Analyzing the Gender Disparity in Education between Developed and Developing Countries

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Abstract

Even with all the progress women have made in the modern era, we wanted to see how gender inequality persisted in the educational sphere, particularly when categorizing nations by development. To do this, we obtained data on poverty, literacy rates and GNI per capita and analyzed the correlation with the expected level of education for women in one hundred different countries. What we found confirmed our suspicions: expected education levels were positively correlated with GNI per capita and literacy rates while showing a negative correlation with poverty rates.

I. Introduction

In the year 2017, oppression is still seen against groups of all types, whether they be racial, LGBTQ, religious, or even political. Oppression against these groups has long been a major threat to societal harmony; and with recent global rifts, society has shown that prejudice against these groups is still a universal threat to be reckoned with. Comprising of over 50% of the global population, women are by far the largest group of people oppressed in the world, even with the major progress made for their benefit in the modern era. 2017 has seen the rise of the latest American president, Donald Trump, a man elected to office even with numerous allegations of sexual misconduct, harassment and rape against women. Even more recently, reports were released and numerous women in Hollywood have come out to describe incidents of misconduct and assault by Hollywood mega-producer Harvey Weinstein. While these reports have just surfaced, the harassment is said to have been going on for decades. Both news stories happen to be concentrated within the United States, but considering the US is one of the de facto leaders of the world in most facets of life, the current state of American womanhood does not bode well for the rest of the world. According to World Bank data from 2012, women's enrollment in school and life expectancy have gone up, yet women are still experiencing excessive death rates at an early age and disparities in their education when compared to male counterparts. Education for women is particularly critical when discussing gender disparities, since education is crucial to a nation's overall development and having a more educated population adds to a country's productivity.

The United Nations Development Programme released their seventeen Sustainability Development Goals in January of 2016, with a target of implementing most, if not all, of these goals by 2030. Goals 4 and 5 set sights on improving the quality of education around the world and reducing gender inequality among nations. Our research aims to measure the progress made in developing countries regarding gender equality through the use of several variables we have chosen as proxies for equality. These variables include income, education level, age, productivity (GDP), and literacy rates, all sorted by gender.

It is clear that underdeveloped nations suffer from more gender disparity when compared to developed countries. This is evident when observing income levels, infant mortality rates, urban population proportions and poverty rates within a nation. Based on research, the education levels for women should have a high correlation to income levels; a nation with lower levels of income should output women with lower levels of education. Poverty would also be a key component as poverty and education levels should have a high negative correlation. Urban population and infant mortality statistics were chosen as further indicators of developing or developed nations. Analyzing these factors together should allow us to produce a regression model that will allow for approximating the level of education women are able to reach in a given nation.

II. Literature Review

In 2012, the World Bank released a World Development Report on Gender Inequality and Development. Their recent data collection shows that globally, the gender gap in school enrollment has decreased. Looking at the global population, school participation among boys and girls at the primary and secondary level are essentially equal, and, in fact, at the tertiary level, women have a clear advantage when it comes to enrollment. As nations have begun to develop their institutions and make education more accessible, people in general, not just women, have had a much easier time getting access to educational institutions. Free primary education programs implemented in many developing nations saw gross enrollment among boys and girls skyrocket. Women living in countries with established programs that informed them of potential employment opportunities were found to be more likely to stay in school longer than women in countries without these types of programs. Progress has been so good for women that gender has dropped down to accounting for 38% of inequality in nations with high rates of inequality. Still, there are still signs of significant disparage between boys and girls' enrollment in lower income nations. The report compares current day school enrollment rates for females ages 5-19 in certain nations to the overall trend of female enrollment in the United States since the late 18th century. Many of these nations still have lower enrollment rates for females than the United States had in 1900. In fact, nations such as Burkina Faso and Mali have a female enrollment rate comparable to the United States at the turn of the 18th century, around a measly 30%. This gender inequality is noticed on an intra-national level as well. The report notices a positive correlation between median grade level achieved and students' income quintiles; the lower the income quintile, the lower grade level achieved. What is interesting here is the disparity between grade levels reached when comparing genders. The trend remains the same for both boys and girls, yet even at lower income levels, boys still attain a higher grade level than girls in the same income quintile. The difference, however, does converge as income levels rise. The World Bank notes

that several differences between men and women can be linked to income inequality; nations with less income inequality tend to see less disparities between men and women. Regardless of income inequality, one of the biggest issues with gender disparity lies in education specialization. Fields of study at the secondary and tertiary level are still heavily skewed towards male or female students, as STEM fields are heavily male dominated while fine arts, humanities, and a majority of health fields are female dominated.

