WATER

HOUSING

EMPLOYMENT

FOOD

FORDHAM'S POPE FRANCIS GLOBAL POVERTY INDEX

GENDER

RELIGIOUS FREEDOM

EDUCATION

"To enable these real men and women to escape from extreme poverty, we must allow them to be dignified agents of their own destiny.

At the same time, government leaders must do everything possible to ensure that all can have the minimum spiritual and material means needed to live in dignity.

In practical terms, this absolute minimum has three names: lodging, labour, and land; and one spiritual name: spiritual freedom, which includes religious freedom, the right to education and other civil rights."

-- Pope Francis in his Address to the United Nations on September 25, 2015

Photo Credit: UN Photo / Cia Pak
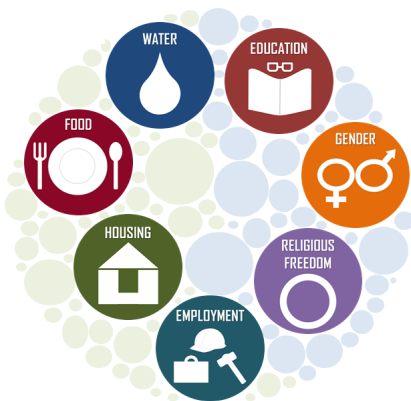
About the Logo:

The logo illustrates the seven primary elements that are considered in the Fordham Francis Index. The four elements on the left side represent the Material Well-being components: Water, Food, Housing and Employment. The remaining three on the right side comprise the Spiritual Wellbeing components: Education, Gender Equity, and Religious Freedom.

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FORDHAM'S POPE FRANCIS GLOBAL POVERTY INDEX

ABSTRACT: The Fordham Francis Index (FFI) is a simple, broad, and innovative international poverty measurement tool derived from a set of primary indicators identified by Pope Francis during his 2015 address to the UN General Assembly. Pope Francis identified seven primary indicators that measure both material wellbeing as well as spiritual wellbeing. The primary indicators of basic material wellbeing are water, food, housing, and employment. The primary indicators of basic spiritual wellbeing are education, gender equity, and religious freedom. The Fordham Francis Index (FFI) is simple because it is based on a small number of only seven indicators. It is, nonetheless, a broad poverty measure because these few primary indicators, especially access to clean water, are strongly correlated with a large number of key measures of both material and spiritual human wellbeing. The Fordham Francis Index (FFI) is also innovative. It distinguishes itself from other standard poverty measures because of its explicit emphasis on spiritual well-being and in particular its focus on religious freedom. It also differentiates itself from other measures of development by its emphasis on meeting the basic needs of the poor. Moving forward in the future, Fordham researchers will attempt to utilize additional sources of data to increase national coverage, further confirm the statistical relationship between Pope Francis' seven primary indicators and the more than 100 targets being developed to measure the achievement of the new UN Sustainable Development Goals (SDGs). In future iterations of the Fordham Francis Index (FFI), we will also need to incorporate more independent measures of gender equity and basic housing. Our present indicator of gender equity is too closely related to our measure of education, while our current indicator of housing quality is too closely related to our measure of clean water. Properly used, the Fordham Francis Index (FFI) can verify the success of a nation in safeguarding the human dignity of its people by providing basic human needs and by protecting basic human freedoms.

Fordham's Pope Francis Global Poverty Index

INTRODUCTION

Fordham University's Pope Francis Global Poverty Index (FFI) offers a simple, broad and innovative international poverty measurement tool. It is simple because it is built on only seven indicators of human wellbeing identified by Pope Francis. It is broad because these seven indicators are highly correlated with many other measures of integral human development. And finally, the Fordham Francis Index (FFI) is innovative for two reasons. First, compared to traditional measures of economic wellbeing or even broader measures of human wellbeing such as the UN's Human Development Index (HDI), the Fordham Francis Index (FFI) places a higher emphasis on satisfying the basic needs of the poor. Second, in addition to its emphasis on meeting the basic needs of the poor, the Fordham Francis Index (FFI) argues that political freedoms, and in particular religious freedom, are a basic component of human wellbeing. Political freedoms such as religious freedom have been traditionally ignored in previous measures of poverty. But this emphasis on the political rights of the poor, such as religious freedom, is consistent with Pope Francis' insistence that the poor be "dignified agents of their own destiny."

The Fordham Francis Index (FFI) was inspired by the address of His Holiness Pope Francis to the United Nations General Assembly last September 2015, during the launch of the UN's Sustainable Development Goals (SDGs). Distilling the 169 targets of the Sustainable Development Goals (SDGs) into the fundamental needs of a human person, Pope Francis attempted to outline the basic material and spiritual dimensions needed to uphold human dignity and to ensure that integral human development enables the marginalized to live with dignity and the capacity for self-determination.

During his speech Pope Francis argued that we must possess simple technical instruments of verification to ensure that our institutions are truly effective in the struggle against poverty, and that our political and economic activities successfully promote justice and that we maintain the constant will to render to each person what is due to them. Currently, there is still systematic exclusion towards the weak and disadvantaged, against those who lack adequate

capabilities and opportunities. He deems this exclusion to be a serious denial of human fraternity and a grave offense against human rights. In reading the Pope's speech, one gets the sense that Pope Francis sees the development of simple technical instruments of verification like the Fordham Francis Index (FFI) as a way to empower civil society to fulfill its oversight responsibilities, namely to monitor, review and supervise the efforts of national and international governmental agencies as well as other national and international actors to promote integral human development through the proper attainment of the UN Sustainable Development Goals (SDGs).

In the next section of this report we will review Pope Francis' seven primary indicators of material and spiritual wellbeing. In order to make the case that the Fordham Francis Index (FFI) is broad, we will estimate the statistical correlations between these primary indicators and other important indicators of integral human development. Following that review we will aggregate these seven primary indictors into two international indices of material and spiritual wellbeing. In turn we will aggregate these two indices of material and spiritual wellbeing into the Fordham Francis Index (FFI). To make the case that the Fordham Francis Index (FFI) is innovative, we will compare it with a traditional measure of economic wellbeing as well as with a broad measure of human wellbeing.

Pope Francis identified seven primary indicators that measure both material well-being as well as spiritual well-being. The primary indicators of basic material well-being are water, food, housing, and employment. The primary indicators of basic spiritual well-being are education, gender equity and religious freedom. The Fordham Francis Index (FFI) is a simple measure of international poverty and development because it is based on a small number of only seven indicators. We at Fordham carefully evaluated various statistical measures for each of the primary indicators. Our selection criteria were straight forward. We wanted a statistic that best captured Pope Francis' idea of wellbeing. We were also concerned that the data would be easily accessible so that anyone anywhere could reproduce our results. Another important concern was geographical coverage. We were also concerned about the consistency, reliability and credibility of the data and sought to use data collected and distributed by respected international organizations. In the following sections you will received a more detailed identification, definition, and justification of each of our seven chosen measures. By the end of the discussion you will learn that we are still not yet satisfied with our measures of gender equity and basic housing.

Once we selected a statistical measure of a primary indicator and using simple linear regression techniques, we regressed the measure on additional indicators of poverty and development. For the regression with other development indicators, the research teams tested for association by analyzing the t-statistics of the regression and interpreting the result according to the following criteria:

- $|t\text{-statistics}| \leq 1.96$ *(<95% confidence interval)*

there is no statistically significant correlation, i.e. the data was unable to establish an association between the two indicators

- $1.96 \leq |t\text{-statistics}| \leq 2.58$ *(>95% confidence interval)*

there is a statistical correlation or association between the two indicators

- $2.58 \leq |t\text{-statistics}|$ *(99% confidence interval)*

there is a strong statistical correlation or association between the two indicators

Through this process we were able to document that these seven primary indicators are correlated with a number of other indicators of international poverty and development. In future iterations of this report we hope to eventually regress all seven of the primary indicators which we selected with all the indicators being developed to measure the world's success in achieving the UN Sustainable Development Goals (SDGs). In the following sections on each of the primary indicators you will read a more detailed analysis of these regression results along with a global map indicating where the prevalence or deficiency of each primary good is geographically focused.

Material Wellbeing Indicators

In this section we will review the selection of statistical measures of the material wellbeing indicators of water, food, housing and employment.

WATER

Pope Francis includes access to drinking water as a primary indicator of human development because it is integral to human life. He suggests that it is not enough to provide the marginalized with access to any type of water. The water should be clean and accessible enough to be obtained as needed, and without undue burden. By interpreting Pope Francis's specification of drinking water in this way, we selected *the percentage of a population using an improved drinking water source* for the Fordham Francis Index's (FFI) water measure.

This measure encompasses cleanliness and safety of drinking water that is free from fecal and chemical contamination, as well as the affordability of water and proximity to an access point, whether public or private. This measure is sourced from the World Health Organization (WHO)/UN Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply and Sanitation using data collected from 2013.

To assess the association with other key development indicators, our water measure was regressed with maternal mortality, infant mortality, and access to sanitation. The results indicate a strong, statistically significant correlation between water and all three of these indicators of development (Table 1). These results support our assertion that the chosen metric is a broad measure, as it is also indicative of other important measures of development.

Using data collected from 2013, the map in Figure 1 reveals concentrations of deprivation across the African continent, with sporadic deprivation throughout Central and Southeast Asia.

Table 1: Regression results of water measure and three key development indicators

Variables	Water Regression Coefficient (t-stat)	Economic Interpretation
Maternal Mortality	-11.4 (-13.8)	A 1% increase in the population with access to an improved water source is correlated with an 11.4% decrease in
Infant Mortality	-1.2 (-17.5)	A 1% increase in the percent of a population with access to an improved water source is correlated with a 1.2% decrease
Access to Sanitation	1.6 (17.2)	A 1% increase in the population with access to an improved water source is correlated with a 1.6% increase in improved sanitation facilities.

Figure 1: Map of percentage of a population using an improved drinking water source
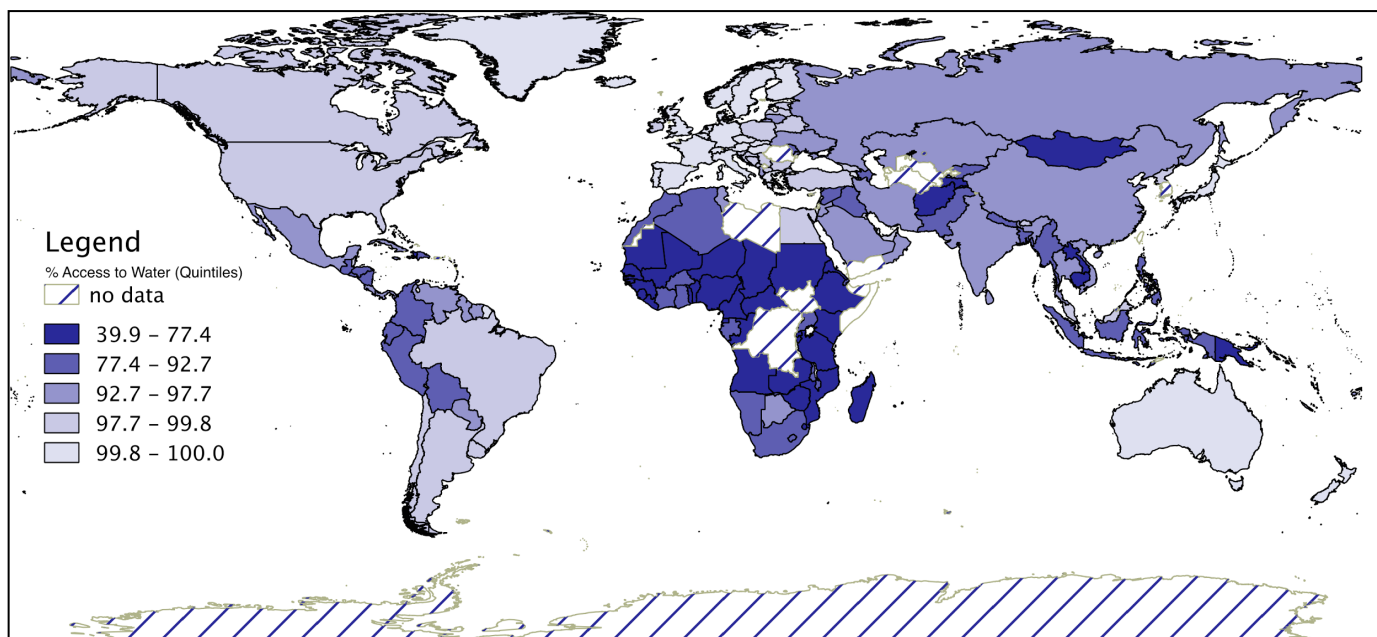
The countries with the least access to an improved water source are Papua New Guinea, Equatorial Guinea, Angola, Madagascar, Mozambique, Chad, Afghanistan, Ethiopia, Tanzania and Sudan. The study lacked data for the Democratic Republic of Congo, South Sudan, Libya, Turkmenistan and Uzbekistan.

