

*SOCIOECONOMIC DETERMINANTS OF FERTILITY RATES IN SUB-SAHARAN AFRICA***I. INTRODUCTION**

Population structure lies at the heart of every nation's development policies, as the intertwinement between population, fertility, resource allocation and social productivity mandate that solving the enigma of demographic transition is paramount to, and necessary for, tackling successive development issues. Sub-Saharan Africa was responsible for 11% of global total fertility by women under age 20 between 2010-2015, and the region houses the largest concentration of Least Developed Countries in the world.¹ Demographically, Sub-Saharan Africa hinders its development culturally and politically by ignoring the welfare of women and indirectly promoting pro-fertility cultural norms.

Fertility rates represent a nation's attitude toward its population structure by expressing said nation's attitude towards female freedom and welfare – mainly towards a woman's freedom of expression concerning childbearing (and indirectly marriage and family). This study will examine the correlation between fertility and various socioeconomic indicators to explore the relationship between women's welfare and fertility rates.

II. SAMPLE

The sample for this study consists of 45 nations from Sub-Saharan Africa, which will be analyzed as a cross-section for the year 2014 (where data are available). This excludes Seychelles, Cape Verde (both Small Island Developing States) and South Sudan due to data

¹ United Nations, Department of Economic and Social Affairs, Population Division. "World Fertility Patterns 2015." *Department of Economic and Social Affairs*. Accessed October 2, 2017. <http://www.un.org/en/development/desa/population/publications/pdf/fertility/world-fertility-patterns-2015.pdf>

insufficiency.

III. DEPENDENT VARIABLE

Total Fertility Rate

The dependent variable for this study is the Total Fertility Rate (TFR) in each of the 43 nations.² Data are supplied by the World Bank's Development Indicators Database for 2014. TFR is defined as the average number of children a woman would bear throughout her child-bearing years (age 15-49). TFR is calculated as the average of the General Fertility Rate (births per 1,000 women) for 7 age groups in increments of 5 years (inclusive) between 15-49 years of age.³

IV. INDEPENDENT VARIABLES

Primary School Graduation Rate

This variable is defined as the percentage of women aged 15-24 who have graduated primary school. Data are supplied by the UNESCO Global Education Monitoring Report,⁴ the UNESCO Institute for Statistics for the nations of Angola,⁵ Botswana,⁶ and Eritrea,⁷ and

² World Bank. "Fertility Rate, Total (Births Per Woman)." *World Bank Open Data*. Accessed October 2, 2017. <https://data.worldbank.org/indicator/SP.DYN.TFRT.IN/>

³ For example, for the age group 15-19, General Fertility rate is calculated as the births per 1,000 women randomly selected from the ages of 15-19.

⁴ United Nations Educational, Scientific and Cultural Organization. "Primary Completion Rate". *Global Monitoring Education Report*. Accessed October 2, 2017. <<http://www.education-inequalities.org>>

⁵ Educational Policy Data Center. "Angola National Education Profile." *Educational Policy Data Center*. Accessed October 2, 2017.

<https://www.epdc.org/sites/default/files/documents/EPDC%20NEP_Angola.pdf>

⁶ Educational Policy Data Center. "Botswana National Education Profile." *Educational Policy Data Center*. Accessed October 2, 2017.

<https://www.epdc.org/sites/default/files/documents/EPDC%20NEP_Botswana_0.pdf>

⁷ Educational Policy Data Center. "Eritrea National Education Profile." *Educational Policy Data Center*. Accessed October 2, 2017. <

https://www.epdc.org/sites/default/files/documents/EPDC%20NEP_Eritrea.pdf>

USAID’s Demographic and Health Survey Program⁸ for the years 2006-2014.⁹

The prevalence of primary school indicates a strong institutional foundation within a country, which is necessary to develop a healthy society and economy. State-mandated formal education and fertility are negatively correlated in most developed nations due to education’s influence on women’s attitudes towards marriage, family planning and demographics.

Graduation from primary school generally fosters a higher awareness of one’s biology, and the potential impact said biology can catalyze on their nation. Higher graduation rates also act as an indicator of more stable social programs (a common problem in upholding educational institutions) and an adverse predisposition to marriage at a young age.¹⁰

This study hypothesizes that nations with higher percentages of women graduating primary school will have a lower fertility rate. As graduation rates increase, young females are more aware of the costs and benefits of child-bearing and recognizing that in the long run costs trump benefits (including the opportunity costs of employment and opportunities for further education), choose to bear fewer children.