The Digital Gender Divide study attempts to uncover if there is a gender divide in select sub-saharan African countries in the use of Information and Communication Technologies (ICTs), specifically, the internet, and if there is, what are the reasons for this divide. Alozi and Akpan-Obong also examine the ownership of cell phones and smartphones in these countries. Alozi and Akpan-Obong did a multivariate analysis with their survey data, with independent variables such as: gender, age, education, urbanism, religion, marital status, employment status, income, internet liberalization, and Westernization. The main regression analysis is focused on the actual internet access and usage frequency, while a secondary analysis on cell and smartphone ownership is done in an attempt to explain the DGD. The sample data used is an accurate representation of sub-saharan Africa, with a median age of around 35 (middle-aged by a life expectancy of 56), women who are poorer than men, and men more likely to be employed than women. The results of the survey show that across all the countries studied, 37.2% of men reported use of the internet, compared to 23.6% of women. The survey also showed that on average, men were 5.9% more likely to use the internet multiple times per day than women (60.9% and 55.0%, respectively). While 79.9% of everyone surveyed owns a cell phone, only 23.5% own a smartphone. Smartphone ownership in Uganda was particularly low at 6.6% overall, and the researchers posit that since Africans typically access the internet through smartphones, this could partially explain the low percentage of internet access in Uganda. The result of the regression analyses show that 'being a woman reduces both the odds of use of the internet and the frequency of that use, as well as both ownership of cell and smartphones' (Alozi and Akpan-Obong 150). Alozi and Akpan-Obong conclude that there is in fact a DGD in sub-saharan Africa, and is partially explained by the fact that "men control the design, distribution, leadership and content of technology, precluding a female perspective and also reinforcing patriarchal notions of technological content and applications" (Alozi and Akpan-Obong 155). It is noted that any solutions to the DGD can not be a cookie cutter policy expected to work for every country because of the different situations of each country. For example, South Africa is much closer to being equal than other countries in the study, likely due to apartheid in the past half century, and thus it will be far easier to bridge the gap between men and women in South Africa than in a country with more inequality, such as Uganda.

In 2016, Hanmer and Klugman (2016) released a study looking at the current standing of women in developing nations. They found that the convergence of equality among men and women in the education sector was one of the most important proponents of increasing overall equality between men and women. Education obviously has lifelong impacts and is one of the biggest factors when looking into economic participation. The study furthers the notion of just how important education is in determining equality. With respect as to how we may be able to develop education equality, the study *Gender Inequality and Economic Development: Fertility, Education and Norms*, conducted by Kleven & Landais (2017), argues that fertility plays a large role in education equality. Specifically, they claim decreasing fertility rates would aid in the convergence between male and female education. More children would inevitably mean a higher supply of workers for the labor force, but Kleven and Landais posit that there is diminishing utility as more and more children are producing, thus reducing overall human capital. With less children, there is a higher probability of them being properly and fully educated, increasing human capital and eventually reducing inequality and improving the overarching economy. That being said, both studies recognize that poverty and development play a large role in equality as well, something the *Women's Empowerment and Economic Development* study looks into. Reviewing evidence on both sides of the empowerment-development relationship, the paper first shows that poverty and lack of opportunity breed inequality between men and women, so that when economic development reduces poverty, the condition of women improves on two counts: first, when poverty is reduced, the condition of everyone, including women, improves, and second, gender inequality declines as poverty declines, so the condition of women improves more than that of men with development. Economic development, however, is not enough to bring about complete equality between men and women. Policy action is still necessary to achieve equality between genders. Such policy action would be unambiguously justified if empowerment of women also stimulates further development, starting a virtuous cycle. This essay argues that empowering women does indeed change society's choices in important ways, although the usual depiction of women as always making the best decisions for long-term development is somewhat exaggerated. The conclusion here is a more balanced, somewhat more pessimistic picture of the potential for women's empowerment and economic development to mutually reinforce each other than that offered by the more strident voices on either side of the debate.