FOOD

Pope Francis's selection of access to adequate food as another primary indicator furthers the belief that every individual has a right to life. In 2013, he called the inexplicable presence of hunger and food insecurity endured by one billion people a global scandal. Thus the measure chosen should be able to explicitly capture the number of individuals regularly experiencing food insecurity. The measure we selected is the *prevalence of undernourishment* (subsequently referred to as "food measure"), which is defined as the percentage of a population who are continuously unable to consume enough food to meet dietary energy requirements.

Initially, two metrics were considered: average dietary supply adequacy and percentage of children under five years of age who are underweight. Although the prevalence of undernourishment covers fewer countries than the average dietary supply adequacy measure, it was chosen because it captures food insecurity across an entire population and places emphasis on individual energy requirements, as opposed to average food intake. The data for prevalence of undernourishment is obtained from the Food and Agriculture Organization of the United Nations (FAO), which defines food security as physical, social, and economic access to sufficient and nutritious food, for all people at all times, which meets dietary requirements and preferences. The UN FAO reports the data as three-year averages and is available every two years for 118 countries.

To assess the association with other developmental indicators, the food measure was regressed with infant mortality, unemployment, and primary school completion rate. The results indicate a strong, statistically significant relationship between the food measure and two of the three additional indicators of development, namely infant mortality and primary school completion rate (Table 2). These results support the assertion that the food measure is also a broad indicator of other important measures of human wellbeing.

Using averaged data over a three-year period from 2011-2013, the map in Figure 2 reveals the prevalence of undernourishment across Sub-Saharan Africa, Asia, and parts of Latin America.

Table 2: Regression results between the food measure and three key development indicators

Variables	Food Regression Coefficient (t-stat)	Economic Interpretation
Infant Mortality	1.33 (9.2)	A 1% increase in undernourishment is correlated with an increase in infant mortality of 133 children per 100,000 live births.
Unemployment	-0.05 (-1.1)	The regression was unable to establish a statistically significant correlation.
Primary completion rate	-0.7 (-4.2)	A 1% increase in undernourishment is correlated with a 0.7% decrease in primary completion rate.

Figure 2: Map of the prevalence of undernourishment averaged over a three-year period (2011-2013)

Legend
- >5%
- 5-10%
- 10.1-20%
- 20.1-30%
- Above 30%
- no data
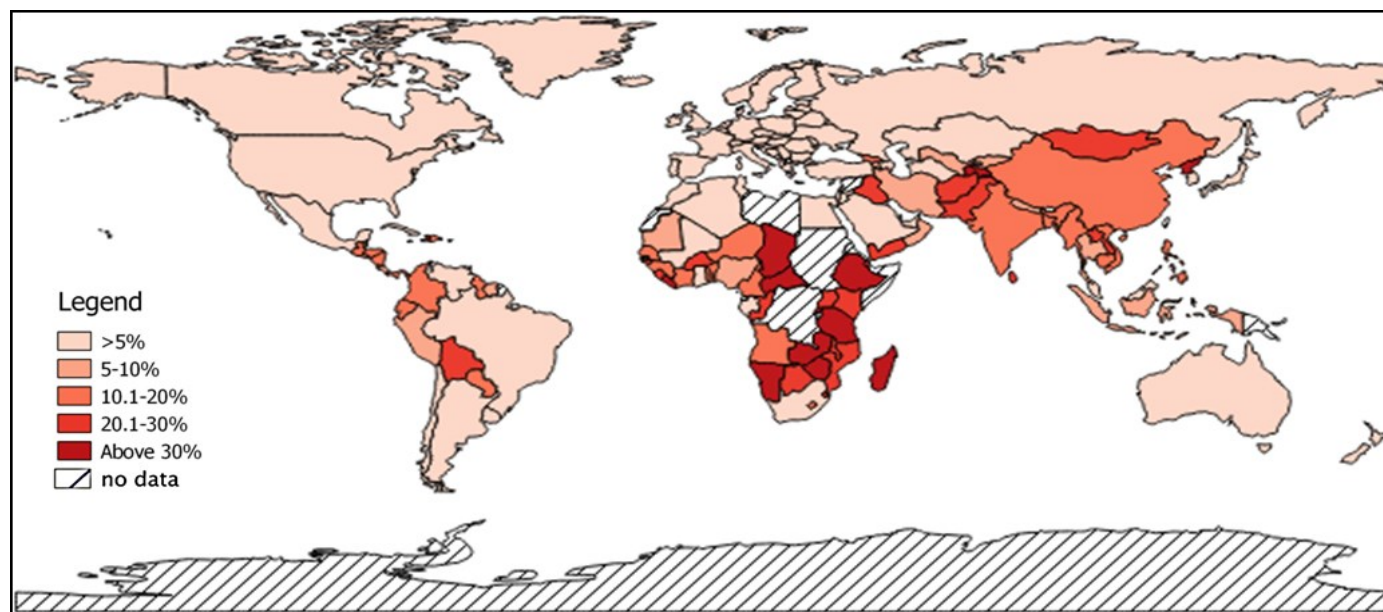
The countries with the highest deprivation of nourishment are Zambia, Haiti, Democratic People's Republic of Korea, Namibia, Chad, Tajikistan, Central African Republic, Ethiopia, Rwanda and Liberia. Countries that lacked data and were not included in the study are the Democratic Republic of the Congo, Papua New Guinea, Sudan, South Sudan and Somalia.

HOUSING

Pope Francis includes housing as one of his four primary indicators of material wellbeing. People require adequate physical space in order to create safe, secured and nurturing homes for their families. Adequate housing with secure tenure can also provide households with regular access to basic sewage, safe drinking water, garbage collection, and electricity. The lack of proper housing and the proliferation of slums around the world often mark whole groups of people who are experiencing homelessness and exclusion from mainstream society.

A number of housing and housing related measures were considered such as the percent of an urban population living in a slum area, proportion of urban population with durable housing, access to safe drinking water, and occupied housing units (by type of housing and source of electricity). While the measure of the percent of urban population living in a slum area was identified as the most representative indicator of adequate housing, the availability of data, unfortunately, was limited to a small number of countries. In order to obtain data that covered a much larger number of countries, the *measure of access to improved sanitation facilities* was chosen as a suitable proxy for adequate housing.

The measure of access to improved sanitation facilities measure was regressed on the percentage of urban population living in a slum area to assess whether the chosen indicator was a good proxy for adequate housing. Regression results show a strong relationship between the two variables (Table 3). Furthermore, the measure of access to improved sanitation

facilities was also regressed on life expectancy and infant mortality and our results show statistically significant correlations (Table 3). These results support the assertion that the housing measure is broadly related to other important measures of development such as life expectancy, infant mortality, and percentage of urban population residing in slums.

Table 3: Regression results of the housing measure and three key development indicators

Variables	Housing Regression Coefficient (t-stat)	Economic Interpretation
Life Expectancy	0.3 (22.03)	A 1% increase in access to improved sanitation is correlated with an increase in life expectancy of 0.3 years
Infant Mortality	0.85 (-23.3)	A 1% increase in access to improved sanitation is correlated with a decrease in infant mortality of 85 children per 100,000 births
Urban Slum Population	-0.6 (-10.3)	A 1% increase in access to improved sanitation is correlated with a decrease of 0.6% in urban slum population

Using data collected from UN Habitat for the year 2013, the map in Figure 3 reveals housing deprivation is focused in Sub-Saharan Africa.

Figure 3: Map of the percentage of a population with access to improved sanitation facilities (2013)

% of Population w/ Access
to Sanitation Facilities
- No Data
- 0.0 - 29.3
- 29.3 - 74.5
- 74.5 - 93.1
- 93.1 - 98.7
- 98.7 - 100.0
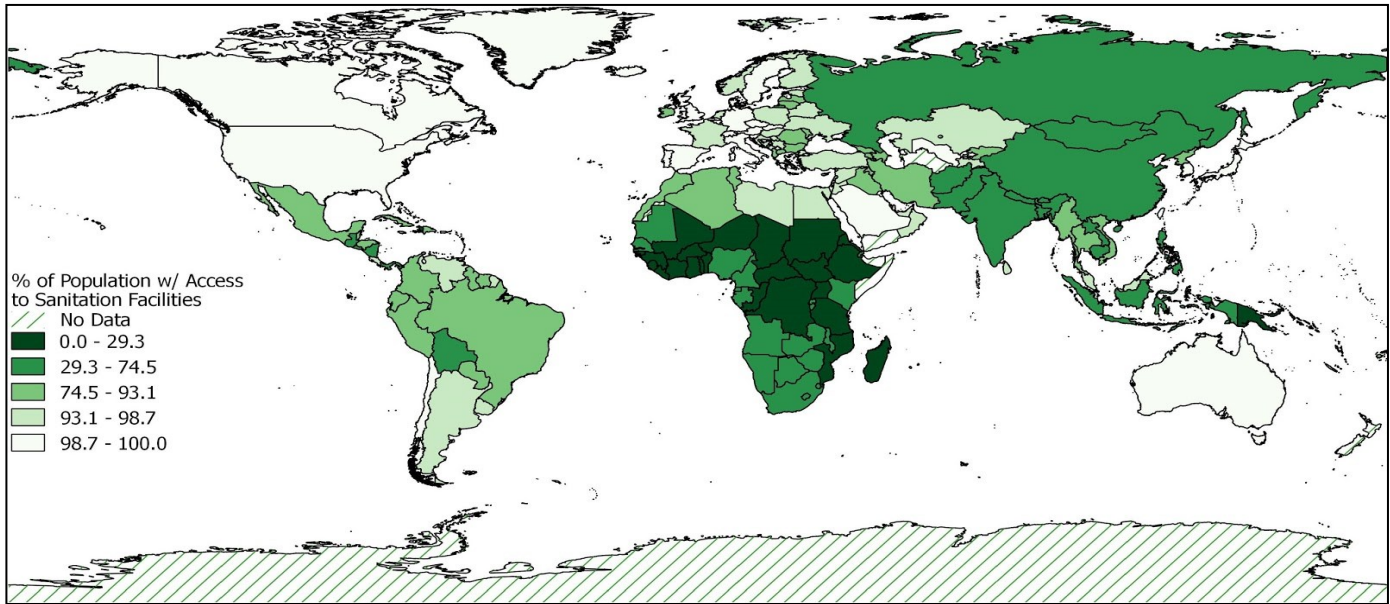
The countries with the highest deprivation of access to improved sanitation are South Sudan, Niger, Togo, Madagascar, Chad, Sierra Leone, Tanzania, Ghana, Republic of Congo and Eritrea. Countries which lacked data and were thus excluded from the study are Andorra, Antigua and Barbuda, Djibouti, Dominica, Grenada, Kiribati, Liechtenstein, Micronesia, Palau, Samoa, Sao Tome and Principe, Seychelles, St. Kitts and Nevis, St. Vincent and the Grenadines, Tonga, and Vanuatu.

