Determinants of HIV

M. Moellenkamp and N. Rosemberg

December 4th, 2014

Presentation Outline

- Research Question & Motivation
- Theoretical Framework
- Methodology
- Descriptive Statistics
- Findings
- Conclusion & Limitations

Research Question & Motivation

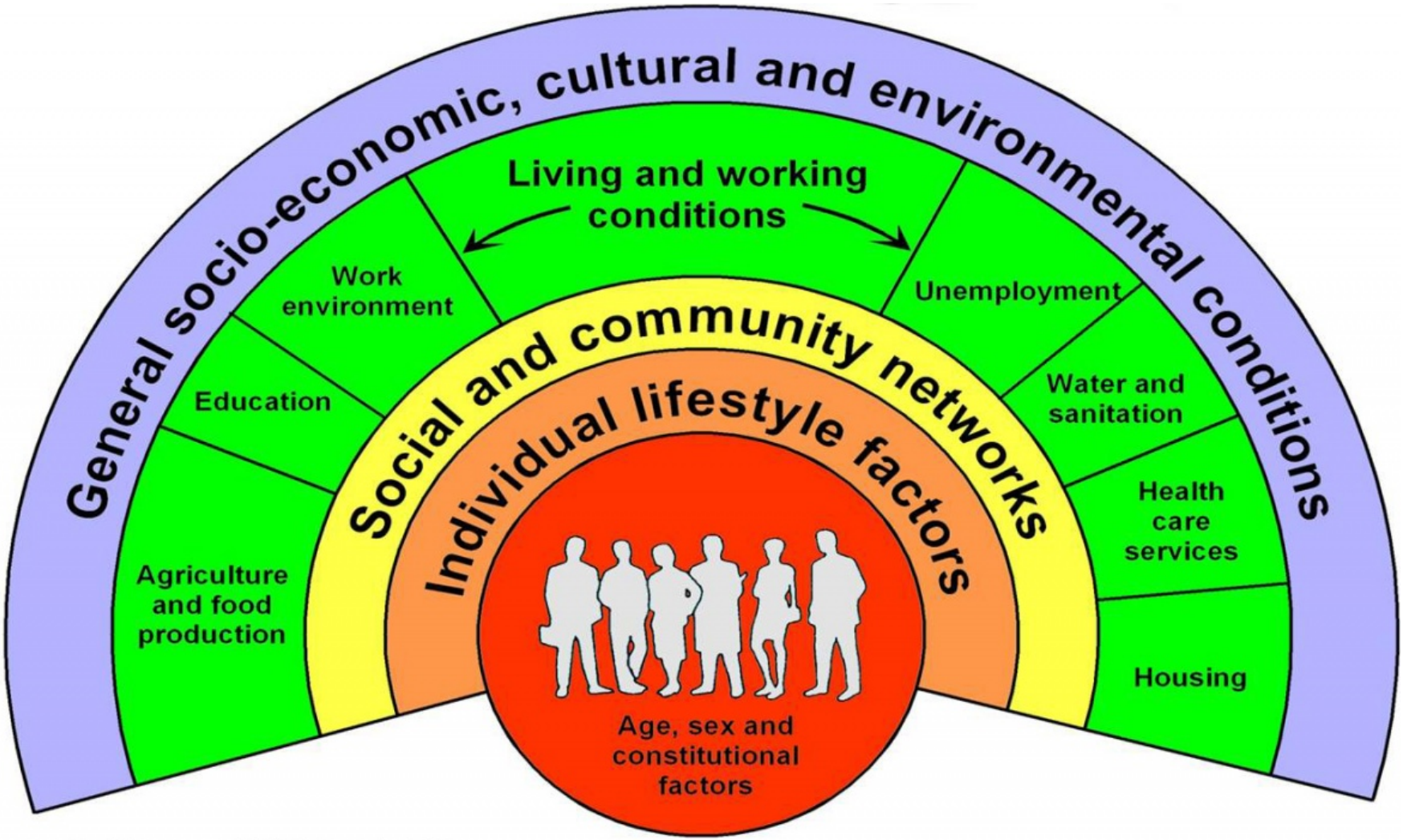
Research Question: Are community level factors significant determinants of HIV/AIDS incidence rates?

1. Understand why some countries failed to achieve MDG 6A

   - *MDG 6: "Combat HIV/AIDS, Malaria and other diseases"*
   - *Target 6A: "Have halted by 2015 and begun to reverse the spread of HIV/AIDS"*

2. Explore disease-specific determinants of health

Theoretical Framework - Determinants of Health



Source: Dahlgren and Whitehead, 1991

Methodology

Model

$$I_{it} = \beta_0 + \beta_1 SE_{it} + \beta_2 WLC_{it} + \beta_3 SCN_{it} + \beta_4 ILF_{it} + \epsilon_{it}$$