Legislation Against Genital Mutilation

Female Genital Mutilation (FGM) is defined by the World Health Organization as “all procedures involving partial or total removal of the female external genitalia or other injury to

⁸ USAID. “República de Guinea Ecuatorial – Encuesta Demográfica y De Salud 2011.” *Demographic and Health Surveys Program*. United States Agency for International Development. Accessed October 2, 2017.

<<https://dhsprogram.com/publications/publication-FR271-DHS-Final-Reports.cfm>>

⁹ Data could not be procured for solely 2014 due to lack of observations and data sources.

¹⁰ United Nations, Department of Economic and Social Affairs, Population Division. “Linkages Between Population and Education: A Technical Support Services Report.” *United Nations, Department of Economic and Social Affairs*. Accessed October 2, 2017. <<http://www.un.org/esa/population/pubsarchive/tssp/tss976/gbc976.htm>>

the female genital organs for non-medical reasons.”¹¹ The United Nations Population Fund finds a strong positive correlation between any of 3 types of FGM (clitoridectomy, excision, infibulation) and fertility rates, especially in nations with high adolescent fertility rates such as Somalia, Eritrea, and Djibouti.¹²

Formal legislation against female genital mutilation is measured as a dummy variable defined as two distinct descriptions of legislation according to survey data from the UK Border Agency’s 2014 report on FGM: Either (1) Strict prohibition of any and all forms of FGM, and (0) all other descriptions. According to several nations, the status of FGM’s legality is either ambiguous, non-existent, or unknown to parliamentary officials. Few nations describe strict and prohibitive legislation against FGM in their legal systems.

Many Sub-Saharan cultures consider FGM to be the right-of-passage between childhood and womanhood. As such, FGM is deeply rooted in the traditional values of motherhood and fertility. This study predicts that as the enforcement of strict formal legislation against FGM increases, fertility rates decrease. The reasoning for this hypothesis is therefore two-fold. First, formal legislation against FGM is indicative of a nation’s ambition to disallow tradition to dictate choice amongst women. Therefore, as legislation against FGM becomes more prevalent, individual choice among women increases. Second, as legislation against FGM increases, cultural focus on motherhood and fertility decreases. Increased individual choice coupled with a de-emphasis on traditional cultural values will lead to lower fertility by fostering ambitions to pursue higher social and economic freedoms.

¹¹ UK Border Agency. “Country Of Origin Information Report: Female Genital Mutilation (FGM).” *European Country of Origin Information Network*. Accessed October 2, 2017. <https://www.ecoi.net/file_upload/1504_1224004793_africa-fgm-080708.pdf>

¹² United Nations Population Fund. “Demographic Perspectives on Female Genital Mutilation.” *Sustainable Development Knowledge Platform*. United Nations. Accessed October 2, 2017. <[https://sustainabledevelopment.un.org/content/documents/19961027123_UN_Demographics_v3%20\(1\).pdf](https://sustainabledevelopment.un.org/content/documents/19961027123_UN_Demographics_v3%20(1).pdf)>

Female Labor Force Participation Rate

According to the World Bank, female labor force participation is defined as the percentage of a nation's population above the age of 15 that are employed, unemployed (and actively searching), or first-time job seekers within the formal sector. Data are collected from the World Bank's Development Indicators Database for 2014.¹³

The International Labor Organization finds that increased employment opportunities for female workers catalyze several beneficial effects concerning individual welfare that passively disincentivize child-bearing or establishing oneself as a housewife. Changes in behavioral preference such as educational investment, sexual aversion, and an acute focus on career trajectories occur due to increased labor opportunities.¹⁴

This study hypothesizes that as female labor force participation increases, fertility decreases. While acknowledging that female labor force participation can potentially misrepresent proper working conditions and insufficient educational opportunities, as labor force participation increases, so does income, time spent away from the household, and financial independence. As independence increases, professional responsibilities and opportunities for upward mobility (and by proxy postgraduate education opportunities) increase, and so the opportunity cost of raising children increases, thereby leading to lower fertility rates.