Our research is differentiated from the papers we reviewed in two distinct ways. First off, our focus is on global inequality that differs between developed and developing nations, not just the inequality in certain areas/regions. Secondly, most of the previous research discusses how education inequality and poverty affect overall gender inequality, but our goal here is to understand the correlation

between poverty and gender inequality in education. Understanding this specific correlation can potentially give us insight as to what institutional changes can be made to fight gender inequality.

III. Data

Variable	Stata Name	Unit	Years
Life Expectancy	LifeExpec	Years	2012
Percentage of Urban Population	UrbPop	% of Population	2009-2016
GNI per Capita (PPP)	GNIcap	2011 USD in PPP	2009-2016
Poverty Headcount Ratio @ $1.90/Day (PPP)	Pov	% of Population	2009-2016
Expected Years of Education (Female)	FemSchool	Years	2009-2016
Infant Mortality Rate	InfMort	per 1000 live births	2009-2016
Log(GNI per Capita)	lGNIcap	% change	2009-2016
Log(Expected Years of Education)	lFemSchool	% change	2009-2016

Variables used, their abbreviations and their units

The objective of our research is to examine and analyze which factors impact a women's opportunities for education the most. We hypothesized that income levels (measured in PPP in 1000's of dollars) and poverty rates (setting the poverty line at $1.90 per day) would be significant factors in determining the level of education women reach in their lives. This stems from the belief that countries that are less developed should see lower levels of education in their female population, i.e. women in these countries will go to school and be educated for a shorter period of time than their counterparts in more well developed areas of the world. Essentially, we picked these variables because we believed they best represented how developed a country is, which is also why we included urban population, infant mortality rates (per 1000's births) and life expectancy, for further detail as to how developed a nation is. Developed nations tend to see higher levels of income since their economies are bigger and more refined. They possess the capital to invest in infrastructure and institutions. In order for them to create long term growth, their innovations have to be more sophisticated, such as technology related to neural networks or quantum computing. Thus, their investments gravitate toward educations for these hopeful advancements to become a reality. On the other hand, developing countries do not possess many of the same luxuries developed countries have; they need to focus investment around infrastructure relating to ease of access to clean water or fighting disease rather than higher orders of education.

Our regression was compiled using data from 100 different countries. Every country in the world was ranked by GDP per capita (obtained from the CIA World Factbook) and then divided into thirds: countries with the highest GDP per capita, lowest GDP per capita and the rest in between. Approximately 32-34 nations were chosen from each group to create the list of 100 countries we used. We chose

countries this way because we wanted to obtain a nice variety in our income levels and poverty rates, so to ensure this, we selected countries from each income bracket.

Data was aggregated from multiple sources to create a cohesive data set with all the variables we decided to observe. The main source of the data was the World Bank, an organization which keeps an extensive database of various statistics relating to health, the environment, financial institutions, and, of course, gender. Information on urbanized population, Gross National Income and expected years of schooling for females, poverty statistics and infant mortality rate came from the World Bank. Values for 2012 life expectancy was provided by the World Health Organization. Since we could not find an existing dataset comprising of all the different variables we wanted to analyze, we had to pool together data from multiple sources to create our own set to test our hypothesis.

Below are the summary statistics of our data set:

Variable	Obs	Mean	Std. Dev.	Min	Max
LifeExpec	98	72.40816	8.596759	52.4	83.7
UrbPop	100	62.3	21.66387	20	100
GNIcap	93	19.85516	18.39222	.7	75.75
Pov	85	11.80824	19.23667	0	77.1
FemSchool	100	13.701	3.768892	5.8	21
InfMort	99	21.10505	21.51575	1.6	88.5

Overall, we were able to find values for each variable in every country we chose. For Life Expectancy, Angola came in with the lowest of all nations at 52.4 years while Japan had the highest, at 83.7 years. Ethiopia had the lowest urbanized population at 20%, and Bermuda had the highest at 100%. Several of the variables had multiple countries sharing the minimum or maximum value. For example, Australia had the highest expected years of schooling for females (21 years) but both the Central African Republic (which had the highest infant mortality rate as well) and Chad had the lowest expected years of schooling for females (5.8 years). This occurred with Poverty as well, as several nations, including Kazakhstan and Iceland (which had the lowest infant mortality rate) had a poverty rate of 0%, while the Democratic Republic of the Congo had a staggering rate of 77%. Speaking of the Democratic Republic of the Congo, it also had the lowest GNI per Capita of all the countries at around $700 and Luxembourg had the highest, at over 100 times the DRC's: $75,750. You can see that poverty rates have the smallest number of observations, since the poverty rates for several nations were not listed. The summary shows that the data has a wide variety of values, something we were hoping for when compiling our set.