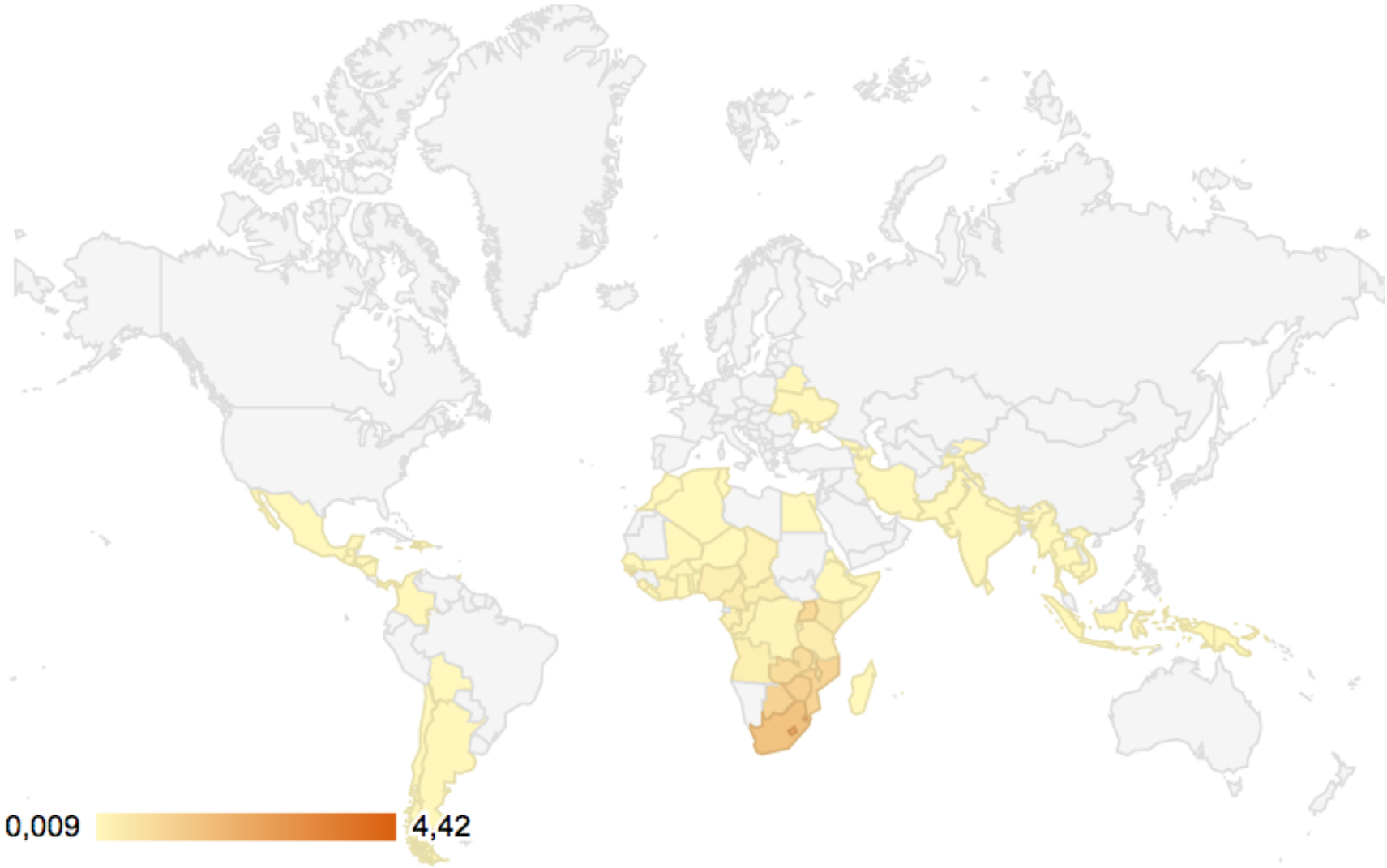
Datasets

- We will use the World Development Indicators (WDI) for the independent variables and a dataset from UNAIDS for the HIV/AIDS prevalence rate.