GDP Per Capita

¹³ World Bank. "Labor Force Participation Rate, Female (% Of Female Population Ages 15+) (Modeled ILO Estimate)." *World Bank Open Data*. World Bank Group. Accessed October 5, 2017. <https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS>

¹⁴ Lim, Lin Lean. "Female Labour-Force Participation." *United Nations, Department of Economic and Social Affairs, Population Division*. Accessed October 2, 2017. <
<http://www.un.org/esa/population/publications/completingfertility/RevisedLIMpaper.PDF>>

GDP per capita is defined by the World Bank as the total measure of final goods and services produced within a nation's boundaries plus product taxes less subsidies divided by the nation's midyear population measured in current U.S dollars. Data are collected for the year 2014 from the World Bank's Development Indicators database¹⁵ and the United Nations Statistics Division's World Statistics Pocketbook 2016.¹⁶

The fertility-income relationship remains a paradox among economic researchers. The Malthusian school asserts that as income increase, population will unambiguously increase solely due to an abundance of income. This contrasts with the modern school's outlook, which states that an abundance of income leads to an increase in individual freedoms and advanced infrastructure, therefore increasing the opportunity cost for childbearing. The characteristics of the modern school's belief define the third stage of the demographic transition model, in which increased aggregate development begets decreasing birth rates. This study hypothesizes that as GDP per capita increases, fertility rates will decline asserting that Sub-Saharan Africa is currently progressing through the third demographic transition stage.

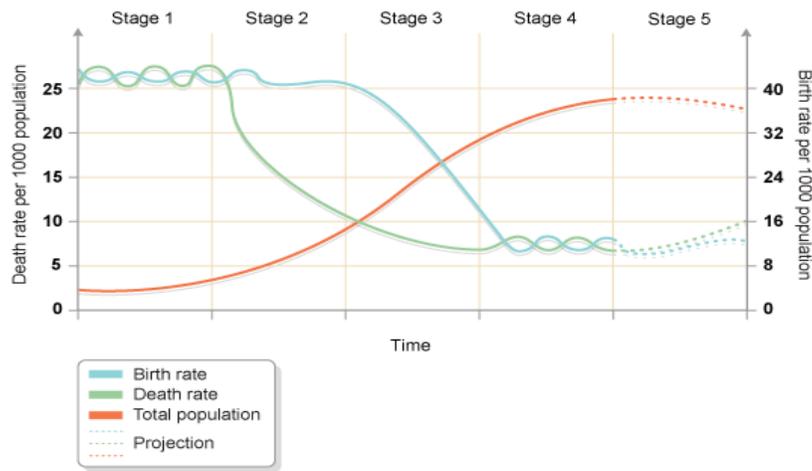
GDP per capita represents a nation's aggregate output to be shared amongst its citizens (as purchasing power). A rise in GDP per capita indicates an increased ability to access both higher quality goods and services such as institutional education, high-grade health infrastructure and food security. As such, increasing GDP per capita within a nation also correlates with lower infant mortality rates, which the United Nations has demonstrated, and so GDP per capita also acts as an indicator of infant mortality.¹⁷ Additionally, the consumption of female contraception,

¹⁵ World Bank. "GDP per capita (current US\$)." *World Bank Open Data*. Accessed October 2, 2017. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

¹⁶ United Nations Statistics Division. "World Statistics Pocketbook 2016." *United Nations Statistics Division*. Accessed October 2, 2017. <
<https://unstats.un.org/unsd/publications/pocketbook/files/world-stats-pocketbook-2016.pdf>>

¹⁷ Ranis, Gustav & Stewart, Francis. "Dynamic Links between the Economy and Human

abortion services (where they are allowed), and voluntary sterilization are within reach.¹⁸



Women in Parliament

This variable is defined as the percentage of women elected to the Lower House or Single House of a nation's parliament for the year 2014.¹⁹ Data are collected from the Inter-Parliamentary Union's Statistical Archive for Women in Parliament.²⁰ Data for women in the Senate (Upper House) is incomplete between 2000-2017 and therefore is insufficient for comprehensive analysis.