EMPLOYMENT

The last material indicator selected by Pope Francis was employment. According to Pope Francis, government leaders should ensure that everyone has the minimum spiritual and material means, not only to live in dignity, but to also create and support a family, the primary cell of any society. As such, employment is required to facilitate this development. The selected metric for employment is the *unemployment rate* (subsequently referred to as "employment measure"), which is defined as the percent of the labor force that is not employed but actively seeking employment and willing to work.

Data for the unemployment rate was sourced from the World Bank for the year 2013. Additional measures considered for the Fordham Francis Index's (FFI) employment component were the poverty rate, economic competitiveness, and experienced wellbeing as established by the Happiness Index. Pope Francis specified in his definition of employment that it must be dignified and properly remunerated. As employment can have significant impacts on individual happiness, health, and sense of purpose, a strong consideration was given to experienced wellbeing as a measure of the employment indicator. Experienced wellbeing is self-reported and includes data from the informal sector, which is often underreported by the government-measured unemployment

rate. It would have accounted for Pope Francis's concerns of employment that it be dignified and properly remunerated. However, the wide coverage, accessibility, and uniformity of the unemployment rate data were the primary reasons why we chose it as our employment indicator.

To assess the association with other key development indicators, we regressed the employment measure on GNI per capita, birthrate, and life expectancy. The results indicate a strong and statistically significant relationship between the employment measure and the three additional developmental indicators (Table 4). These results support our assertion that our employment measure is also a broad measure indicative of other important indicators of development.

Using 2013 data from the World Bank, the map below in Figure 4 indicates a concentration of unemployment across Africa, the Middle East, and parts of Europe.

Table 4: Regression results of the employment measure and three key development indicators

Variables	Employment Regression Coefficient (t-stat)	Economic Interpretation
Gross National Income per capita	-15.7 (-16.3)	A 1% increase in GNI per capita is correlated with a 0.16% decrease in unemployment rate.
Birthrate	0.86 (49.4)	A 1% increase in the birth rate of a given country is correlated with an increase in the unemployment rate of 0.861%
Life Expectancy	0.8 (-24.5)	A 1% increase in unemployment rate is correlated with a 10 month decrease in life expectancy

Figure 4: Map of the unemployment rate (2013)

Legend
Unemployment Rate (%)

- no data
- 0.0 - 4.0
- 4.0 - 6.1
- 6.1 - 7.9
- 7.9 - 13.1
- 13.1 - 31.1
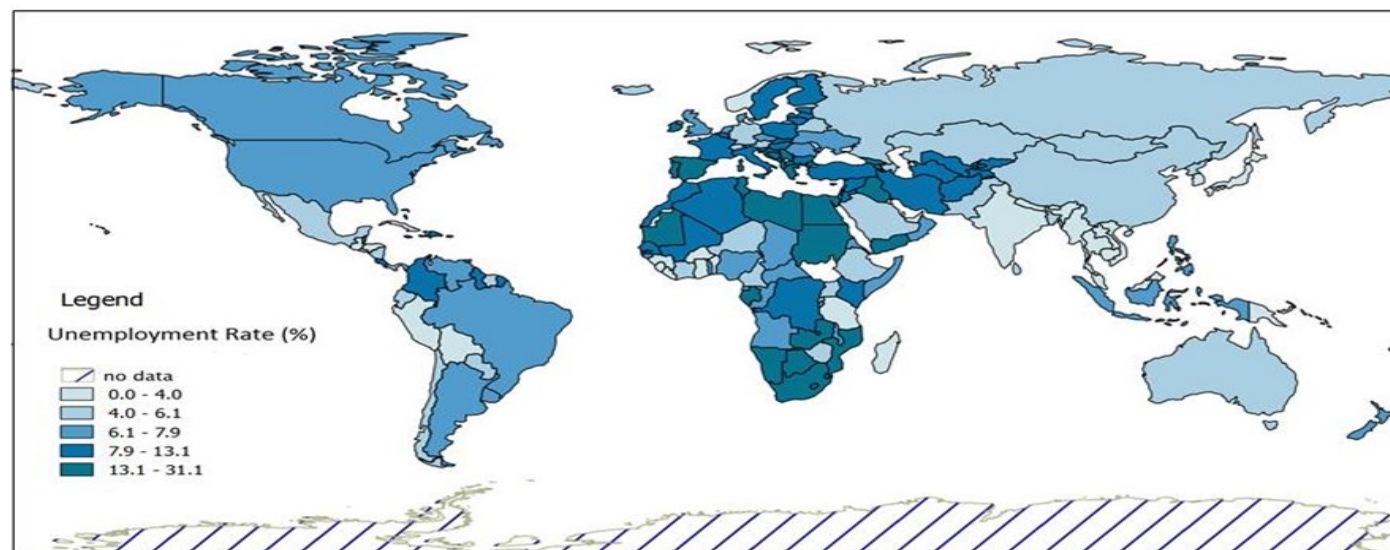
The countries with the highest unemployment rates are Mauritania, Macedonia, Bosnia and Herzegovina, Greece, Spain, Lesotho, South Africa, West Bank and Gaza, Mozambique and Swaziland. Countries which lacked data and were, thus, excluded in the study are Andorra, Antigua and Barbuda, Djibouti, Dominica, Grenada, Kiribati, Liechtenstein, Micronesia, Palau, Samoa, Sao Tome and Principe, Seychelles, St. Kitts and Nevis, St. Vincent and the Grenadines, Tonga, and Vanuatu.

Spiritual Wellbeing Indicators

In this section we will review the selection of statistical measures of the spiritual wellbeing indicators of education, gender equity and religious freedom.

EDUCATION

Education is one of the key primary indicators chosen by Pope Francis to measure spiritual wellbeing. According to Francis, human dignity and development cannot be imposed. "They must be built up and allowed to unfold for each individual, for every family, in communion with others, and in a right relationship with all those areas in which human social life develops." Education is a critical element that enables the poor to be "dignified agents of their own destiny."

Beyond this, we must respect the rights of families to educate their children, and the rights of churches and civic groups to support these endeavors. *Adult literacy rates* (herein referred to as "education measure") were selected to capture how many individuals received a basic education. This measure is not simply a performance measure like attendance at school or the completion of a set number of grades. Rather it is an impact indicator measuring whether or not individuals have mastered basic reading skills. It measures the actual impact of the education provided. Our education measure is sourced from UN Educational, Scientific, and Cultural Organization (UNESCO) and the World Bank, which in turn monitors the reliability and accuracy of the measure. The Adult Literacy Rate is formally defined as the percentage of the population age 15 and above who can read, write, and comprehend a simple statement about their everyday life.

Additional statistical metrics considered included primary completion rate, primary enrollment rate, and government expenditure per primary student as a percentage of Gross Domestic Product (GDP) per capita. While primary enrollment rate provided more coverage and availability of data, we selected adult literacy rates to represent education in the Fordham Francis Index (FFI) since it is an impact indicator that conveys the educational outcomes of attending school.

Much research has already been done showing the important statistical links between education and other measures of development (Jere R. Behrman, Investment in Education – "Inputs and Incentives," *Handbook of Development Economics*, 2010). The relationships between the chosen educational impact indicator with the following performance indicators were tested: enrollment in primary education, expenditure on education, and graduation ratio.

Table 5: Regression results of the education measure and three other educational indicators

Variables	Education Regression Coefficient *(t-stat)*	Economic Interpretation
Primary Enrollment Rate	1.0 *(-0.7)*	The regression was unable to establish a statistically significant correlation.
Expenditure in Education	1.2 *(-1.4)*	The regression was unable to establish a statistically significant correlation.
Primary Graduation Ratio	0.7 *(8.3)*	A 1% increase in graduation ratio is correlated with a 0.7% increase in adult literacy rate

The results indicate a strong and statistically significant relationship between adult literacy rate and the graduation ratio, but statistically insignificant correlations between adult literacy rates and enrollment in primary education and expenditure on education (Table 5). These results imply that graduation rates, like literacy rates, measure educational achievement, while the relationships between school attendance or school spending with educational achievement are not clear.

Using data collected from UNESCO for the year 2013, the map below (Figure 5) indicates that education deprivation is concentrated across Africa and South and Southeast Asia.

Figure 5: Map of adult literacy rates (2013)
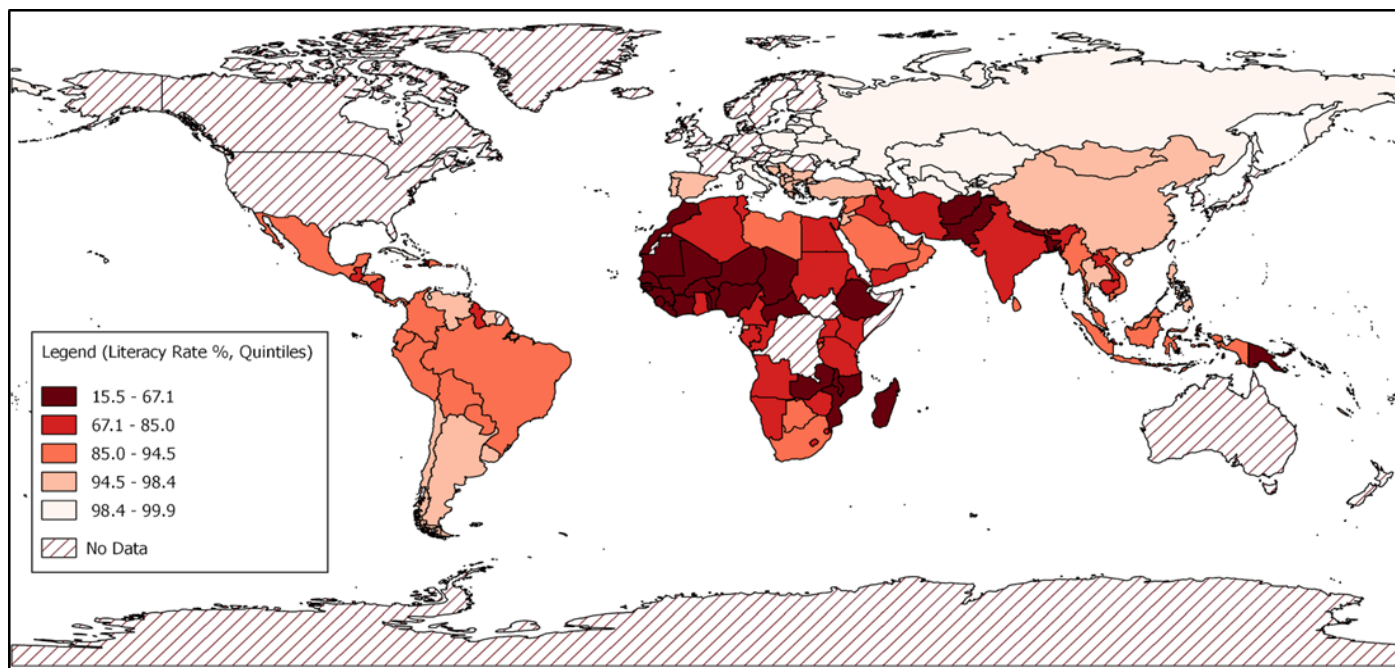
The countries with the lowest adult literacy rates are Niger, Guinea, South Sudan, Benin, Burkina Faso, Afghanistan, Mali, Central African Republic, Chad and Ethiopia. This study lacked data for the Democratic Republic of the Congo, South Sudan, Somalia, Australia, the Unites States, Canada and much of northern Europe.

GENDER

In promoting rights to life, dignity, and development, Pope Francis emphasized that access to these rights must be inclusive. It is through exclusion and marginalization that many continue to suffer in poverty today. In order to foster integral human development Pope Francis stressed gender equity, specifically in education. Furthermore, if a country is preventing one gender from accessing education that may also indicate exclusion from other sectors of society as well as discrimination against other social groupings. The *Youth Gender Parity Index* metric (herein referred to as "gender measure") was selected. The gender measure is the ratio of female youth literacy rates to male youth literacy rates between the ages of 15 and 24. This statistic indicates the disparity in outcomes of access to basic education between males and females. The data was sourced from the World Bank. For our analysis we calculated a four-year average to increase the number of available observations.