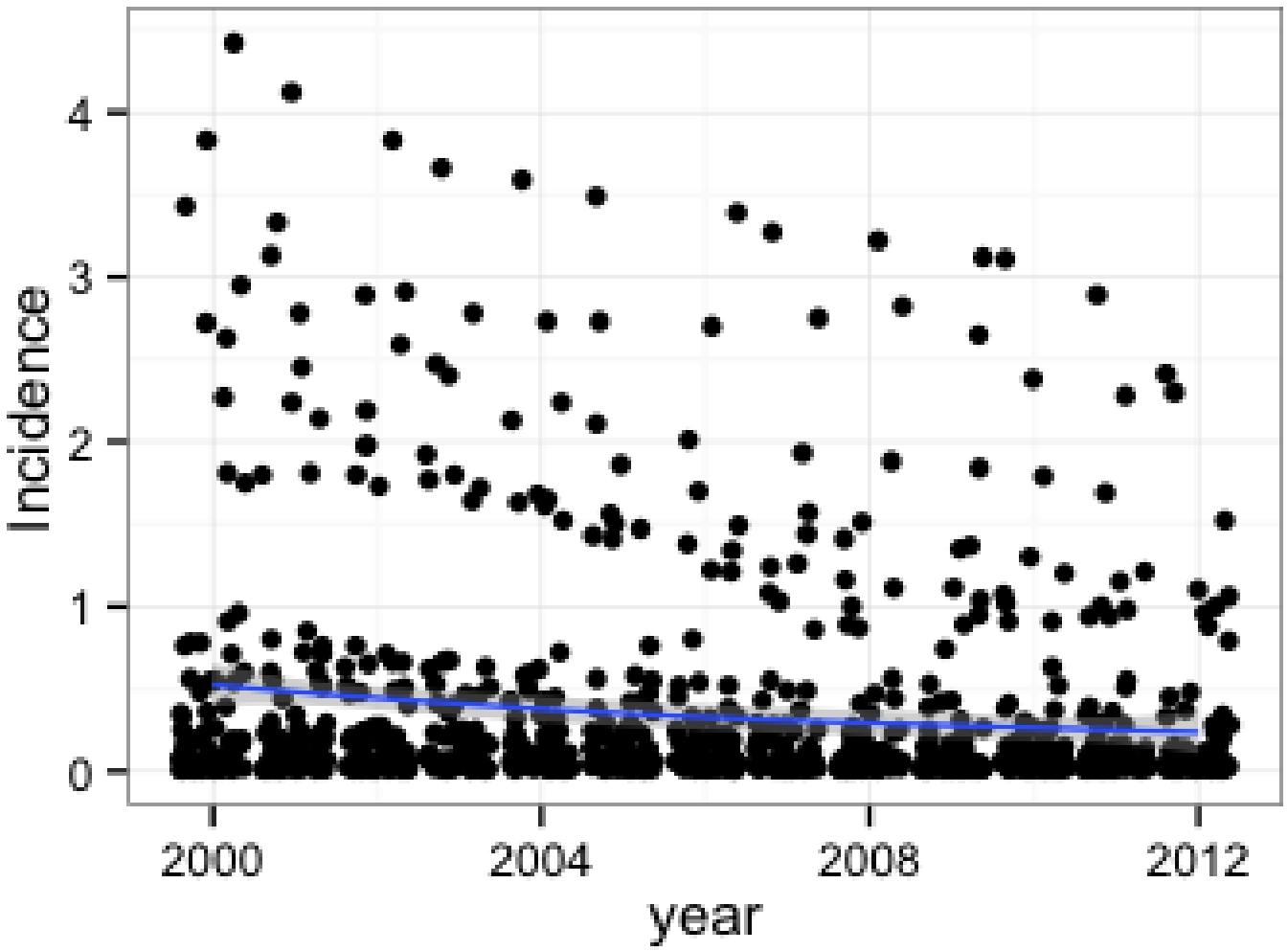
Methodology

- Model 1: Logistic Regression & Predicted Probabilities
- Model 2: Pooled OLS Regression (with robust stand. Errors)

