

Examining the Relationship Between Women's Health and National Happiness

A Holistic Understanding of Global Development

Abstract

The current debate about global development disproportionately focuses on economic development indicators as a means to advance national welfare. When the international community uses only an economic lens to approach development, it fails to take human development and social welfare indicators into account, which are integral to understanding global development. We decided to use national happiness as a measure of our holistic understanding of development. We narrowed our explanatory development indicators to those pertaining to women's health and wellbeing to emphasize the necessity of measuring development with social welfare factors. Using a regression model, we explored the question of whether women's health indicators could predict national happiness. We found a high correlation between women's health indicators and national happiness, suggesting that a solely economic understanding of development cannot provide a holistic measure to national well-being.

Background and Significance

As global development became a more pressing issue for the international community, distinct approaches to development materialized. There is no international consensus on how to approach development, but many analyze the issue from a solely economic standpoint. However, there is a growing community moving away from this approach to a more holistic and people-centered approach to development, emphasizing the intersection between social well-being, human development and economic welfare (Fukuda-Parr 2009).

Studies show a correlation between national happiness and development, leading us to consider using this relationship to further understand development (The Economist 2010). We believe that national happiness can function as a holistic measure of development, which allows us to apply the aforementioned comprehensive approach to investigate the relationship between happiness and development. We took this a step further and examined whether specific subsets of development indicators can predict national happiness. Inspired by Martha Nussbaum's research on the capabilities approach to development, we were interested in examining the relationship between women's health and well-being and national happiness (Nussbaum 1999). Our research question is: Do women's health and development indicators predict national happiness?

We used women's health and development data from the World Bank and life ladder¹ as a measure of national happiness from the National Happiness Report to run a regression model to test our hypothesis that women's health can predict national happiness levels. The Life Ladder measurement is collected from samples of people from each country, who were asked to rate their overall life satisfaction on a ladder, with the tenth ladder rung being the most satisfied, and the first rung being the least satisfied.

Methods

Data Collection:

We collected data for every country from The World Bank relating to women's health and development and overall national socio-economic development. We then collected data from the World Happiness Report for a measure of national happiness for each country. We then narrowed our development and women's health data and national happiness data to the years 2006, 2010 and 2014. We narrowed our data further by limiting our dataset to the countries for which we had happiness data for 2006, 2010 and 2014.

Variables:

Our variables reflect what we felt were the most important women's health and wellbeing indicators for development, as well as key socio-economic development indicators such as GDP/capita. Even though our study aims to examine the relationship between women's health and happiness, we included GDP/capita as an explanatory variable to ensure that our approach was comprehensive. Our final analysis included the indicators GDP per capita, Mortality Rate of infants, Fertility Rate, and Female Life Expectancy at Birth, and the response variable Life Ladder, a measure of national happiness.²

¹ "Life ladder" measurement: samples of people from each country were asked to think of their overall life satisfaction as a ladder, with the tenth ladder rung being the most satisfied, and the first rung being the least satisfied. (See appendix for wording of question)

² See appendix (used best subset and looked at matrix plot to determine which variables were correlated to national happiness)

Analytical Methods:

We ran a regression model using the variables from our best subsets analysis to determine a regression equation to predict national happiness. We used variant-stabilizing transformations to make our data better fit model assumptions that relationships in regression models are linear. Our final explanatory variables were $\ln(\text{GDP})$, sqrt. Mortality , sqrt. Fertility , and Life Expectancy^4 .

Results

Our regression equation is: $\text{Life Ladder} = -0.508 + 0.4360 \ln(\text{GDP}) + 0.0933 \text{sqrt. Mortality} + 0.224 \text{sqrt. Fertility} + 0.000000 \text{Life Expectancy}^4$. This equation has an R^2 value of 69.46%. We are confident that this R^2 value accurately reflects the correlation between our development and women's health indicators and national happiness because, out of our 183 cases, only 3 cases were unused in our model due to incomplete data.