To assess the association with other important development indicators, we regressed our gender measure on the secondary school enrollment Gender Parity Index, labor force participation, and the fertility rate. The results indicate a strong and statistically significant relationship between our gender measure and secondary school enrollment Gender Parity Index, as well as with fertility rates (Table 6). Our results imply that a Gender Parity Index based on educational achievement (literacy, an impact indicator) or educational activity (enrollment, a performance indicator) yield similar results. Our results also confirm the already widely known relationship between female education and the reduction of fertility rates (T. Paul Schultz, "Population Policies, Fertility, Women's Human Capital and Child Quality," *Handbook of Development Economics*, 2007). The relationship between our gender measure and labor force participation was statistically insignificant (Table 6). This result implies that our gender measure, while indicative of secondary school enrollment Gender Parity Index and fertility rates, it is not indicative of labor force participation.

Table 6: Regression results of the gender measure and three key development indicators

Variables	Gender Regression Coefficient (t-stat)	Economic Interpretation
Secondary Enrollment Rate	0.68 (10.2)	A 0.1 value increase in enrollment GPI is correlated with a 0.068 increase in youth literacy GPI.
Labor Force Participa-	0.000008 (-0.1)	The regression was unable to establish a statistically significant relationship.
Fertility Rate	8.4 (-8.6)	A 1% increase in literacy GPI is correlated with a 0.84% decrease in fertility rates

Using data averaged over a four-year period, the map below in Figure 6 indicates deprivation of gender equality is concentrated across Africa, the Middle East, and South Asia.

Figure 6: Map of the Youth Gender Parity Index averaged over a four-year period (2010-2013)
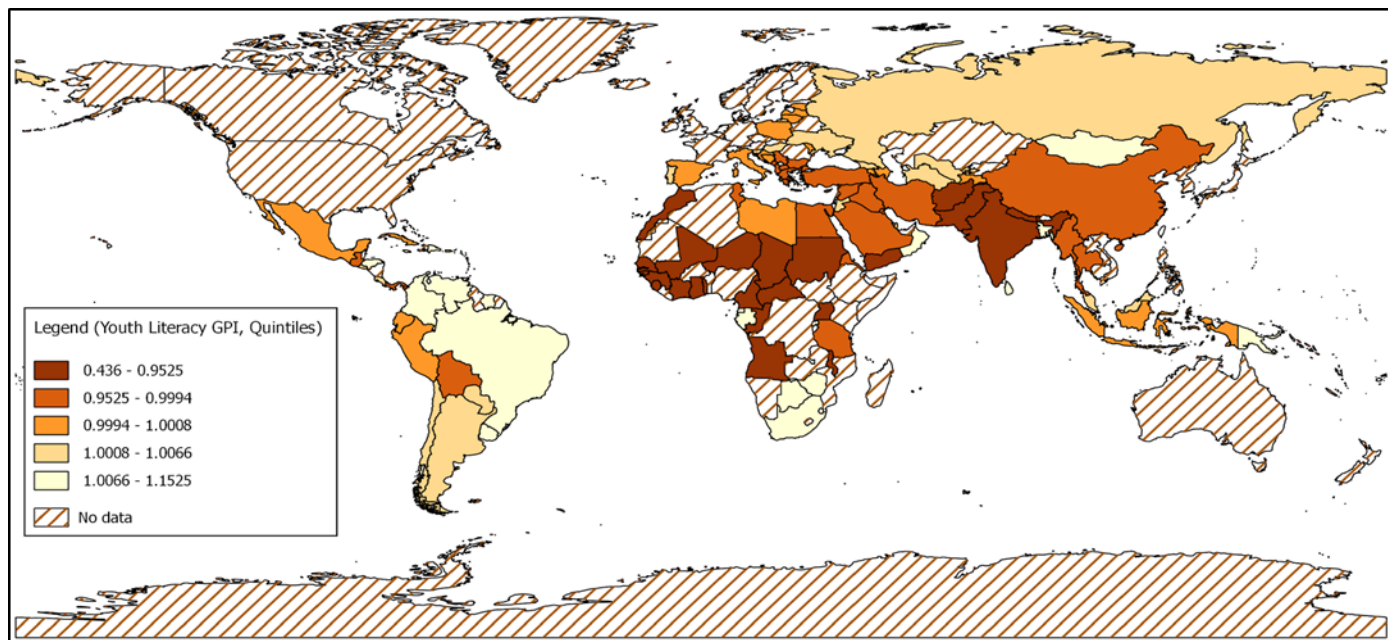
The countries with the lowest gender parity are Niger, Afghanistan, Central African Republic, Guinea, Cote d'Ivoire, Mali, Sierra Leone, Pakistan, Yemen, and Morocco. Countries that lacked data and were excluded from the study include Algeria, Burkina Faso, the Democratic Republic of the Congo, South Sudan, Somalia, Ethiopia, Madagascar, Mauritania, Namibia, Nigeria, Zambia, Mozambique, Australia, the Unites States, Canada and much of northern Europe.

RELIGIOUS FREEDOM

Pope Francis specifies that religious freedom is also among the absolute minimum requirements needed to live in dignity. Governments must protect the religious freedom of their citizens. Creating an environment suitable for religious freedom means ensuring each person has the opportunity to act in accordance with their conscience, a crucial component in granting individuals the right "to be dignified agents of their own destiny." We selected the *Government Restrictions Index (GRI)* from the Pew Research Center (herein referred to as "religious freedom" measure) as our metric. We found this measure to be most suitable as it also accounts for the role of government institutions in promoting or deterring religious freedom.

Other measures considered for religious freedom are Social Hostilities Index (SHI), Government Favoritism Index, Modified Social Regulation Index (MSRI) and the World Values Survey. The Government Restrictions Index (GRI) uses 20 sub-indicators to measure how national and local governments restrict religion including through force and coercion. The Pew Research Center employs extensive data verification checks and attains its data from various government and independent sources, which implies that the Government Restrictions Index (GRI) is reliable, consistent, and comprehensive. Government Re-

strictions Index (GRI) was selected as the appropriate measure of religious freedom over Modified Social Regulation Index (MSRI) and Social Hostilities Index (SHI) as the latter two do not account for the role of government in promoting or restricting religious freedom.

To assess the association with other important development indicators, the religious freedom measure was regressed with the Social Hostilities Index (SHI), the measure of Ethnic Fractionalization, and the Corruption Perception Index (CPI). Our results indicated a strong statistically significant relationship with both the Social Hostilities Index (SHI) and the Corruption Perception Index (CPI). There were no significant relationships between religious freedom and Ethnic Fractionalization (Table 7). The positive relationship with the Social Hostilities Index (SHI) may indicate that governments are restricting religious freedom as a way to contain social hostilities. The negative relationship with the corruption perception index (CPI)

may indicate that an atmosphere of religious intolerance is consistent with an atmosphere of increase corruption. This result is consistent with other empirical research that show that religious freedom is consistent with better economic and business outcomes (Brian Grim, Greg Clark, and Robert Snyder, "Is Religious Freedom Good for Business?," *Interdisciplinary Journal of Research on Religion*, 2014).

Table 7: Regression results between the religious freedom measure and three key development indicators

Variables	Religious Freedom Regression Coefficient (t-stat)	Economic Interpretation
Social Hostilities Index	0.6 (9.5)	A 0.1 increase in index of government restriction on religion is correlated with a 0.63 increase in social hostilities index.
Ethnic Fractionalization	0.05 (0.7)	The regression was unable to establish a statistically significant relationship.
Corruption Perception Index	-2.2 (-3.2)	A 0.1 increase in government restriction on religion is correlated with a 2.17 increase in perceived corruption

Photo Credit: Armand Aquino

Using data sourced from the Pew Research Center for the year 2013, the map below in Figure 7 reveals concentrations of religious freedom deprivation in the Middle East and other parts of Asia.

Figure 7: Map of the Government Restrictions Index (2013)
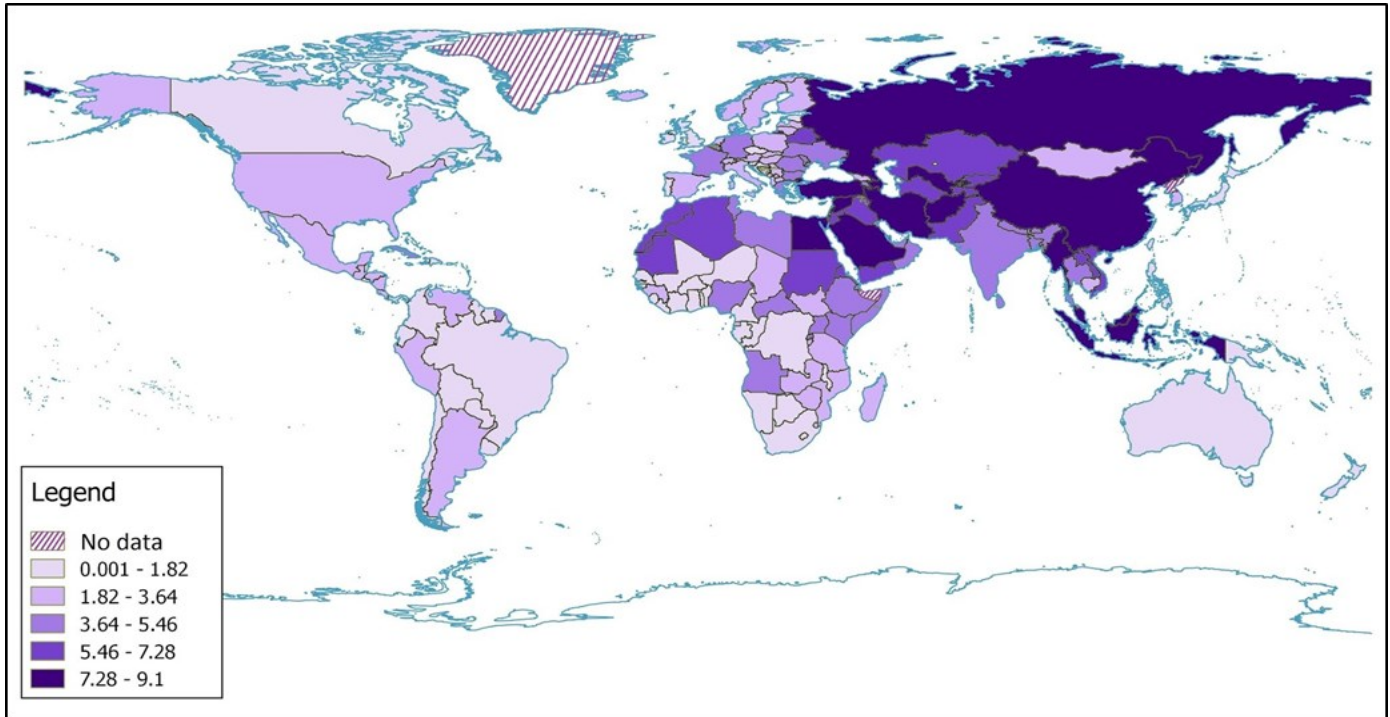
The countries with the greatest religious restrictions are China, Indonesia, Uzbekistan, Iran, Egypt, Afghanistan, Malaysia, Saudi Arabia, Myanmar, Russia, Syria, and Turkey.

Correlation Matrix

While the seven primary indicators should be highly correlated with all important measures of development, ideally these seven indicators should also be independent from each other. A correlation coefficient with an absolute value of more than 0.60 is deemed high, meaning that the two indicators are too strongly correlated, either positive or negative. We calculated the correlation coefficients for each pair of primary indicators. The results are presented below in a correlation matrix (Table 8).