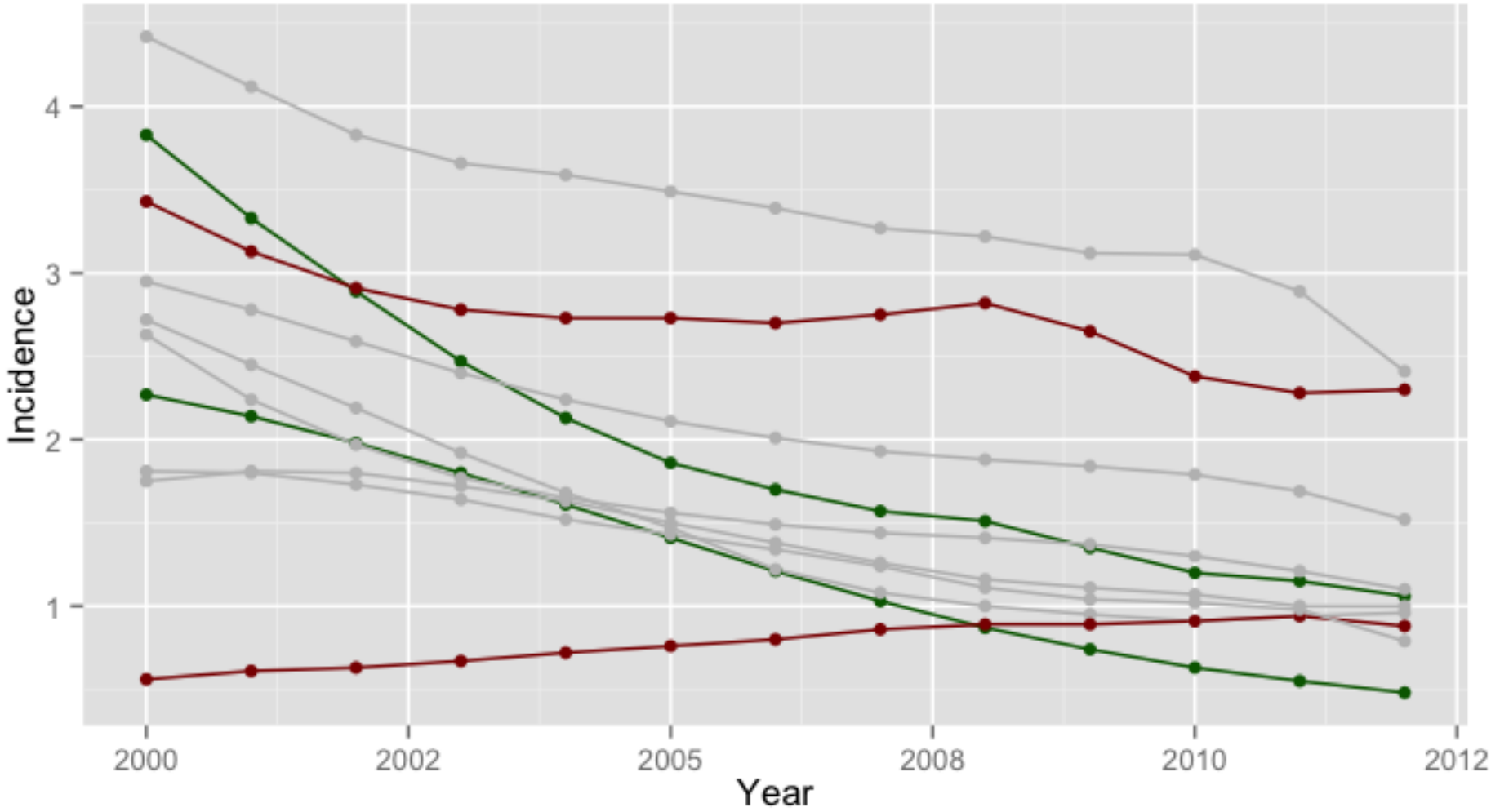
Distribution of HIV Incidence Rates



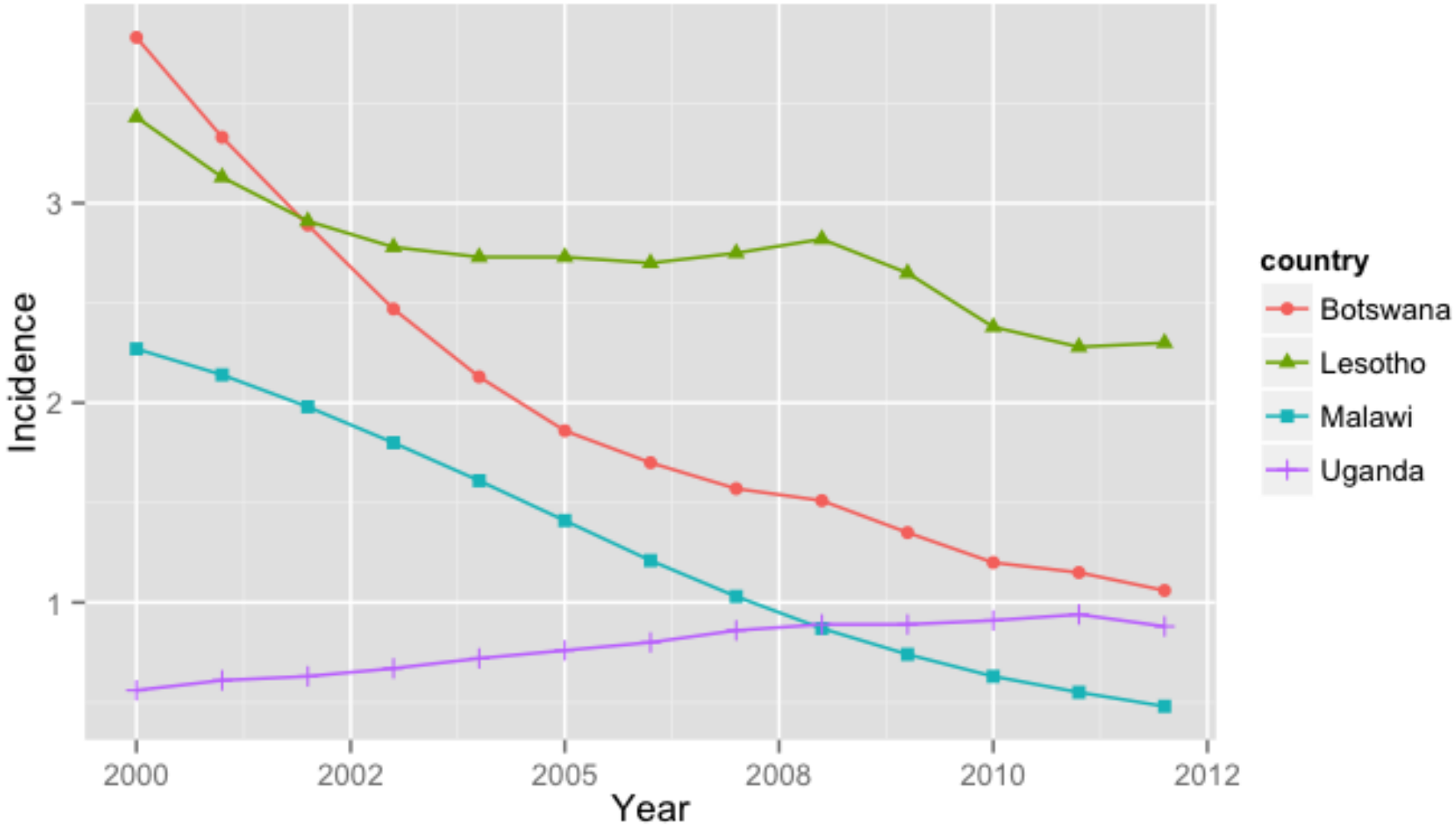