Female presence in local, regional, or national government has substantial effects concerning women's advocacy within the policy arena as well as political cohesion. In the policy arena, female parliamentarians profess stronger advocacy for gender equality, family & community welfare, education and health care than their male counterparts.²¹ Additionally, the presence of

Development." *Department of Economic and Social Affairs*. Accessed October 2, 2017. http://www.un.org/esa/desa/papers/2005/wp8_2005.pdf

¹⁸ (Image above of Demographic Transition Model) — Bitesize. "The Demographic Transition Model." BBC: *British Broadcasting Corporation*. 2014. Accessed March 22, 2018.

<http://www.bbc.co.uk/schools/gcsebitesize/geography/population/population_change_structure_rev4.shtml>

¹⁹ Data for Central African Republic is procured from 2017 due to lack of any parliamentary establishment until 2017.

²⁰ Inter-Parliamentary Union. "Women In National Parliaments Statistical Archive." *Inter Parliamentary Union*. October 2, 2017. <<http://www.ipu.org/wmn-e/arc/classif011214.htm>>

²¹ Inter-Parliamentary Union. "Equality in Politics: A Survey of Women and Men in Parliament"

female parliamentaries represents a nation's attitude towards women's social status.

This study hypothesizes that higher female parliamentary representation leads to lower fertility rates.²² Female representation begets greater focus on health programs, family planning, education and fair legal treatment for women. As legislation advances within these issues, female health and empowerment will increase, and with the advancement of individual female welfare, the opportunity cost of childbearing overtakes its benefits.

Male Contraception Prevalence

Male contraception prevalence is defined as the percentage of men who voluntarily use contraception as reported by women either married or in-union between the ages of 15-49. Data are collected from the United Nation Population Fund's World Contraception Report 2017.²³ Data for each nation is selected from the years 2010-2015 except for South Africa (2003), Djibouti (2006), Somalia (2006), Botswana (2007) and Madagascar (2008) due to data inconsistency.²⁴

In many Sub-Saharan cultures, men are dominant in decisions regarding contraception usage within relationships. Several women cite fear of their partner's disapproval as the main reason for the avoidance of contraception. Women occasionally avoid family planning programs for the same reason. Voluntary male contraception represents an easing of patriarchal attitudes within a relationship and more respect for women's choice concerning intercourse and

Inter-Parliamentary Union. Accessed October 2, 2017. <<http://www.ipu.org/wmn-e/arc/classif011214.htm>>

²² Note: This causality may occur in the opposite manner – women with lower fertility rates may choose to devote more of their effort & resources to political endeavors.

²³ United Nations, Department of Economic and Social Affairs, Population Division. "World Contraceptive Usage 2017." *United Nations, Department of Economic and Social Affairs*. Accessed October 2, 2017.

<<http://www.un.org/en/development/desa/population/publications/dataset/contraception/wcu2017.shtml>>

²⁴ Data could not be procured for solely 2014 due to lack of observations and data sources.

contraception.²⁵

This study hypothesizes that as male contraception usage rises, fertility rates fall. This is due to shifting cultural focuses towards male awareness of women's welfare within marriages/unions and an active female role in the decision-making process. Voluntary contraception usage, at the political level, is also indicative of more acute attention to female welfare in public policy which is most notable through higher funding for family planning programs.

V. RESULTS

Primary School Graduation Rate (primary %)

This variable was highly significant in the regression at a p-value of 0.0005, which reveals that this variable is also significant at the 99% confidence interval (making this the most significant independent variable in this study). As hypothesized, the variable has a negative coefficient, affirming the prediction that as primary education increases, fertility decreases. The value of the coefficient asserts that if the collective primary graduation rate rises by 1 percentage point, women on average will bear approximately 0.0216 fewer children. This is marginally greater than the standard replacement rate for global total fertility (2.1). In more developed nations such as Botswana and South Africa, where the total fertility rate is just under 3 children per woman, a substantial 25-50% increase in female education harbors the potential to decrease total fertility below the standard global replacement rate. Additionally, primary education is more significant than male contraception usage. Education may be more effective than the

²⁵ Blackstone, Sarah R. & Iwelunmor, Juliet. "Determinants of Contraceptive Use Among Nigerian couples: Evidence From the 2013 Demographic and Health Survey." *Contraception and Reproductive Medicine* 2, no. 9 (2017): 1-8.

provision of (and education concerning) contraception due to the proliferation of ideas such as sexual choice, family planning and the opportunity cost of bearing children at a very young age. Ideas such as sexual abstinence and family planning may be more ingratiated in students' minds within small communities due to African society's strong propensity for community relations and collectivist culture (which are highly prevalent in rural areas).