	Water	Food	Housing	Employment	Education	Gender	Religious Freedom
Water	1.00						
Food	0.68	1.00					
Housing	0.78	0.55	1.00				
Employment	-0.25	-0.19	-0.28	1.00			
Education	0.72	0.46	0.83	-0.25	1.00		
Gender	0.66	0.30	0.67	-0.19	0.86	1.00	
Religious Freedom	0.03	0.05	-0.16	-0.13	-0.04	0.04	1.00

Boxes highlighted in yellow contain correlation coefficients that exceed the absolute value of .60 or 60%. From the correlation matrix, we observe that the water measure is highly correlated with four other primary indicators. This suggests the primal importance of water in a person's wellbeing. The high correlation with housing is expected since our measure of adequate housing is access to basic sanitation, a characteristic highly dependent on access to water. The high correlation with education and gender is less obvious but one can speculate the relationship as follows: in many developing countries with poor access to improved water, women and girls are in charge of fetching water for their families, which takes away time that could have been devoted to education. Thus, the water measure would be correlated with education and gender equity. Perhaps we need to consider using another characteristic of basic housing that is less dependent on water such as safety, electricity, or the sturdiness and size of the building.

Additionally, education and gender are extremely correlated with each other (86%). This relationship is expected since our gender equity measure compares female to male literacy rates, both of which are directly related to our education measure of adult literacy. The extremely high correlation implies the need to have a more independent measure of gender in future iterations of the FFI. Perhaps we might want to replace our gender equity measure with a measure related to other aspects of gender equity such as women's labor participation or perhaps a measure related to women health issues such as maternal mortality rates. In future iterations, we intend to explore alternative measures for housing and for gender equity.

Finally, please note that religious freedom has very low levels of correlation with any of the other primary indicators. Since most measures of development such as economic wellbeing or the UN Human Development Index (HDI) ignore religious freedom as well as many other political dimensions, this result suggests that Pope Francis, by including religious freedom as an important measure of development, is opening up a whole new avenue in the analysis of poverty and development, very much consistent with his insistence that the poor be "dignified agents of their own destiny."

FORDHAM FRANCIS INDEX

Our approach to computing the Fordham Francis Index is identical to the methodology employed by the United Nations Development Program in their calculation of the Human Development Index (HDI). Using the same approach assures that different implications between the indices are due to substantial differences in their components and not simply to technical differences on how we aggregated the various components.

First, we inverted our measures of food (undernourishment), employment (unemployment), and religious freedom (government restrictions index) so that for all seven of our measures a higher number would represent a better outcome.

Then, we standardized our seven primary indicators of water, food, housing, employment, education, gender and religious freedom so that they each yielded indices with values between 0 and 1 according to the following formula:

$$Primary\ Indicator\ Score = \frac{X - Min\ Theoretical\ Value\ of\ Statistic}{Max\ Value\ of\ Statistic - Min\ Theoretical\ Value\ of\ Statistic}$$

The maximum values were set to the perfect scores of the respective indicator as these represent the ideal goal posts. Meanwhile, the minimum values were set to the least possible theoretical value for each indicator.

Table 9: Measurement parameters for each indicator

	Water	Food*	Housing	Employment*	Education	Gender	Religious Freedom*
Minimum	0	0	0	0	0	0	0
Maximum	100	100	100	100	100	1	10

The figures for the indicators of Food, Employment and Religious Freedom were converted to their inverse values to facilitate the aggregation into the Material Wellbeing Index and Spiritual Wellbeing Index.

Next, we created a Material Wellbeing Index (MWI) by computing the geometric mean of the four normalized indices of water, food, housing, and employment according to the following formula:

$$Material\ Wellbeing\ Index = Water^{\frac{1}{4}} * Food^{\frac{1}{4}} * Housing^{\frac{1}{4}} * Employment^{\frac{1}{4}}$$

We gave equal weight to all four components when computing the Material Wellbeing Index (MWI).

Similarly, we created a Spiritual Wellbeing Index (SWI) by computing the geometric mean of the three normalized indices of education, gender equity, and religious freedom according to the following formula:

$$Spiritual\ Wellbeing\ Index =$$
$$Education^{\frac{1}{3}} * Gender^{\frac{1}{3}} * Religious\ Freedom^{\frac{1}{3}}$$

We gave equal weight to all three components when computing the Spiritual Wellbeing Index.

Finally, we computed Fordham's Pope Francis Global Poverty Index by calculating the geometric mean of the Material Wellbeing Index and the Spiritual Wellbeing Index according to the following formula:

$$Fordham\ Francis\ Index =$$
$$Material\ Wellbeing\ Index^{\frac{1}{2}} * Spiritual\ Wellbeing\ Index^{\frac{1}{2}}$$

Again, we gave equal weight to both the Material Wellbeing Index and the Spiritual Wellbeing Index.

Data collected for each indicator were from 2013, except in the instance of food and gender equality. The food measure is reported as a three-year averaged from 2011-2013, and the gender equity is reported as a four-year average from 2010-2013. The year 2013 was selected as it was the most recent year that had a large number of available observations for all variables.

Data sources differed across variables, but included: World Health Organization (WHO)/UN Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply, the UN Food and Agriculture Organization (FAO), UN Habitat, the World Bank, the UN Educational, Scientific, and Cultural Organization (UNESCO), and the Pew Research Center.

Material Wellbeing Index

As stated above the Material Wellbeing Index (MWI) represents an equally weighted aggregation of Pope Francis' four primary indicators of material wellbeing: *water, food, housing,* and *employment.* The selected statistical metrics for the primary indicators were normalized to create comparable values. For food and employment measures, however, the "inverse" was considered to be consistent with the other indicators where higher values imply better outcomes. For instance, a country with unemployment rate of 5% implies that it has an employment rate of 95% (100%-5%). The normalized values were then combined by taking the geometric mean thereby creating the Material Wellbeing Index (MWI). The resulting index provides a comparable descriptive and ranking system among nation-states.

In order to provide a comparison between the Material Wellbeing Index (MWI) and the more conventional measures of poverty and deprivation, the Material Wellbeing Index (MWI) was regressed on *economic wellbeing,* measured as the *logarithm of GDP per capita,* and on the Human Development Index (HDI). The Human Development Index (HDI) expands our economic wellbeing measurement of human welfare by including an indicator of health measured by life expectancy and an indicator of knowledge measured by the mean of actual and expected years of schooling) in addition to a more traditional indicator of economic wellbeing measured by per capita gross national income. Our results indicate a strong statistical relationship of our Material Wellbeing Index (MWI) with both economic wellbeing and the Human Development Index (HDI) (Table 10). Additionally, R^2 values imply that only 68% and 79% of the variation in values of the Material Wellbeing Index (MWI) are ex-

plained by economic wellbeing or the Human Development Index (HDI), respectively. The unexplained variation in Material Wellbeing Index (MWI) can be attributed to the additional indicators not considered by the former two indices. The graph in Figure 8 illustrates a positive relationship between the log of Gross Domestic Product (GDP) per capita and MWI score. Transforming the data on the Gross Domestic Product (GDP) per capita into a logarithmic scale allows us to run a linear regression analysis. Countries are essentially ranked from low to high income.

To a large extent (68%), GDP per capita determines the level of material wellbeing as measured by Pope Francis' primary indicators, but there are some significant exceptions. For instance, Chad and Kyrgyzstan have similar levels of income, yet there is a stark contrast in their Material Wellbeing Index (MWI) scores (0.43 and 0.92 respectively). Kyrgyzstan has significantly higher scores in providing clean water and basic housing compared to Chad, even though both have

Table 10: Regression results of the MWI and two commonly used poverty measures

Variables	Material Wellbeing		Economic Interpretation
	Regression Coefficient (t-stat)	R²	
Economic Wellbeing (GDP per Capita in log form)	0.11 (-17.2)	0.68	A 1% increase in log GDP per capita is correlated with a .11 increase in Material Wellbeing Index
Human Development Index	0.87 (22.4)	0.79	A 0.1 increase in HDI is correlated with a 0.09 increase in Material Wellbeing Index

similar low average incomes. Then there are relatively high incomes countries such as East Timor and Gabon which have petroleum and natural gas as sources of income but lag in providing basic aspects of material wellbeing as defined by Pope Francis such as water, food, housing, and employment.

Figure 8: Regression results of the Material Wellbeing Index (MWI) and the log of GDP per capita
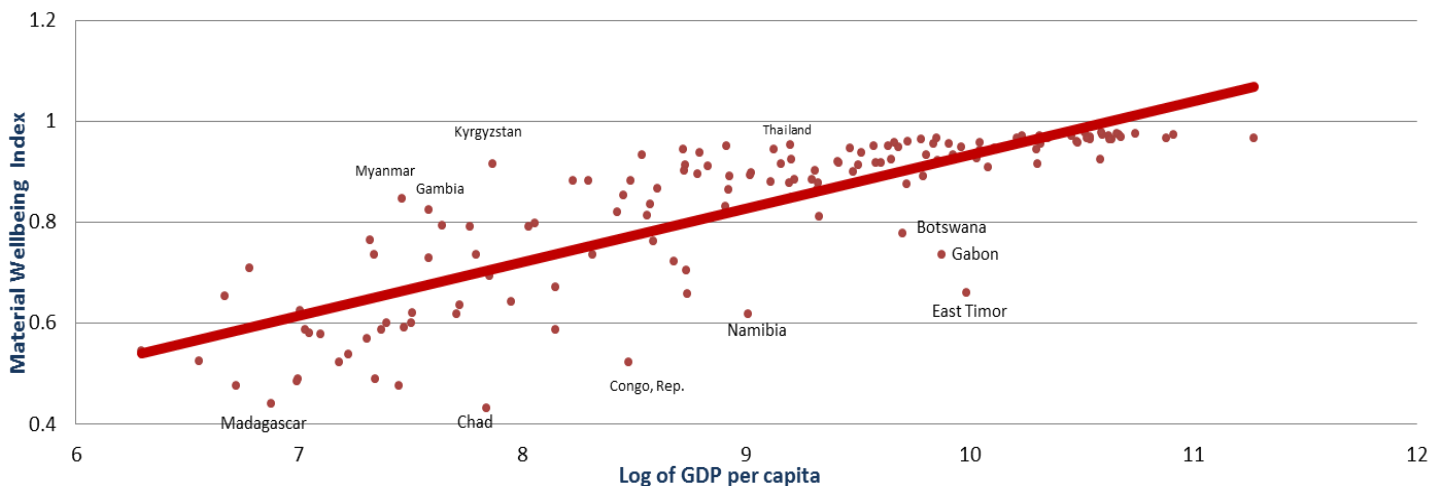
Similar to economic wellbeing, there is also a strong positive relationship between our Material Wellbeing Index (MWI) and the UN Human Development Index (HDI). The Material Wellbeing Index (MWI) scores are dispersed in countries with low to medium Human Development Index (HDI) scores but converge at the upper end of the UN Human Development Index (HDI) range (Figure 9). Interestingly, there are countries which are categorized in the Human Development Index (HDI) as low but may have high Material Wellbeing Index scores because of the priority they place on providing clean water, adequate food, basic housing, and unemployment. Take for example Madagascar and Myanmar which both have low Human Development Index (HDI) scores (0.51 and 0.53, respectively). Madagascar's Material Wellbeing Index (MWI) score is 0.44 while Myanmar has 0.85. The former's low Material Wellbeing Index (MWI) score is primarily due to low levels of Water and Housing indices.