HIV Incidence Rates over Time



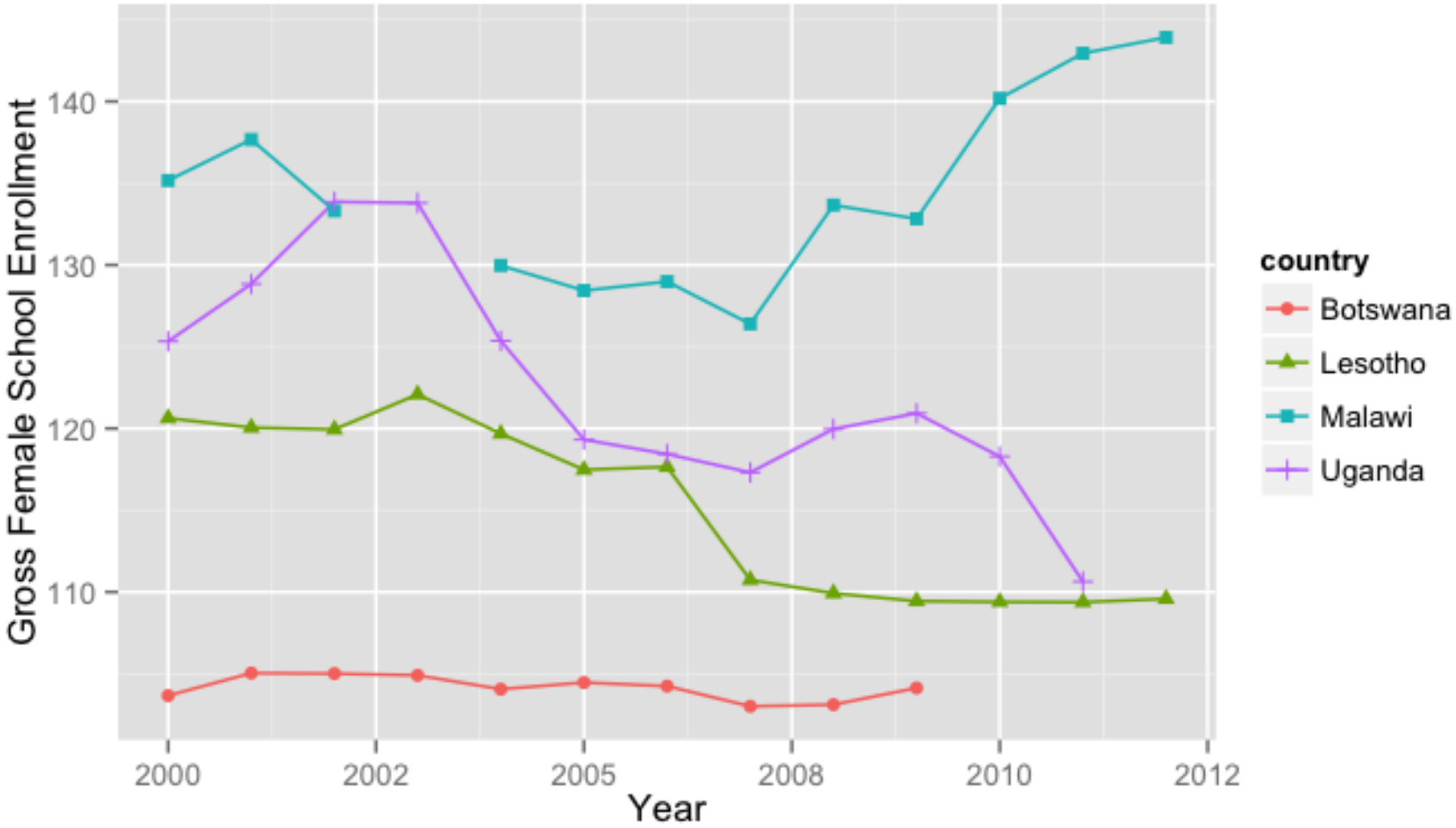
Selecting interesting Cases for Extreme Changes in HIV/AIDS Incidence Rates