Modeling data, of course, is not perfect so we had to make a few assumption when running our regression analysis. These assumptions comply with the Multiple Linear Regression guidelines. As explained earlier, our data was chosen randomly, in order to ensure we had an accurate representation of the entire world population. The model's parameters are linear in nature, showing no evidence of quadratic or other transcendental functional behavior. When looking at the actual variables, it is clear that while some may exhibit a linear relationship, none of the independent variables are perfectly linearly correlated with one and other. That is to say, none of the independent variables are dependent on each other, each factor holds its own. The correlation chart below conveys this assumption via the correlation coefficients of each variable. We also placed our model under the assumption that women's level of education is only affected by a nation's GNI per capita, their poverty rate and the female literacy rate of the country. These assumptions allow our model to follow the Gauss Markov guidelines for regression.

Correlation Table						
	lFemSchool	**lGNIcap**	**Pov**	**UrbPop**	**LifeExpec**	**InfMort**
lFemSchool	1					
lGNIcap	0.8774	1				
Pov	-0.7374	-0.8012	1			
UrbPop	0.7683	0.7968	-0.6382	1		
LifeExpec	0.8624	0.8694	-0.8068	0.7486	1	
InfMort	-0.8843	-0.8538	0.8553	-0.7069	-0.9375	1

IV. Results

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
lGNIcap	0.2335*** (0.0136)		0.1437*** (0.0280)	0.1068*** (0.0267)
InfMort		-0.0099*** (0.0009)		-0.0085*** (0.0014)
UrbPop		0.0035*** (0.0009)		0.0023** (0.0011)
Pov			0.0006 (0.0014)	0.0032** (0.0014)
LifeExpec			0.0149*** (0.0037)	
Intercept	2.0026*** (0.0369)	2.5649*** (0.0730)	1.1331*** (0.2441)	2.3162*** (0.0877)
Observations	93	99	84	84
R^2	0.7632	0.7878	0.8108	0.8553

We ran a variety of different regressions with our data, using every combination of independent variables we could think of, however, some turned out to be far more useful than others for the purpose of our analysis, in the sense that some regressions returned very weak coefficients for our independent variables (beta 1s). So for the sake of brevity, we chose to only include the regressions that seemed the most promising as far as answering our hypothesis in this write-up.

Model 1: lFemEduc = 0.2335(lGNIcap) + 2.0026

We started off our testing by looking at different simple regression models to see the correlations between each variable and female education levels. Since our main focus was looking at the development level of a nation, we decided the best simple regression model to look at would be between GNI per Capita and Female Years of Schooling. However, when we first ran the regression between the two variables, we noticed that there was an exponential relationship. To combat this, we put each variable on a logarithmic scale to linearize it and it produced much better results. GNI per Capita proved to be statistically significant even at the 1% level, indicating a strong relationship. It's coefficient tells us that for every percentage increase in GNI per Capita, the expected years of schooling for females rises by about 0.23%.

Model 2: lFemEduc = -0.0099(InfMort) + 0.0035(UrbPop) + 2.5649

For our second model, we tested two more variables we believed to be representative of whether a nation is developed or undergoing development. Infant Mortality Rate showed the expected negative correlation, as every one child increase in Infant Mortality decreased the expected level of female education by 0.0099%. As for urban population, every 1% increase in Urban Population increased expected level of female education by 0.0035%. While these may only seem like minor changes, both of the coefficients for these variables are shown to be statistically significant at the 1% level, as Infant Mortality has a t value of -10.8 and Urban Population has a t-value of 3.86, both of which are much higher than the 1% t-value of 2.365. P values of 0 also indicate strong statistical significance.