Legislation Against Genital Mutilation (*legislation*)

This variable was not statistically significant in the regression at a p-value of 0.18. Therefore, the null hypothesis, that legislation against female genital mutilation (FGM) has no effect on fertility rates, cannot be rejected with 95% confidence. The effect of some nation's legislation prohibiting FGM are potentially weak and ineffective.

Female Labor Force Participation Rate (*labor force*)

This variable was not statistically significant in the regression at a p-value of 0.67. Therefore, the null hypothesis, that female labor force participation rate has no effect on fertility rates, cannot be rejected with 95% confidence.

GDP Per Capita (*gpd per cap*)

This variable was not statistically significant in the regression at a p-value of 0.63. Therefore, the null hypothesis, that GDP per capita has no effect on fertility rates, cannot be rejected with 95% confidence.

Women in Parliament (*fem low hous*)

This variable was not statistically significant in the regression at a p-value of 0.06. Therefore, the null hypothesis, that Women in Parliament has no effect on fertility rates, cannot be rejected with 95% confidence.

Male Contraception Prevalence (contraception)

This variable was significant in the regression at a p-value of 0.02. As hypothesized, the coefficient was negative at a value of -4.37 (the strongest coefficient of all significant variables in this study), stating that a 1 percentage point increase in the male contraception usage rate would decrease fertility by 0.0437 children. Awareness of/respect for female welfare at the individual and governmental levels is a strong potential catalyst for this result. Additionally, contraception's ease of production, wholesale purchase, transportation, distribution and use make it considerably less costly and time-consuming to distribute to the general public than other agents of change (notably primary education). Male contraception is more effective in the short run (playing the role of shock therapy) due to its ease of proliferation and sharp immediate results. Similar to primary education graduation rates, a 25-50% increase in male contraception usage has the potential to bring a nation's total fertility rate below the standard global replacement rate (2.1 children per woman).

CONCLUSION

The adjusted R-squared value was 0.46, indicating that a standard collection of orthodox socioeconomic indicators weakly explains the variation in fertility rates across Sub-Saharan Africa. The variables representing primary graduation rates and male contraception usage were the only statistically significant variables in this study.

The most effective predictor of fertility in this study was found to be primary education. The proliferation of ideas and tenets concerning sexual abstinence at a young, tender age has the strongest effect on schooling-age girls across the region due to both high neuroplasticity and strong interpersonal relations within villages and small communities. Modest increases in primary education across moderately or highly developed countries could decrease fertility below the standard replacement rate of 2.1 children per woman.

Four supplementary regressions were conducted. The first three regressions omitted GDP per capita, male contraception usage and legislation against female mutilation each individually to account for multicollinearity and the possibility that legislation against female genital mutilation is potentially non-binding. None of these three regressions changed the significance of any variable as compared to the original regression, and coefficients (intercepts) were virtually unchanged. The fourth regression replaces GDP per capita as the same variable in the form of its natural logarithm (*ln gdp per capita*). In this regression, a 1 percentage point increase in GDP per capita would decrease fertility by 0.0002 children. This regression also did not change the significance of any variable as compared to the original regression, and again, coefficients remained unchanged.

Additionally, a regression including a variable representing a nation's rural population was conducted using data representing the total non-urban population of each nation provided by the World Bank.²⁶ The percentage of a nation's population residing in rural areas could potentially influence fertility rates alongside aforementioned socioeconomic indicators. Income, education, access to government resources and formal employment opportunities are drastically

²⁶ World Bank. "Rural population (% of total population)." *World Bank Open Data*. Accessed October 2, 2017. <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>

CORRELATION MATRIX

	<i>fertility</i>	<i>primary%</i>	<i>legislation</i>	<i>laborforce</i>	<i>gdp per cap</i>	<i>fem low hous</i>	<i>contraception</i>	<i>rural</i>
<i>fertility</i>	1							
<i>primary%</i>	-0.6544848	1						
<i>legislation</i>	-0.0632031	-0.02427	1					
<i>laborforce</i>	0.0555074	-0.0902875	-0.0579107	1				
<i>gdp per cap</i>	-0.286831	0.45978686	-0.142935	-0.1338939	1			
<i>fem low hous</i>	-0.171431	0.00195647	-0.0430352	0.23630775	0.06339201	1		
<i>contraception</i>	-0.5023195	0.49906353	-0.2606556	-0.0331608	0.34516558	-0.0893125	1	
<i>rural</i>	0.31267113	-0.3031531	0.02599096	0.34338611	-0.316831	0.20651193	-0.2391441	1