Figure 9: Regression results of the Material Wellbeing Index (MWI) and the Human Development Index (HDI)
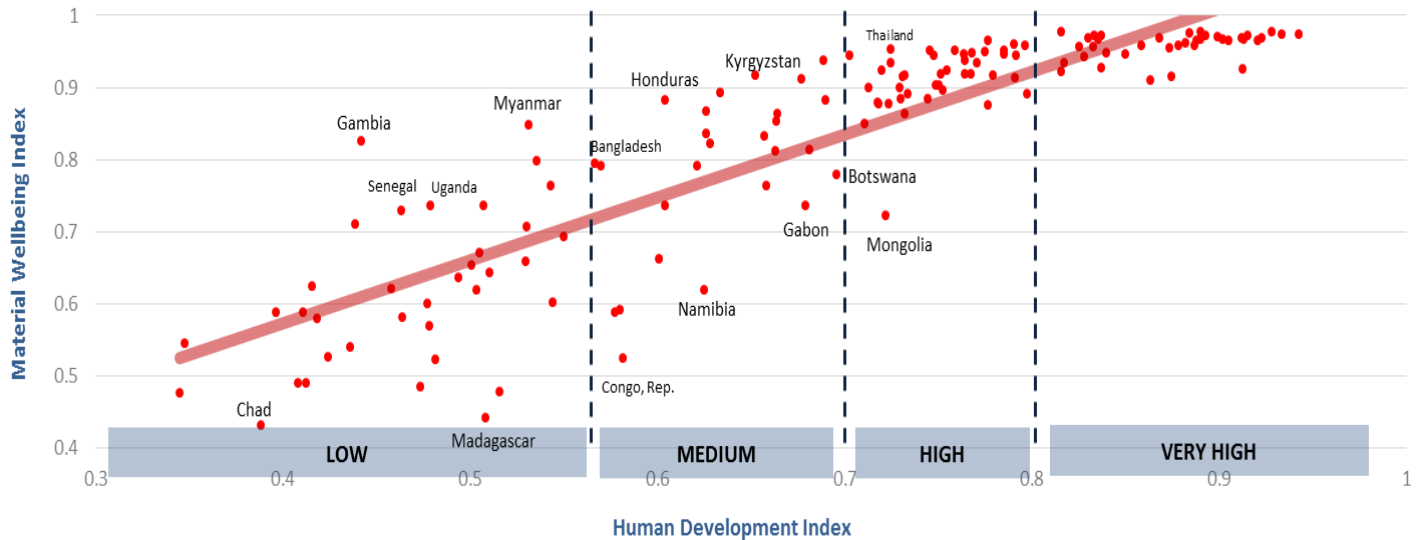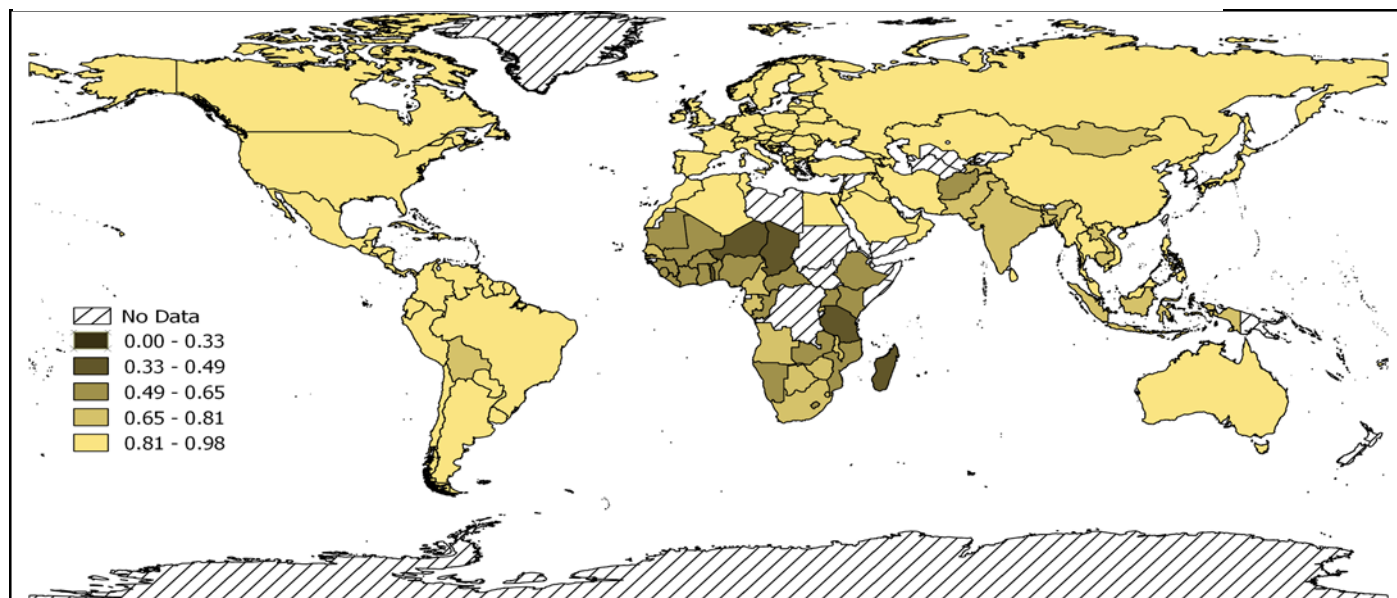
The highest levels of material deprivation are experienced in Chad, Republic of Congo, Haiti, Liberia, Madagascar, Mozambique, Niger, Sierra Leone, Tanzania, and Togo. Common to all the least materially-rich countries is the fact that they have low scores in the Housing Index. MWI was limited to 143 countries due to data unavailability and excludes countries such as the Sudan, South Sudan, Libya, Somalia, Yemen, Uzbekistan, Turkmenistan, Kyrgyzstan, and Papua New Guinea.

Spiritual Wellbeing Index

The Spiritual Wellbeing Index (SWI) represents an equally weighted aggregation of Pope Francis' three primary indicators of spiritual wellbeing: education, gender equity and religious freedom. The "inverse" of the religious freedom indicator was used to maintain consistency. The selected statistical measures of the primary indicators were then normalized to create comparable values. The normalized values were aggregated by taking the geometric mean, thereby creating the Spiritual Wellbeing Index (SWI). The resulting index offers a tool for comparison among nation-states.

In order to provide a comparison between the Spiritual Wellbeing Index (SWI) and other standard measures of poverty and deprivation, the Spiritual Wellbeing Index (SWI) was regressed with *economic wellbeing*, measured as the logarithm of Gross Domestic Product (GDP) per capita, and the Human Development Index (HDI). The results indicate a strong statistical relationship of our Spiritual Wellbeing Index (SWI) with both economic wellbeing and the Human Development Index (HDI) (Table 11). However, the respective R^2 values of the regressions imply that only 19% of the variation in our measure of Spiritual Wellbeing (SWI) is explained by either changes in economic wellbeing or changes in the Human Development Index. The large unexplained variations in our Spiritual Wellbeing Index (SWI) can be attributed

to the additional dimensions of gender and religious freedom not considered by the former two poverty measures.

Table 11: Regression results of the SWI and two commonly used poverty measures

| Variables | Spiritual Wellbeing | | Economic Interpretation |
	Regression Coefficient (t-stat)	R²	
Economic Wellbeing (GDP per Capita Log form)	.07 (4.8)	0.19	A 1% increase in GDP per capita is correlated with a .0007 increase in Spiritual Wellbeing Index
Human Development Index	0.52 (4.86)	0.19	A 0.1 increase in HDI is correlated with a 0.052 increase in Spiritual Wellbeing Index

Both Material Wellbeing Index (MWI) and the Spiritual Wellbeing Index (SWI) exhibit a positive relationship (Figure 11) with Economic Wellbeing. Unlike with the Material Wellbeing Index (MWI), the Spiritual Wellbeing Index (SWI) has a much lower R² indicating that economic wellbeing alone can explain only 19% of the variation in the our Spiritual Wellbeing Index (SWI). For example, Egypt and Samoa have similar levels of average economic wellbeing, but have very different scores on our Spiritual Wellbeing Index (SWI). Samoa is an example of a country that does much better than countries with the same level of income, while Egypt's overall score is pulled down primarily by its low score on the religious freedom index. The results imply that high income does not necessarily translate into high spiritual wellbeing.

The Spiritual Wellbeing Index (SWI) and Human Development Index (HDI) also demonstrate a significant positive relationship, but again the Human Development Index (HDI) can only explain 19% of the variation in our Spiritual Welfare Index (Figure 12). There are many countries that are ranked low by the Human Development Index (HDI) that exhibit a high measure of spiritual wellbeing, while many countries ranked high or very high by the HDI exhibit a low measure of spiritual wellbeing. Papua New Guinea, for instance, has a low HDI score (mainly because of its low per capita income) but has a high Spiritual Wellbeing Index (SWI) score. Conversely, China has a

Figure 11: Regression results of Spiritual Wellbeing Index (SWI) and the log of GDP per capita
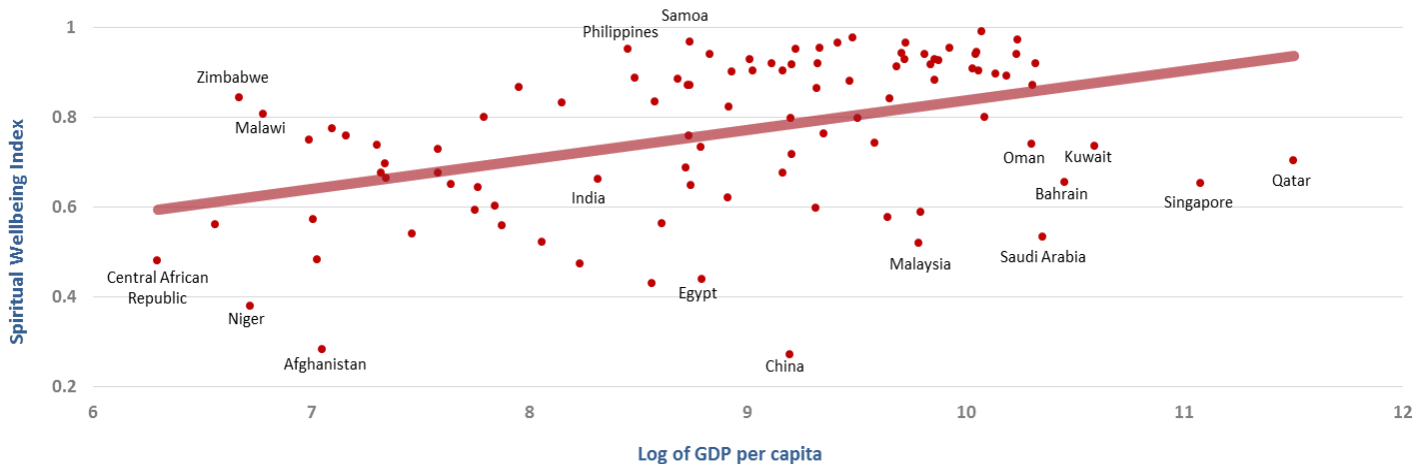
Figure 12: Regression results of Spiritual Wellbeing Index and the Human Development Index
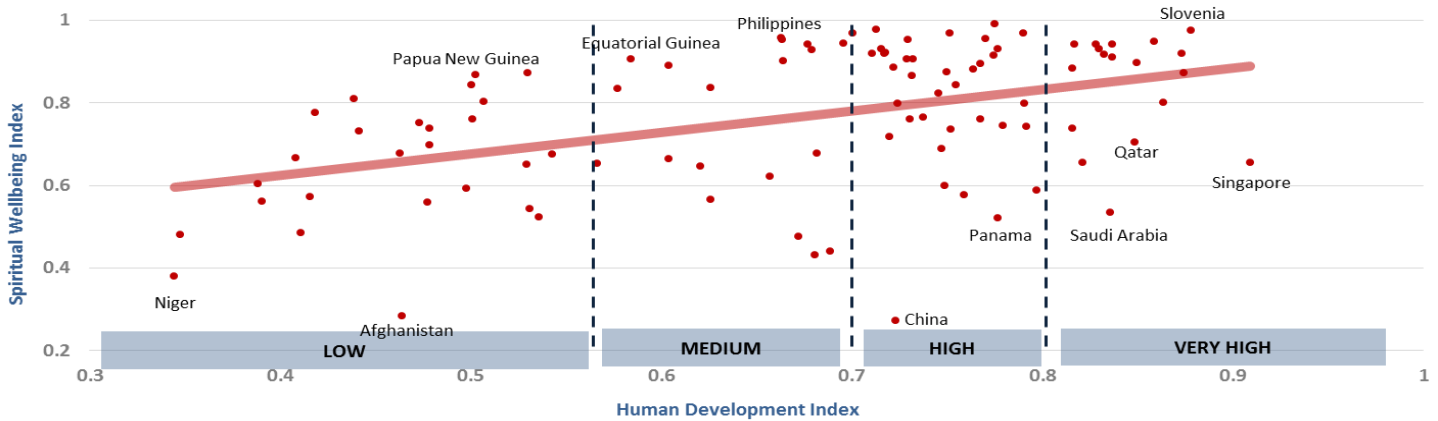
high HDI score, but is doing poorly in terms of its Spiritual Wellbeing Index (SWI) score. While China is performing well in terms of per capita income and literacy, they are among those countries with limited religious freedom.