Model 3: lFemEduc = 0.1437(lGNIcap) + 0.0006(Pov) + 0.0149(LifeExpec) + 1.1331

With the third model, we added Poverty Rates and Life Expectancy to our simple regression model to try to create a more specific picture. GNI per Capita maintained similar results as before, albeit with a slightly smaller coefficient of 0.1437, indicating that for every percentage increase in GNI per Capita, expected female education levels go up by 0.1437%. GNI per Capita is still significant at the 1% level with a t-value of 5.12. Life Expectancy was also shown to be statistically significant in this model,

with a t-value of 3.99 also showing significance at the 1% level. Interpreting the coefficient shows that every one year increase in life expectancy increases expected female education levels by 0.0149%. The difference in this model comes from the Poverty variable as the coefficient is statistically equal to 0 since it is shown to be statistically insignificant. Its t value of 0.39 is much lower than any value of significance on the t distribution.

Model 4: lFemEduc = 0.1068(lGNIcap) - 0.0085(InfMort) + 0.0023(UrbPop) + 0.0032(Pov) + 2.3162

The final model encompasses the broadest scope of variables in order to give the greatest quantification of development. Infant Mortality and GNI per Capita had the most statistically significant coefficients, both being significant at the 1% level. GNI per Capita recorded a t-value of 3.99 while Infant Mortality had a t-value of -6.14, both of which are much greater than the t value for the 1% level. Interpreting their coefficients, we see that every 1% increase in GNI per Capita increases the expected level of female education by 0.1068% and every 1 child increase in Infant Mortality decreases the expected level of female education by 0.0085%. The coefficients for Poverty and Urban Population showed a slight statistical difference than the other variables in the model. Neither were shown to be insignificant, but both were only significant at the 5% level rather than the 1% level. Looking at their coefficients, for every 1% increase in Urban Population rates, female education levels are expected to rise by 0.0023% and for every 1% increase in Poverty rates, female education levels are expected to rise by 0.0032%.

It is interesting to note that the Poverty variable returned unexpected results in both of the models it was included in. We expected poverty to have a strong negative correlation with female education rates for the simple reason that we believed a nation with more poverty was more likely to be underdeveloped, thus having a lower education level for females. What we actually saw was that Poverty had a positive correlation with female education levels in each model. This first time around, we were able to look past this since the variable was deemed to be insignificant. We could write off the coefficient as being statistically equal to 0, so that did not affect the model as much. However, when looking at the second model, Poverty was shown to be significant and still had a positive coefficient. Running a simple regression between female education and Poverty showed us that, yes, there is a strong, negative correlation between the two variables, so areas with more poverty do tend to have lower levels of female education. Since the coefficient was positive in our multiple regression model, we believe this indicates poverty may not be the best indicator of the level of development in a nation. The United States, for example, is the world's top consumer and boasts one of the biggest economies, yet it has a striking homeless problem. Poverty is calculated as a percentage of population as well, and nations with different

population distributions can skew that percentage to look a lot smaller or a lot larger than it actually is. Wealth distribution is another factor to consider. A nation may have a large GNI per Capita but most of that money could belong to a small percentage of that country.

In our fourth model, urban population and poverty were the variables with the least significant coefficients, so we decided to conduct an F-test on these variables to see if they were more significant jointly than singularly. The F-test value is 23.34 , while the critical value for the 1% significance level is 4.977. This confirms that these two variables are jointly significant in our regression model. We also decided to conduct a further test on this model by using a dummy variable to split the countries into two categories: Developed and Developing. This split was done using the UN's classification that a developed nation is one that has a GNI per Capita greater than or equal to $12,615. After running the regression with the dummy variable, its coefficient of -0.0088089 indicated that developed nations had a slightly lower expected years of schooling for females than their developing counterparts, however, the variable was shown to be quite insignificant as it had a t value of -0.17 and a p value of 0.865. This is likely due to the fact that the development variable is a simplification of our GNI per Capita data, something already included in the model and the fact that the UN's definition of development is solely dependent upon income and no other factors. See the appendix for our model on this dummy variable regression.