MODELS

Regression 1 (main regression): $\text{fertility} = \beta_0 + \beta_1(\text{primary \%}) + \beta_2(\text{legislation}) + \beta_3(\text{labor force}) + \beta_4(\text{gdp per cap}) + \beta_5(\text{fem low hous}) + \beta_6(\text{contraception}) + \text{error}$

Regression 2: $\text{fertility} = \beta_0 + \beta_1(\text{primary \%}) + \beta_2(\text{legislation}) + \beta_3(\text{labor force}) + \beta_4(\text{fem low hous}) + \beta_5(\text{contraception}) + \text{error}$

Regression 3: $\text{fertility} = \beta_0 + \beta_1(\text{primary \%}) + \beta_2(\text{legislation}) + \beta_3(\text{labor force}) + \beta_4(\text{gdp per cap}) + \beta_5(\text{fem low hous}) + \text{error}$

Regression 4: $\text{fertility} = \beta_0 + \beta_1(\text{primary \%}) + \beta_2(\text{labor force}) + \beta_3(\text{gdp per cap}) + \beta_4(\text{fem low hous}) + \beta_5(\text{contraception}) + \text{error}$

Regression 5: $\text{fertility} = \beta_0 + \beta_1(\text{primary \%}) + \beta_2(\text{legislation}) + \beta_3(\text{labor force}) + \beta_4(\text{gdp per cap}) + \beta_5(\text{fem low hous}) + \beta_6(\text{contraception}) + \beta_7(\text{rural}) + \text{error}$

Regression 6: $\text{fertility} = \beta_0 + \beta_1(\text{primary \%}) + \beta_2(\text{legislation}) + \beta_3(\text{labor force}) + \beta_4(\ln \text{gdp per cap}) + \beta_5(\text{fem low hous}) + \beta_6(\text{contraception}) + \text{error}$

Regression 1 (main regression)

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.73							
R Square	0.54							
Adjusted R Square	0.46							
Standard Error	0.74							
Observations	45.00							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	6.00	23.87	3.98	7.32	0.00003			
Residual	38.00	20.66	0.54					
Total	44.00	44.53						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	6.40	0.53	12.08	0.00	5.33	7.47	5.33	7.47
primary %	-2.16	0.57	-3.77	0.001	-3.33	-1.00	-3.33	-1.00
legislation	-0.33	0.24	-1.35	0.18	-0.82	0.16	-0.82	0.16
labor force	0.29	0.68	0.43	0.67	-1.08	1.66	-1.08	1.66
gdp per cap	0.00002	0.00004	0.49	0.63	-0.0001	0.0001	-0.0001	0.0001
fem low hous	-1.74	0.90	-1.92	0.06	-3.57	0.09	-3.57	0.09
contraception	-4.37	1.83	-2.39	0.02	-8.08	-0.67	-8.08	-0.67

APPENDIX

Regression 2 (Omitting GDP Per Capita)

SUMMARY OUTPUT									
<i>Regression Statistics</i>									
Multiple R	0.73								
R Square	0.53								
Adjusted R Square	0.47								
Standard Error	0.73								
Observations	45.00								
<i>ANOVA</i>									
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
Regression	5.00	23.74	4.75	8.91	0.00001				
Residual	39.00	20.79	0.53						
Total	44.00	44.53							
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
Intercept	6.40	0.52	12.22	0.00	5.34	7.46	5.34	7.46	
primary %	-2.07	0.53	-3.88	0.0004	-3.14	-0.99	-3.14	-0.99	
legislation	-0.34	0.24	-1.43	0.16	-0.82	0.14	-0.82	0.14	
labor force	0.24	0.66	0.37	0.72	-1.10	1.58	-1.10	1.58	
fem low hous	-1.69	0.89	-1.90	0.07	-3.49	0.11	-3.49	0.11	
contraception	-4.26	1.80	-2.37	0.02	-7.90	-0.63	-7.90	-0.63	