The analysis was made for only 99 territories because of unavailable data. The global mapping of the Spiritual Wellbeing Index (SWI) (Figure 13) shows that low Spiritual Wellbeing Index (SWI) scores are concentrated around Northern Africa, the Middle East, and East Asia.

Figure 13: Map of SWI (2013)
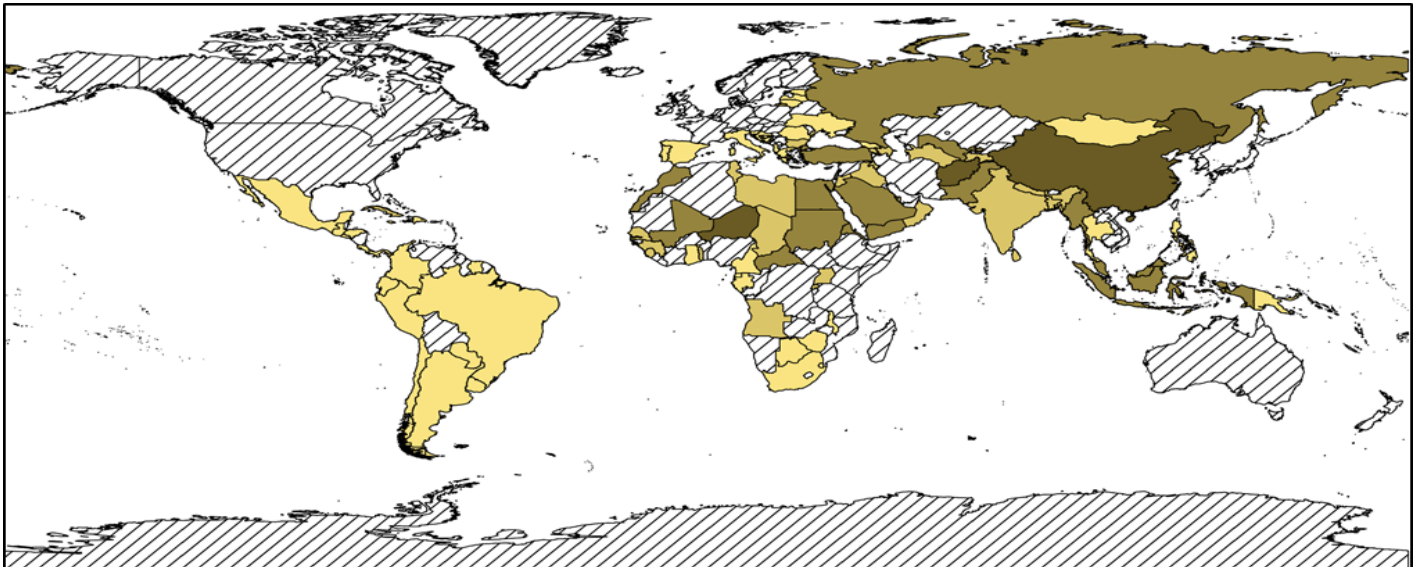
The lowest scores on the Spiritual Wellbeing Index are found in China, Indonesia, Uzbekistan, Iran, Egypt, Afghanistan, Malaysia, Saudi Arabia, Myanmar, Russia, Syria, and Turkey. Most of these countries tend to have authoritarian governments and have low religious freedom index scores. Countries not included in the analysis due to data unavailability include Namibia, Mozambique, Madagascar, Bolivia, Tanzania, the Democratic Republic of the Congo, South Sudan, Somalia, Ethiopia, Algeria, Western Sahara, Nigeria, Burkina Faso, Iran, Kazakhstan, Kyrgyzstan, Australia, New Zealand, Canada, the United States, and the majority of Europe.

Fordham's Pope Francis Global Poverty Index

The Fordham Francis Index (FFI) represents an equally weighted aggregation of the Material Wellbeing Index (MWI) and the Spiritual Wellbeing Index (SWI) by taking their geometric mean.

In order to provide a comparison between the Fordham Francis Index (FFI) and standard measures of poverty, the Fordham Francis Index (FFI) was regressed on economic wellbeing, measured as the *logarithm of GDP per capita*, and on the Human Development Index (HDI). The results indicate a strong statistical relationship of the Fordham Francis Index (FFI) with both economic wellbeing and the Human Development Index (HDI) (Table 12). Additionally, the R² values of the regressions imply that 59% and 57% of the variation in values of the Fordham Francis Index (FFI) are explained by economic wellbeing or the Human Development Index (HDI), respectively. This result is due to the additional dimensions captured in Fordham Francis Index (FFI). These additional dimensions represent the value added of the Fordham Francis Index (FFI) and are what makes this

Table 12: Regression results of the FFI and two commonly used poverty measures

Variables	Fordham Francis Index Regression Coefficient (t-stat)	R²	Economic Interpretation
Economic Wellbeing	.09 (9.3)	0.59	A 1% increase in the log GDP per capita is correlated with a .0009 increase in Fordham Francis Index
Human Development Index	0.7 (10.4)	0.57	A 0.1 increase in HDI is correlated with a 0.07 increase in Fordham Francis Index

new index innovative.

The graph in figure 14 represents the positive relationship between economic wellbeing and the Fordham Francis Index (FFI). It indicates where countries stand in levels of deprivation pertaining to Pope Francis' seven primary indicators relative solely to their economic wellbeing. One can notice countries with almost similar levels of economic wellbeing but who nonetheless have very different scores on the Fordham Francis Index (FFI). Looking closely at some of these pairs, one can see that the variation between scores measured by the Fordham Francis Index (FFI) primarily stem from the divergence in the spiritual primary indicators, most notably religious freedom. Additionally, for countries at lower levels of economic wellbeing, there is also divergence caused by differences in the material primary indicators of water and housing. Some countries with the same level of economic resources focus more of their limited resources on providing basic needs such as clean water and adequate housing to the poorer groups in their society and therefore score significantly higher on the Fordham Francis Index (FFI).

The graph in figure 15 represents the relationship between the Fordham Francis Index (FFI) and the Human Development Index (HDI). It reveals disparities between the two poverty measurements. There are countries, with almost similar scores on the Human Development Index (HDI) that have significantly different scores on the Fordham Francis Index (FFI). Looking closely at some of these interesting pairs, one can see that the variation in Fordham Francis Index (FFI) scores between countries stems from the divergence in spiritual wellbeing and most notably differences in religious freedom. But there are some countries at the lower levels of economic wellbeing where the variation in FFI scores is driven not by differences in religious freedom but by differences in the

provision of basic goods needed by the poor such as clean water and housing with proper sanitation. To summarize, unlike previous measures of human well-being such as economic wellbeing or the Human Development Index (HDI), the Fordham Francis Index (FFI) places a much higher emphasis on satisfying the basic needs of the poor as well as a stronger value on political freedoms and in particular religious freedom.

Figure 14: Regression results of the Fordham Francis Index and the log of real GDP per capita
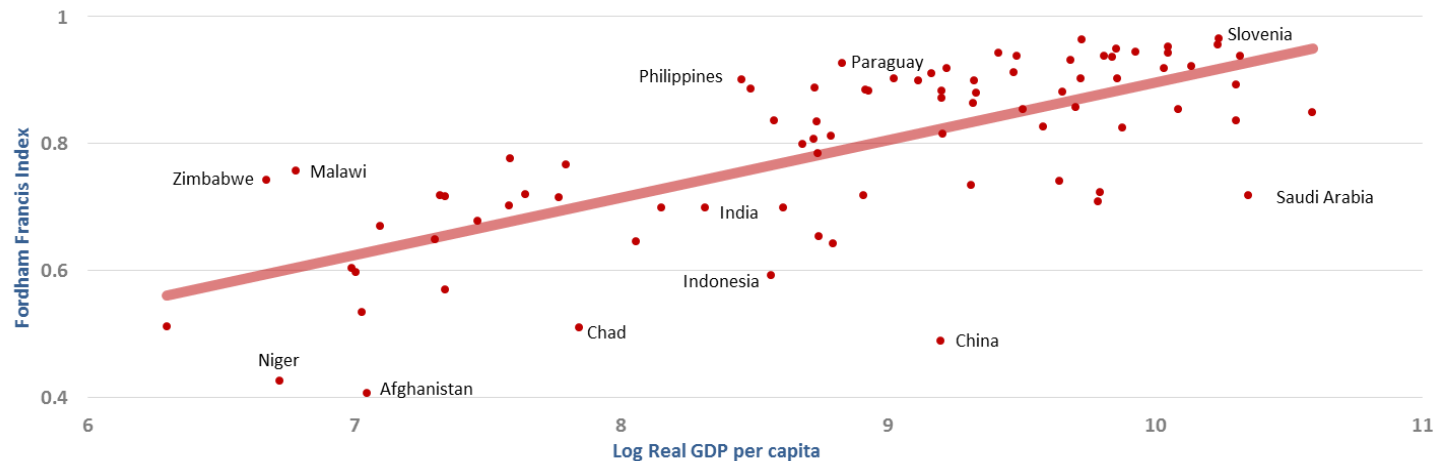
Figure 15: Regression results of the Fordham Francis Index and Human Development Index
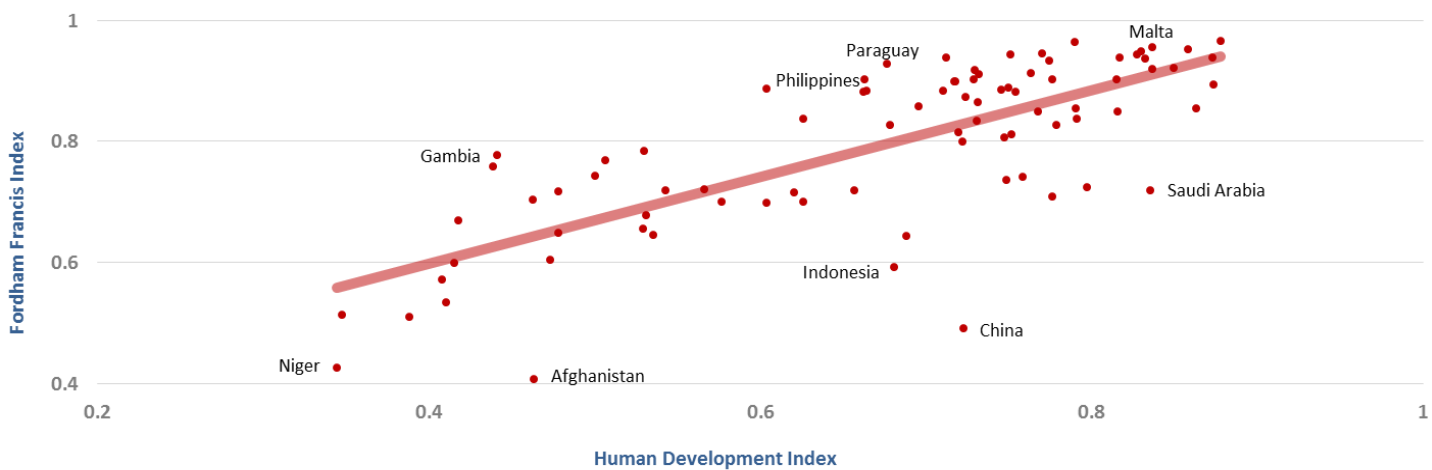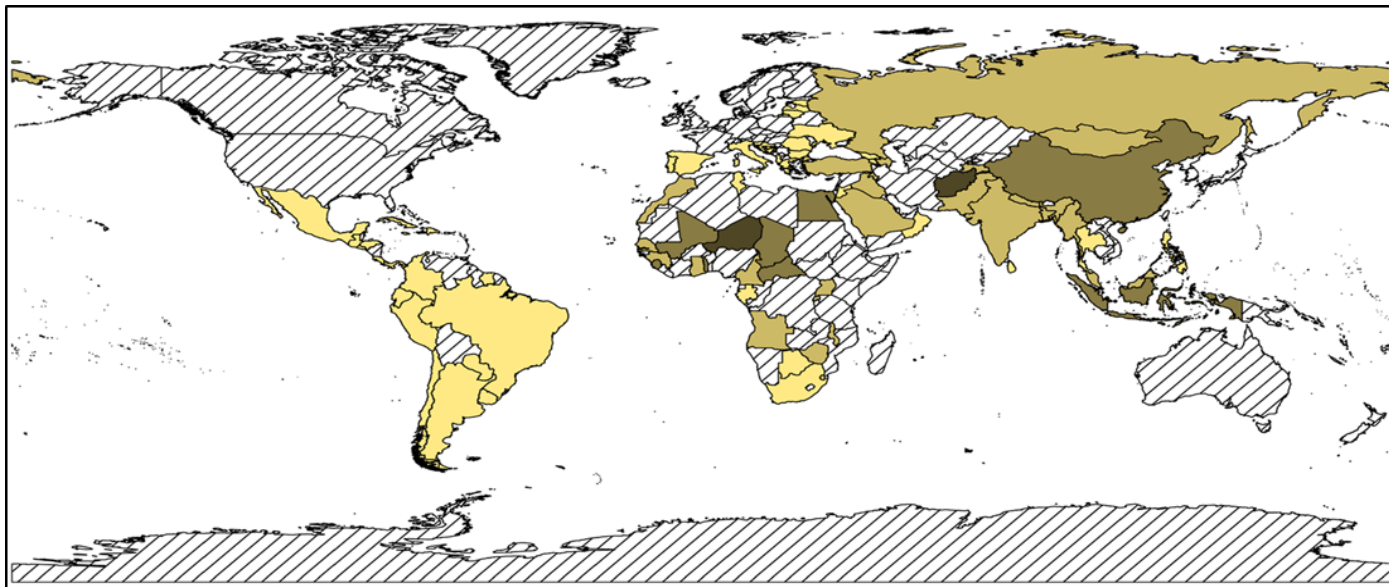
The map of the FFI indicates a concentration of deprivation in Africa, the Middle East and Asia, however a significant number of countries lacked complete data for all seven primary indicators and were therefore excluded from the analysis. Of the countries that had complete data availability, the least developed countries by FFI standard are Niger, Afghanistan, Guinea, Chad, Central African Republic, China, Sierra Leone, Mali, Togo and Indonesia.