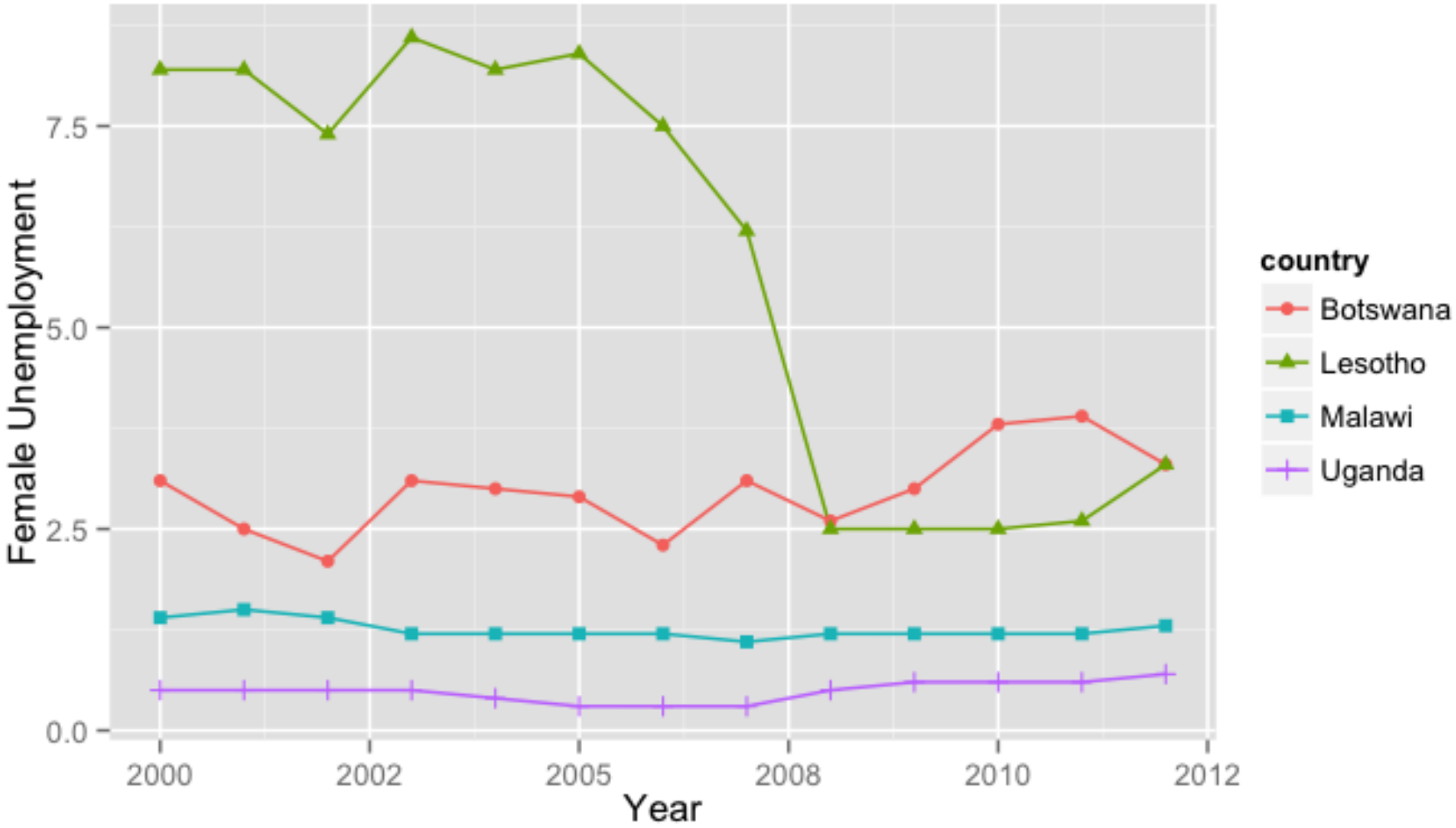
Case Studies



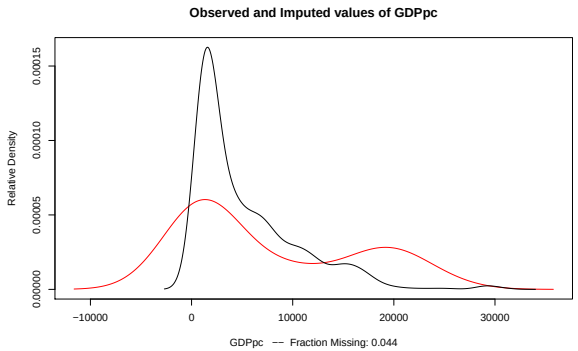
Female School Enrollment in Selected Countries

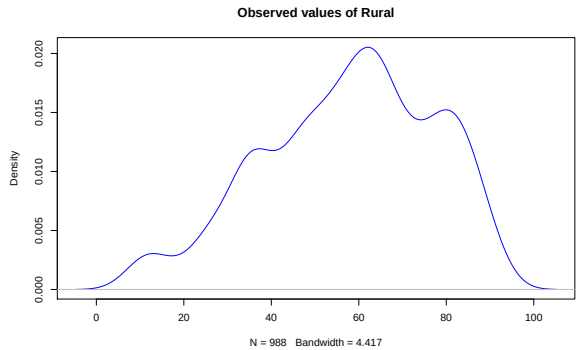


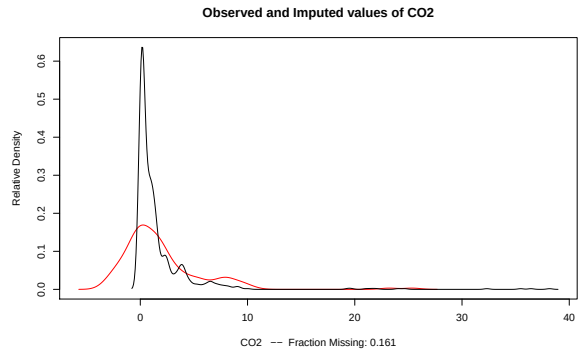
Female Unemployment compared to Total Unemployment in Selected Countries