Regression 3 (Omitting Male Contraception Usage)

SUMMARY OUTPUT									
<i>Regression Statistics</i>									
Multiple R	0.68								
R Square	0.47								
Adjusted R Square	0.40								
Standard Error	0.78								
Observations	45.00								
<i>ANOVA</i>									
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
Regression	5.00	20.76	4.15	6.82	0.0001				
Residual	39.00	23.76	0.61						
Total	44.00	44.53							
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
Intercept	6.50	0.56	11.62	0.00	5.37	7.63	5.37	7.63	
primary %	-2.76	0.55	-5.03	0.00001	-3.87	-1.65	-3.87	-1.65	
legislation	-0.17	0.25	-0.69	0.50	-0.67	0.33	-0.67	0.33	
labor force	0.22	0.72	0.31	0.76	-1.23	1.67	-1.23	1.67	
gdp per cap	0.00001	0.00	0.17	0.86	-0.0001	0.0001	-0.0001	0.0001	
fem low hous	-1.44	0.95	-1.52	0.14	-3.36	0.48	-3.36	0.48	

Regression 4 (Omitting Female Genital Mutilation)

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.72							
R Square	0.51							
Adjusted R Square	0.45							
Standard Error	0.75							
Observations	45.00							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	5.00	22.87	4.57	8.24	0.00002			
Residual	39.00	21.66	0.56					
Total	44.00	44.53						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	6.26	0.53	11.92	0.00	5.20	7.33	5.20	7.33
primary %	-2.29	0.57	-3.99	0.0003	-3.45	-1.13	-3.45	-1.13
labor force	0.34	0.68	0.50	0.62	-1.04	1.72	-1.04	1.72
gdp per cap	0.00003	0.00004	0.63	0.53	-0.0001	0.0001	-0.0001	0.0001
fem low hous	-1.67	0.91	-1.83	0.07	-3.52	0.17	-3.52	0.17
contraception	-3.70	1.78	-2.08	0.04	-7.30	-0.10	-7.30	-0.10

Regression 5 (Including Rural Population)

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.75							
R Square	0.56							
Adjusted R Square	0.48							
Standard Error	0.73							
Observations	45.00							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	7.00	24.87	3.55	6.69	0.00004			
Residual	37.00	19.65	0.53					
Total	44.00	44.53						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	5.90	0.64	9.23	0.00	4.60	7.19	4.60	7.19
primary %	-2.05	0.57	-3.58	0.001	-3.22	-0.89	-3.22	-0.89
legislation	-0.33	0.24	-1.37	0.18	-0.81	0.16	-0.81	0.16
labor force	0.02	0.70	0.03	0.98	-1.39	1.43	-1.39	1.43
gdp per cap	0.00003	0.00004	0.74	0.46	-0.0001	0.0001	-0.0001	0.0001
fem low hous	-1.94	0.91	-2.14	0.04	-3.78	-0.10	-3.78	-0.10
contraception	-4.20	1.81	-2.32	0.03	-7.88	-0.53	-7.88	-0.53
rural	1.05	0.76	1.37	0.18	-0.50	2.59	-0.50	2.59

Regression 6 (Replacing GDP per capita as its natural logarithmic form)

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.73							
R Square	0.53							
Adjusted R Square	0.46							
Standard Error	0.74							
Observations	45.00							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	6.00	23.75	3.96	7.24	0.00			
Residual	38.00	20.78	0.55					
Total	44.00	44.53						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	6.24	1.26	4.95	0.00	3.69	8.80	3.69	8.80
primary %	-2.11	0.62	-3.38	0.002	-3.37	-0.85	-3.37	-0.85
legislation	-0.34	0.24	-1.41	0.17	-0.83	0.15	-0.83	0.15
labor force	0.29	0.74	0.39	0.70	-1.21	1.78	-1.21	1.78
ln gdp per capita	0.02	0.17	0.14	0.89	-0.32	0.36	-0.32	0.36
fem low hous	-1.72	0.93	-1.85	0.07	-3.60	0.16	-3.60	0.16
contraception	-4.34	1.90	-2.28	0.03	-8.18	-0.49	-8.18	-0.49