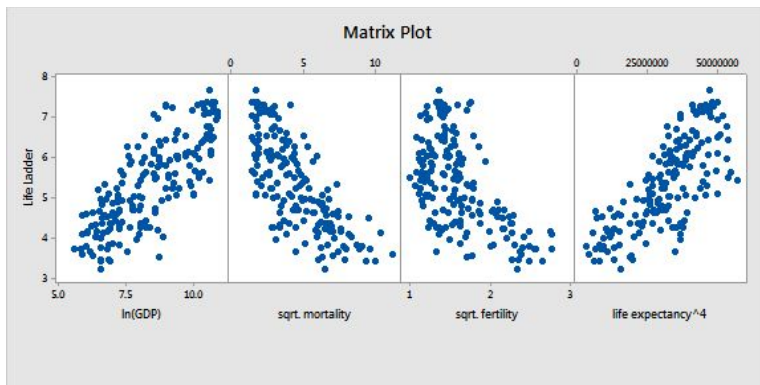


Figure 1.

This matrix plot shows the linear relationships between each transformed explanatory variable and the response variable of Life Ladder. The variables of $\ln(\text{GDP})$ and Life Expectancy^4 have positive linear relationships with Life Ladder and the variables of sqrt. Mortality and sqrt. Fertility have negative linear relationships with Life Ladder.

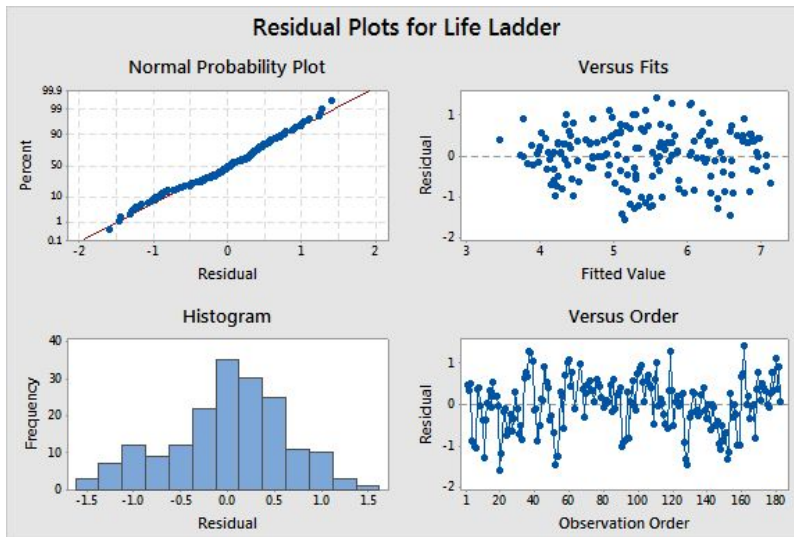


Figure 2.

These residual plots for Life Ladder shows no clear pattern, meaning that our regression model provides a fairly accurate prediction for national happiness.

Discussion

The results above indicate that there is a strong correlation (R^2 of 69.46%) between the explanatory variables of national GDP per capita, fertility rate of women, infant mortality rate, and life expectancy of women and the response variable of national happiness. This suggests that women's health indicators can be used as predictors of national happiness.

However, these results could have been confounded by missing data. We were unable to collect complete data for all countries for a span of consecutive years. We had to limit our dataset to 61 countries and use data from only the years 2006, 2010, and 2014 to maximize the amount of data we could include in our regression model. Along these lines, there were other women's health and development indicators that we felt could have strengthened our model, but we were unable to use them due to missing data. Another limitation of our model was the fact that we used GDP per capita as an explanatory variable. While an important measure of national socio-economic status, GDP per capita is not a specific women's health indicator, which could decrease the validity of the model. However, we ran a regression model without the variable $\ln(\text{GDP})$ and still found a strong correlation (R^2 of 61.66) between our women's health indicators and national happiness.³ Thus, our hypothesis is still strongly supported that women's health indicators could be used to predict national happiness.

Our study has implications for the future of global development because it highlights the importance of women's health in increasing national welfare and happiness. Increasing the life expectancy of women, increasing fertility rate, and decreasing infant mortality rate could have the potential to drastically improve national well-being. Further research should be conducted using more complete data (more indicators for every country for consecutive years) to solidify this possible correlation. These results could transform global politics by encouraging national actors to adopt a women-centric approach to development.

³ See appendix for regression model.

References

Fukuda-Parr, Sakiko. "Human Rights and Politics in Development." In *Human Rights: Politics and Practice*, written by Michael Goodhart, 164-181. Oxford: Oxford University Press, 2009.