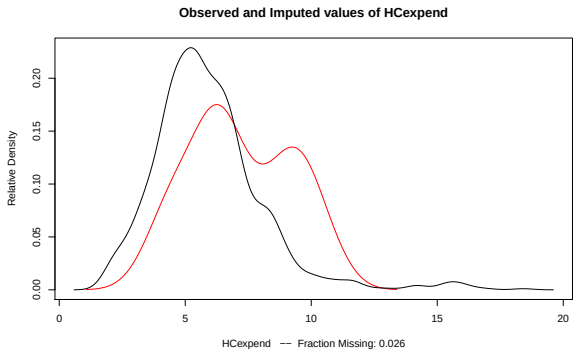


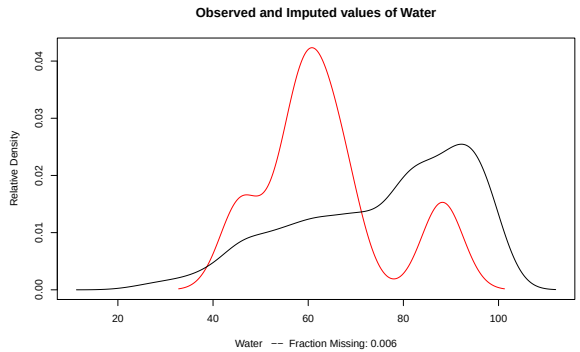
Imputed Missing Values

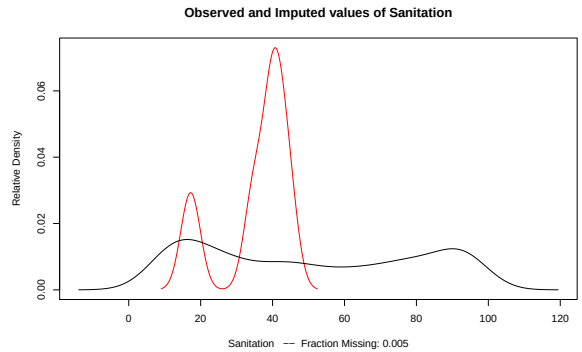


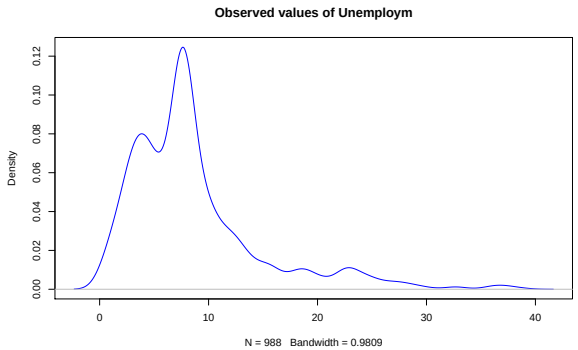


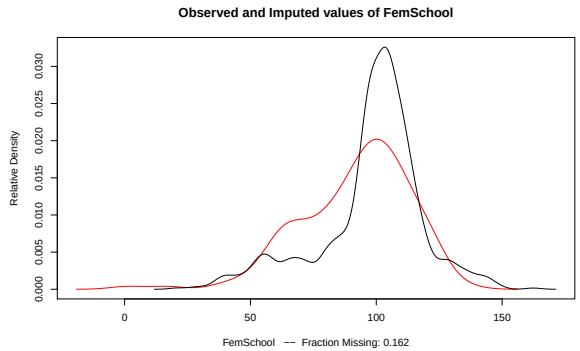


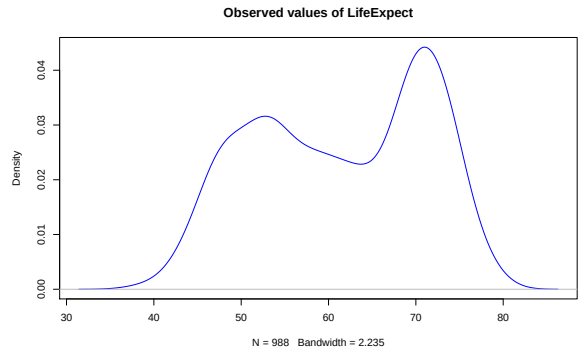












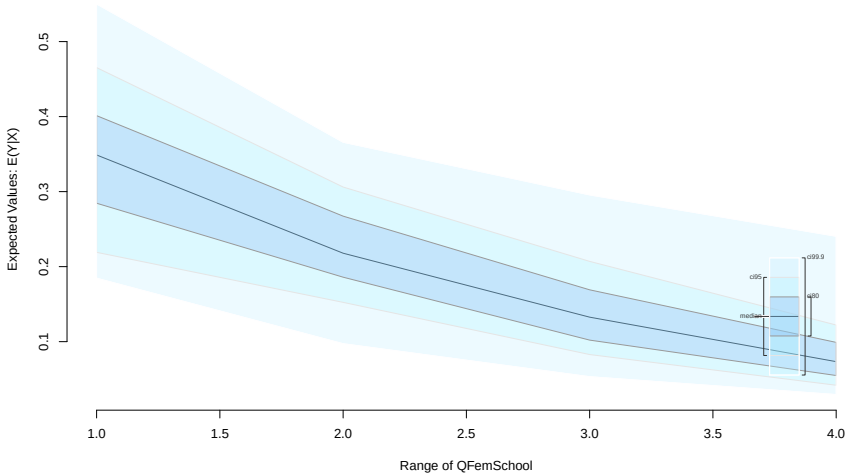
Logistic Regression Results - Model 1

Table 1: Logistic Regression Results of Model 1

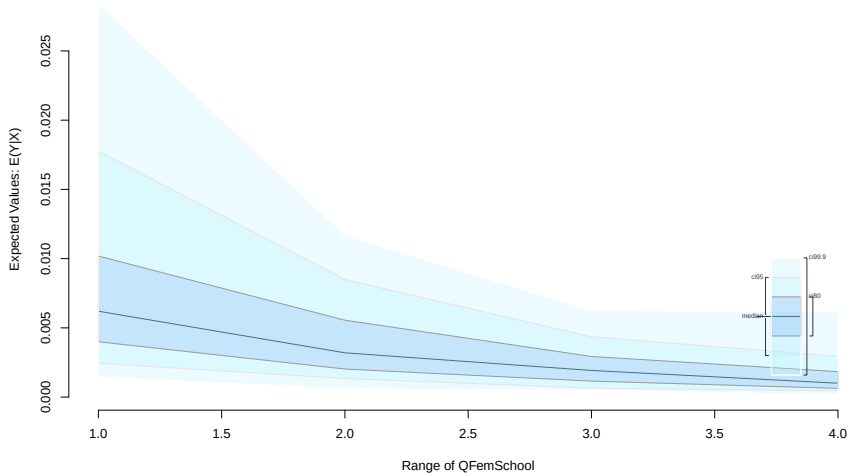
Variables	Coeff.	Std. Error	T-Stat.	P-Value
Constant	-101.45	9.02	-11.25	0.00
GDP per capita	-0.77	0.30	-2.59	0.01
Share of Rural Population	-1.05	0.40	-2.60	0.01
CO2 Emissions per capita	-1.01	0.18	-5.56	0.00
Healthcare Expenditure	0.31	0.35	0.87	0.38
Access to Water	0.48	0.74	0.66	0.51
Access to Sanitation	0.23	0.24	0.94	0.35
Life Expectancy	29.95	2.33	12.86	0.00
Immunisation against DPT	-1.34	1.21	-1.11	0.27
Immunisation against Measles	1.71	1.27	1.35	0.18
Female School Enrollment	-3.74	0.49	-7.58	0.00
Share of Female Unemployment	-0.02	0.03	-0.66	0.51