V. Conclusions

In all of our regression models shown here, the variables for GNI per capita and infant mortality always have a statistically significant effect on the female level of education at the 1% level, and are considered to be the variables with the strongest effect on female education levels. This affirms our hypothesis that the development level of a country is tied with the expected level of education for females by way of using our explanatory variables as proxies for an overall level of development in a country. Life expectancy was also a strong indicator of education levels when tested, however, we only used it in one of our models. Our weakest two variables were poverty and urban population, with poverty only being significant at any level in our fourth regression model. We conducted an F-test for robustness between poverty and urban population to see if these variables, while weaker than our others, could have a jointly significant effect on female education levels. Based on our F-test results, urban population and poverty were well past the critical value needed to be jointly significant at the 1% level.

Based on our results, we believe that policies directed towards developing infrastructure in underdeveloped countries will help women stay in school longer, thereby creating a better workforce so that women have a more prominent role in the economy. This effect will be cyclical, as more educated women enter the workforce and help grow and develop the economy, more women will have access to quality education, allowing them to get higher paid jobs.

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Appendix

List of Countries Used:

Afghanistan	Croatia	Kenya	Republic of the Congo
Albania	Democratic Republic of the	Kiribati	Romania
Algeria	Congo	Kuwait	Russia
Angola	Denmark	Kyrgyzstan	Rwanda
Argentina	Ecuador	Lebanon	S Korea
Armenia	Egypt	Lesotho	San Marino
Australia	El Salvador	Lithuania	Senegal
Austria	Ethiopia	Luxembourg	Serbia
Bangladesh	Finland	Mali	Slovakia
Barbados	France	Mexico	Slovenia
Belgium	Germany	Moldova	South Africa
Benin	Ghana	Morocco	Spain
Bermuda	Greece	Mozambique	Sudan
Brazil	Guatemala	Netherlands	Sweden
Burkina Faso	Guyana	New Zealand	Switzerland
Cambodia	Honduras	Nigeria	Syria
Cameroon	Iceland	Norway	Thailand
Central African	India	Pakistan	Tunisia
Republic	Indonesia	Panama	Turkey
Chad	Iran	Paraguay	Turkmenistan
Chile	Ireland	Peru	UK
China	Israel	Philippines	Ukraine
Colombia	Italy	Poland	US
Costa Rica	Japan	Portugal	Venezuela
Cote D'Ivore	Jordan	Qatar	Yemen
	Kazakhstan		Zimbabwe

Stata Output:

Model 1:

```
regress lFemSchool lGNIcap
```

Source	SS	df	MS	Number of obs	=	93
				F(1, 91)	=	293.34
Model	6.79710782	1	6.79710782	Prob > F	=	0.0000
Residual	2.10863259	91	.023171787	R-squared	=	0.7632
				Adj R-squared	=	0.7606
Total	8.90574041	92	.096801526	Root MSE	=	.15222

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lGNIcap	.2334954	.0136331	17.13	0.000	.2064148	.2605759
_cons	2.00256	.0369163	54.25	0.000	1.92923	2.07589

Model 2:

```
regress lFemSchool InfMort UrbPop
```

Source	SS	df	MS	Number of obs	=	99
				F(2, 96)	=	178.20
Model	7.18255693	2	3.59127846	Prob > F	=	0.0000
Residual	1.93469857	96	.02015311	R-squared	=	0.7878
				Adj R-squared	=	0.7834
Total	9.11725549	98	.093033219	Root MSE	=	.14196

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
InfMort	-.0098932	.0009158	-10.80	0.000	-.0117111	-.0080754
UrbPop	.0035474	.0009192	3.86	0.000	.0017227	.0053721
_cons	2.564937	.0729785	35.15	0.000	2.420076	2.709798

Model 3:

```
regress lFemSchool lGNIcap Pov LifeExpec
```

Source	SS	df	MS	Number of obs	=	84
				F(3, 80)	=	114.25
Model	6.65523919	3	2.21841306	Prob > F	=	0.0000
Residual	1.55337569	80	.019417196	R-squared	=	0.8108
				Adj R-squared	=	0.8037
Total	8.20861488	83	.098898974	Root MSE	=	.13935