"Money and happiness." *The Economist*. Last modified January 25, 2010. http://www.economist.com/blogs/dailychart/2010/11/daily_chart_1.

Nussbaum, Martha. "Women and equality: The capabilities approach." *International Labor Review* 138, no. 3 (1999): 227-247.

Appendix

Footnote 1:

Definition of Life Ladder from Statistical Appendix for "The Distribution of World Happiness", John F. Helliwell, Haifang Huang and Shun Wang, Chapter 2, World Happiness Report Update 2016:

"Happiness score or subjective well-being (variable name ladder): The survey measure of SWB is from the Jan 22, 2016 release of the Gallup World Poll (GWP), which covers the years from 2005 to 2015. Unless stated otherwise, it is the national average response to the question of life evaluations. The English wording of the question is "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?" This measure is also referred to as Cantril life ladder, or just life ladder in our analysis."

Footnote 2:

Full variable list with descriptions:

-Gross Enrollment Ratio, Gender Parity Index: Ratio of female gross enrollment ratio for primary to male gross enrolment ratio for primary. It is calculated by dividing the female value for the indicator by the male value for the indicator. A GPI equal to 1 indicates parity between females and males. In general, a value less than 1 indicates disparity in favor of males and a value greater than 1 indicates disparity in favor of females.

-Proportion of seats in Parliament Occupied by Women: Women in parliaments are the percentage of parliamentary seats in a single or lower chamber held by women.

-Health Expenditure, Public (% GDP): Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds.

-Adolescent Fertility Rate (Births per 1000 women aged 15-19): Adolescent fertility rate is the number of births per 1,000 women ages 15-19.

-Unmet Need for Contraception (% of Women Ages 15-49): Unmet need for contraception is the percentage of fertile, married women of reproductive age who do not want to become pregnant and are not using contraception.

-Poverty Gap at National Poverty Line (%): Poverty gap at national poverty lines is the mean shortfall from the poverty lines (counting the non poor as having zero shortfall) as a percentage of the poverty lines. This measure reflects the depth of poverty as well as its incidence.

-Prevalence of HIV, total (%): Prevalence of HIV refers to the percentage of people ages 15-49 who are infected with HIV.

-Prevalence of HIV, female (%): Prevalence of HIV is the percentage of people who are infected with HIV. Youth rates are as a percentage of the relevant age group.

-Female Completion Rate, female (%): Total number of new female entrants in the last grade of primary education, regardless of age, expressed as percentage of the total female population of the theoretical entrance age to the last grade of primary. This indicator is also known as "gross intake rate to the last grade of primary education." The ratio can exceed 100% due to over-aged and under-aged children who enter primary school late/early and/or repeat grades.

-Contraceptive Prevalence, Any Methods (% of women age 15-49): Contraceptive prevalence rate is the percentage of women who are practicing, or whose sexual partners are practicing, any form of contraception. It is usually measured for women ages 15-49 who are married or in union.

-Mortality Rate, Infant (Per 1000 Live Births): Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.

-GDP Per Capita (US \$): GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.

-Fertility Rate, total (births per woman): Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year.

-Happiness, or Subjective Well-Being: Happiness score or subjective well-being (SWB): The survey measure of SWB is from the December 26, 2014 release of the Gallup World Poll (GWP), which covers the years from 2005 to 2014. Unless stated otherwise, it is the national average response to the question of life evaluations. The English wording of the question is "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?"

-Life Expectancy at Birth, female (years): Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Note that all explanatory variables were collected from the World Bank database and that the response variables of Life Ladder was collected from the National Happiness Report.

Footnote 3:

Regression Analysis: Life Ladder versus sqrt. mortality, sqrt. fertility, life expectancy^4
Rows unused 3

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	3	141.392	47.1306	94.35	0.000
sqrt. mortality	1	1.158	1.1576	2.32	0.130
sqrt. fertility	1	1.782	1.7822	3.57	0.061

life expectancy^4	1	13.221	13.2211	26.47	0.000
Error	176	87.919	0.4995		
Total	179	229.311			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.706781	61.66%	61.01%	60.19%

Regression Equation

$$\text{Life Ladder} = 3.215 - 0.1137 \text{ sqrt. mortality} + 0.446 \text{ sqrt. fertility} + 0.000000 \text{ life expectancy}^4$$

Residual Plots for Life Ladder *without* ln(GDP)