Predicted Probabilities Female School Enrollment

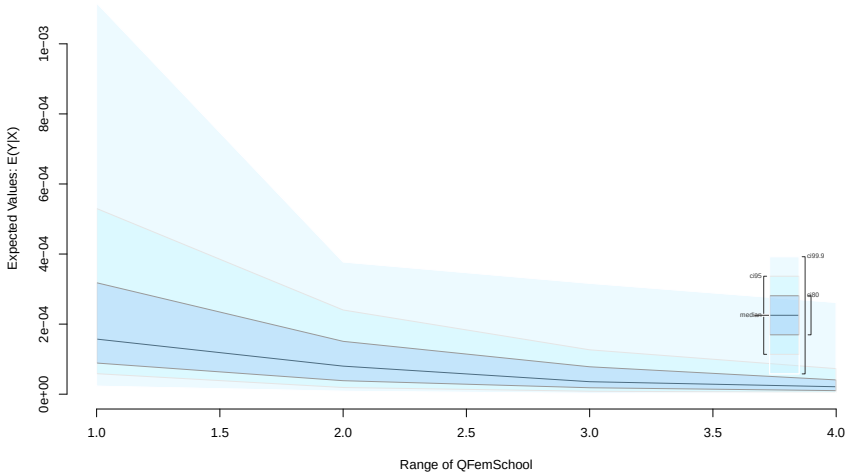
Scenario of Uganda



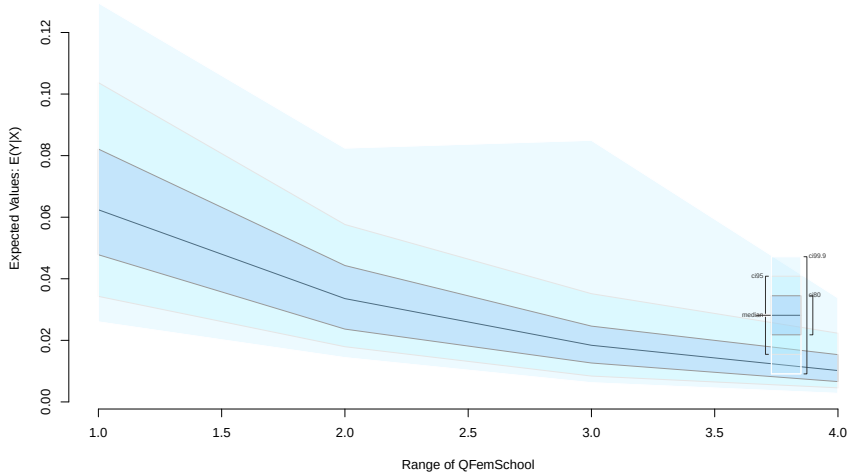
Scenario of Lesotho



Scenario of Botswana



Scenario of Malawi



Simple Linear Regression Results - Model 2

Table 2: OLS Regression Results of Model 2 with robust standard errors

Variables	Coeff.	Std. Error	T-Stat.	P-Value
Constant	15.51	1.52	10.22	0.00
GDP per capita	0.18	0.08	2.38	0.02
Rural Population	0.54	0.12	4.37	0.00
CO2 Emissions	0.11	0.04	2.53	0.01
Healthcare Expenditure	-0.09	0.10	-0.90	0.37
Water Access	0.24	0.19	1.27	0.21
Sanitation Access	0.01	0.07	0.11	0.91
Life Expectancy	-7.04	0.29	-24.39	0.00
DPT Immunisation	0.25	0.27	0.90	0.37
Measles Immunisation	-0.13	0.30	-0.45	0.65
Female School Enrollment	1.43	0.14	10.01	0.00
Female Unemployment	0.13	0.02	6.87	0.00

Conclusions & Limitations - Model 1

1. **Logistic Regression Results of Model 1 (all countries)**

- Results are generally in line with hypothesis
- GDP per capital, Rural Population, CO2 Emissions, Life Expectancy and Female School Enrollment are statistically significant
- BUT: Female Unemployment compared to total unemployment is not statistically significant

2. **Predicted Probabilities of Model 1 (selected countries)**

- Direction of effect of Female School Enrollment matches initial assumptions for all case studies

Conclusions & Limitations - Model 2

3. **Linear Regression of Model 2 (countries with incidence above mean)** Significance of some variables changes:

- Female Unemployment compared to total unemployment becomes highly significant
- Effect of Female School Enrollment remains highly significant but becomes positive (!)