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lGNIcap	.143699	.0280439	5.12	0.000	.0878899	.1995082
Pov	.0005582	.0014265	0.39	0.697	-.0022807	.0033971
LifeExpec	.0149342	.0037408	3.99	0.000	.0074899	.0223785
_cons	1.133151	.2441257	4.64	0.000	.6473256	1.618977

Model 4:

```
regress lFemSchool lGNIcap UrbPop InfMort Pov
```

Source	SS	df	MS	Number of obs	=	84
				F(4, 79)	=	116.72
Model	7.02066919	4	1.7551673	Prob > F	=	0.0000
Residual	1.18794569	79	.015037287	R-squared	=	0.8553
				Adj R-squared	=	0.8480
Total	8.20861488	83	.098898974	Root MSE	=	.12263

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lGNIcap	.1067691	.0267359	3.99	0.000	.0535525	.1599856
UrbPop	.0022827	.0011207	2.04	0.045	.0000521	.0045133
InfMort	-.0085087	.0013853	-6.14	0.000	-.0112661	-.0057512
Pov	.0031632	.0013965	2.27	0.026	.0003836	.0059428
_cons	2.316255	.087725	26.40	0.000	2.141643	2.490867

F Test:

Unrestricted Model:

```
regress lFemSchool lGNIcap UrbPop InfMort Pov
```

Source	SS	df	MS	Number of obs	=	84
				F(4, 79)	=	116.72
Model	7.02066919	4	1.7551673	Prob > F	=	0.0000
Residual	1.18794569	79	.015037287	R-squared	=	0.8553
				Adj R-squared	=	0.8480
Total	8.20861488	83	.098898974	Root MSE	=	.12263

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lGNIcap	.1067691	.0267359	3.99	0.000	.0535525	.1599856
UrbPop	.0022827	.0011207	2.04	0.045	.0000521	.0045133
InfMort	-.0085087	.0013853	-6.14	0.000	-.0112661	-.0057512
Pov	.0031632	.0013965	2.27	0.026	.0003836	.0059428
_cons	2.316255	.087725	26.40	0.000	2.141643	2.490867

Restricted Model:

```
regress lFemSchool lGNIcap if !missing(Pov)
```

Source	SS	df	MS	Number of obs	=	84
				F(1, 82)	=	274.14
Model	6.31859473	1	6.31859473	Prob > F	=	0.0000
Residual	1.89002015	82	.023049026	R-squared	=	0.7698
				Adj R-squared	=	0.7669
Total	8.20861488	83	.098898974	Root MSE	=	.15182

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lGNIcap	.2349325	.0141892	16.56	0.000	.2067056	.2631594
_cons	1.997189	.039172	50.99	0.000	1.919264	2.075115

Dummy Variable:

```
. regress lFemSchool lGNICap InfMort PovertyRates UrbPop developed
```

Source	SS	df	MS	Number of obs	=	84
				F(5, 78)	=	92.24
Model	7.02111418	5	1.40422284	Prob > F	=	0.0000
Residual	1.1875007	78	.015224368	R-squared	=	0.8553
				Adj R-squared	=	0.8461
Total	8.20861488	83	.098898974	Root MSE	=	.12339

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lGNICap	.1100908	.0331839	3.32	0.001	.0440267	.1761549
InfMort	-.00854	.0014059	-6.07	0.000	-.011339	-.005741
PovertyRates	.0032355	.0014673	2.21	0.030	.0003142	.0061567
UrbPop	.0023018	.0011331	2.03	0.046	.0000459	.0045577
developed	-.0088089	.0515224	-0.17	0.865	-.1113822	.0937644
_cons	1.550786	.2939847	5.28	0.000	.9655071	2.136064

Extraneaous:

Female Education & Poverty Simple Regression:

```
regress lFemSchool Pov
```

Source	SS	df	MS	Number of obs	=	85
				F(1, 83)	=	99.06
Model	4.47210649	1	4.47210649	Prob > F	=	0.0000
Residual	3.74697781	83	.045144311	R-squared	=	0.5441
				Adj R-squared	=	0.5386
Total	8.2190843	84	.097846242	Root MSE	=	.21247

lFemSchool	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Pov	-.0119946	.0012051	-9.95	0.000	-.0143916	-.0095977
_cons	2.727766	.0270853	100.71	0.000	2.673895	2.781638

Female Education & GNI per Capita Scatter Plot: