenditure had a negative effect on quality of life in every regression except for with only African countries represented. This means that in Africa government

consumption expenditure does not show a significant negative effect on quality of life. This could tell me there is something else that is common in countries that have high consumption expenditures that would cause them to have a lower quality of life that may not be present in African countries. I would not assume that a lower consumption expenditure would equate to a lower quality of life, but it is possible the work that governments would spend consumption funding on would be something that a lot of poorer governments do not have at all and is instead replaced by non-governmental organizations. This would lead to governments that are richer spending consumption money that doesn't reflect a higher average citizen quality of life.

Population growth had a negative effect in Asia and positive in Africa. This could be a reflection of population density, meaning that in Asia more population just causes crowding and more difficulty getting jobs, moving around in cities, and with pollution. In Africa however, more population growth could increase the number of people working on subsistence farms or adding to the local economies. The negative effect in Asia was more than three times the positive effect seen in Africa and more statistically significant, which I believe encourages the assumption that in Asia population growth only causes a lot of issues for the average citizen, as is reflected by China's one child policy and other efforts by Asian governments to reduce city populations.

Life expectancy had a negative effect when I used all of the countries in my model and the maximum MDG percentage. The only other significant effect was in Africa using the maximum MDG percentage. These negative effects seem counter intuitive, I would not expect a longer life to correlate with a lower quality of life. I would say that one year added to a life expectancy is relatively negligible but the effect is large enough that when I increase life expectancy by 5 or 10 years I start to see a large and significant negative effect on quality of life. One more obvious reason might be that another variable that is correlated with quality of life and not present in my model could be causing this effect. But it is also possible this effect would still be seen no matter what variables were added and it is just an effect I see in countries worldwide with respect to maximum MDG but in Africa even more strongly. None of our MDGs would occur at a higher rate as life expectancies increased such as diseases and health issues. It is interesting that I did not see a significant effect in Asia, hinting that I may see an effect worldwide only because I have a stronger effect in certain regions.

Political stability had a positive effect, the same effect worldwide using both minimum and maximum MDG percentages and in Asia. This is the only variable to be significant and the same amount for both maximum and minimum MDG percentages. Consumption expenditure was the only other variable to be significant for both maximum and minimum percentages. It is striking that I did not see this effect in Africa, a region I expected to have strong effects due to more stable leadership or lack thereof. Perhaps there simply was not sufficient enough data in Africa to detail the political stability in certain regions. It does however tell me that for both maximum and minimum MDGs worldwide and maximum in Asia that I know where stability is higher I see a significantly higher quality of life. This seems to be one of my more obvious conclusions: the more stable your government the higher your quality of life will be because your government will be more efficient in improving your life, you have less fear of political issues effecting your own life, and your economic outlook is more stable.

Internet usage showed a negative effect when I used my minimum MDG percentage and twice the positive effect when evaluating maximum MDG in Africa. This I believe was because when you have more people using the Internet in your country, one is likely to see a larger gap in wages and quality of life in a country which would mean that the lower quality of life statistic was lower when the Internet use is higher in that country. This would not be true for the maximum MDG percentage worldwide, and I did not see this effect so that theory holds. I did see a statistically significant and positive effect between Internet usage maximum MDG percentage in Africa. This could be because when Internet is introduced in Africa it is for educational or micro-loan banking purposes. I could imagine that I would see Internet in Africa used to help everyone increase their way of life and in other regions it would be just making the rich richer.

Education statistics had a both positive and negative effect on quality of life. Secondary education completion rates had a negative effect on quality of life in Asia, which could be a variable that shows an effect only because I am missing a variable in my model that would control for that effect. I do see that the effect is relatively small, but it is large enough to warrant inquiry. It may be that as more individuals are completing school there is more competition for higher paying jobs and thus less farmers or less skilled farmers available at all to work the land and provide food for the population. However I believe it is most likely that I am missing some

variable here. Pupil-teacher ratio had a positive effect in every model except for maximum MDG percentage worldwide. The smallest effect was using minimum MDG percentage worldwide with the largest effect being in Africa. I believe I did not see an effect with maximum MDG percentage because more people getting an individualized education is more likely to help citizens with public health issues like open defecation, one of the MDG statistics, than it is to help "finish" one of the MDG issues reflected in maximum MDG percentage. Hence more students receiving an individualized school experience would have an effect on quality of life using minimum but not maximum MDG which I see in my model. I do, however, see my pupil-teacher ratio having an effect on maximum MDG percentage in Africa and Asia. I see twice the effect in Africa that I do in Asia which I believe is a reflection of the importance in Africa of individualized attention and care to complete work which may be a reflection of cultural values as where with Asian countries students are more motivated on their own, have more pressure from parents, or have more means to find answers for themselves at home such as more educated parents or more access to the Internet.

Inflation had a negative effect on minimum MDG percentage worldwide, which I believe tells me that inflation only had a negative effect on working on already low quality of life statistics, less so than it hinders a country from completing a MDG percentage and eradicating an issue. Inflation was not significant with of my maximum MDG statistic worldwide, in Asia or Africa which tells me this theory may be correct.

It is important to note that my model may suffer from omitted variable bias. However, I have included a variety of statistics in sectors such as education, government, and personal life which I believe allow me to control for nearly everything I need to control for and to look at my effects and the reason I may be seeing them in the real world. I hope these results can be the beginning of examining global poverty in a more analytical way and not simply pumping money into poverty-stricken areas. With more time and careful analysis, Western countries can be more cognizant of the ways in which they keep poor people in poverty only because of a lack of knowledge about where that money is most helpful.

We discuss poverty and globalization constantly in business and global politics without understanding how globalization effects the majority of the World's population. This is unfair to those who are affected most by our decisions. There is hope: FDI and openness are correlated

with maximum and minimum MDG percentages respectively and both were positive. For the time being we have little reason to worry that globalization might be slowly decreasing the quality of life of the people it most effects. As a business person and consumer attempting to understand how globalization affects the global population, there is more analysis and work to be done.

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