CONCLUSION

The Fordham Francis Index (FFI) is a simple tool designed to measure international poverty across nations. It is a simple tool because it relies on only seven primary indicators. All of these indicators are easily available for most countries in the world. The development of a simple technical instrument of verification like the Fordham Francis Index (FFI) can empower members of civil society to carry out their own oversight responsibilities. They can use the Fordham Francis Index (FFI) to monitor, review and supervise the efforts of national and international governmental agencies as well as other national and international actors to promote integral human development through the proper attainment of the UN's Sustainable Development Goals (SDGs).

The seven primary indicators of the Fordham Francis Index (FFI) can still be improved. In future iterations we hope to expand the number of countries that are covered by the index. Also, our seven primary indicators should be as independent from each other as possible. We need to consider better statistical measures for basic housing and gender equity so that they do not simply replicate to too large an extent what we already know from our other indicators of water and education.

Additionally, the Fordham Francis Index (FFI) is a broad tool to measure global poverty. We have already determined that our primary indicators are strongly correlated to many other important indicators affecting development and human wellbeing. For example, our indicators are significantly related to various health concerns such as infant mortality, maternal mortality, fertility, and life expectancy. They are also strongly related to economic measures such as per capita incomes and the proportion of the population living in urban slums. We also found correlations with various educational measures such as graduation success rates and school enrollment. Finally, we found interesting correlations with political indicators such as indices of political corruption and social hostilities.

We still need to test for further correlations. We are especially interested in determining how well the Fordham Francis Index (FFI) is an indicator of the more than 100 targets being developed for the new UN Sustainable Development Goals (SDGs). And we are also interested in further determining the relationship between the Fordham Francis Index and other indicators of political freedoms.

Finally, the Fordham Francis Index (FFI) is an innovative tool to measure basic human needs across countries. Unlike more traditional measures of economic wellbeing or a more expansive measure of human wellbeing such as the Human Development Index (HDI), the Fordham Francis Index (FFI) places a greater emphasis on the poor with it focus on meeting the basic needs of human wellbeing. An even more innovative feature of the Fordham Francis Index (FFI) is the value it places on political freedoms and in particular on religious freedom as a basic component of human wellbeing. Political freedoms, such as religious freedom, have been traditionally ignored in previous measures of poverty. But this emphasis on the political rights of the marginalized, such as religious freedom, is consistent with Pope Francis' insistence that the marginal be "dignified agents of their own destiny."

APPENDICES

APPENDIX A: VARIABLE DEFINITIONS

Variable	Definition
Access to Improved Drinking Water Source	Percentage of population who use an improved drinking water source including piped water on private premises (piped household water connection located inside the user's dwelling, plot or yard), and other public improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collections) that are nearby.
Access to Improved Sanitation Facilities	Percentage of population who use an adequate sanitation facility. A sanitation facility is considered adequate if it hygienically separates human excreta from human contact. The types of technology that are likely to meet this criterion are: flush to piped sewer system; flush to septic tank; flush/pour flush to pit; composting toilet; VIP latrine; pit latrine with a slab
Adult Literacy Rate	The percentage of people ages 15 and above who can both read and write
Birth Rate	The total number of live births per 1,000 of a population in a year.
Corruption Perception Index	Measured by Transparency International that ranks countries by their perceived levels of corruption, as determined by expert assessments and opinion surveys.
Enrollment in primary education, both sexes	Total enrollment in primary education expressed as a percentage of the population of official primary education age.
Ethnic Fractionalization	Measures the degree of ethnic, linguistic and religious heterogeneity in various countries
Fertility Rate	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.
Government Expenditure on Education	Total government expenditure on education expressed as a percentage of total government expenditure on all sectors
Government Restrictions Index	The Government Restrictions Index (GRI) measures – on a 10-point scale – government laws, policies and actions that restrict religious beliefs or practices. The GRI is comprised of 20 measures of restrictions, including efforts by governments to ban particular faiths, prohibit conversions, limit preaching or give preferential treatment to one or more religious groups.
Gross National Income per capita.	The sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad, divided by the total population

Variable	Definition
Infant Mortality Ratio	Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.
Labor force participation rate, female (% of female population ages 15+)	Labor force participation rate is the proportion of the population ages 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.
Life Expectancy	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.
Maternal Mortality Ratio	Maternal mortality ratio is the number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births. The data are estimated with a regression model using information on the proportion of maternal deaths among non-AIDS deaths in women ages 15-49, fertility, birth attendants, and GDP.
Prevalence of Undernourishment	Percentage of population who are continuously unable to consume enough food to meet dietary energy requirements
Primary Education Graduation Ratio	Number of graduates regardless of age and sex in a given level or program, expressed as a percentage of the population at the theoretical graduation age for that level or program.
Primary School Completion Rate	Total number of new entrants in the last grade of primary education, regardless of age, expressed as percentage of the total population of the theoretical entrance age to the last grade of primary.
Secondary School Enrollment GPI	Ratio of female gross enrolment ratio for secondary to male gross enrolment ratio for secondary.
Social Hostilities Index	Measures acts of religious hostility by individuals, organizations, or groups, including armed conflict, terrorism, mob or sectarian violence, and harassment over religious attire.
Unemployment Rate	Percentage of total labor force that is unemployed but actively seeking employment and willing to work
Urban Slum Population	The number of people living in slums of a city divided by the total population of this city, expressed as a percentage.
Youth Gender Parity Index	Gender parity index for youth literacy rate is the ratio of females to males ages 15-24 who can both read and write

APPENDIX B: OUTLIERS FROM REGRESSION OF THE FORDHAM FRANCIS INDEX AND HUMAN DEVELOPMENT INDEX

Country	Water	Food	Housing	Employment	Education	Gender	Religious Freedom
Afghanistan	0.533	0.756	0.311	0.908	0.317	0.519	0.140
Malawi	0.901	0.939	0.588	0.930	0.532	0.909	0.806
Indonesia	0.862	0.907	0.597	0.937	0.928	0.999	0.086
Paraguay	0.950	0.882	0.868	0.950	0.946	1.002	0.882
Saudi Arabia	0.970	0.950	1.00	0.943	0.944	0.998	0.161
Malta	1.000	0.950	1.000	0.935	0.933	1.010	0.882

APPENDIX C: OUTLIERS FROM REGRESSION OF THE FORDHAM FRANCIS INDEX ON THE LOGARITHM OF GROSS DOMESTIC PRODUCT PER CAPITA

Country	Water	Food	Housing	Employment	Education	Gender	Religious Freedom
Niger	0.573	0.898	0.105	0.949	0.155	0.436	0.817
Zimbabwe	0.773	0.668	0.372	0.947	0.836	1.028	0.699
Afghanistan	0.533	0.756	0.311	0.908	0.317	0.519	0.140
Malawi	0.865	0.790	0.401	0.924	0.613	0.942	0.914
Indonesia	0.862	0.907	0.597	0.937	0.928	0.999	0.086
Philippines	0.911	0.861	0.725	0.929	0.952	1.015	0.892
Saudi Arabia	0.970	0.950	1.00	0.943	0.944	0.998	0.161
Slovenia	0.995	0.950	0.991	0.898	0.997	1.000	0.925

APPENDIX D: AREAS OF DEPRIVATION

Least Materially-rich Countries	Water	Food	Housing	Employment	Material Index
Chad	0.51	0.61	0.12	0.93	0.43
Madagascar	0.50	0.68	0.12	0.96	0.44
Niger	0.57	0.90	0.11	0.95	0.48
Tanzania	0.55	0.67	0.15	0.97	0.48
Togo	0.62	0.83	0.12	0.93	0.48
Sierra Leone	0.61	0.75	0.13	0.97	0.49
Mozambique	0.51	0.72	0.20	0.78	0.49
Haiti	0.58	0.51	0.27	0.93	0.52
Congo, Rep.	0.76	0.72	0.15	0.93	0.52
Liberia	0.74	0.66	0.16	0.96	0.53

APPENDIX E: FORDHAM FRANCIS INDEX COUNTRY RANKINGS

Rank	Country	FFI	Materi-al Index	Water	Hous-ing	Food	Employment	Spiritual Index	Religious Freedom	Educa-tion	Gender
1	Slovenia	0.965	0.958	0.995	0.991	0.950	0.898	0.973	0.925	0.997	1.000
2	Uruguay	0.962	0.960	0.995	0.961	0.950	0.934	0.965	0.914	0.984	1.000
3	Malta	0.954	0.971	1.000	1.000	0.950	0.935	0.937	0.882	0.933	1.000
4	Estonia	0.952	0.958	0.996	0.972	0.950	0.914	0.947	0.849	0.999	1.000
5	Chile	0.948	0.967	0.990	0.990	0.950	0.940	0.929	0.828	0.967	1.000
6	Trinidad and Toba-go	0.945	0.934	0.951	0.915	0.907	0.964	0.955	0.882	0.989	1.000
7	Portugal	0.942	0.943	1.000	0.996	0.950	0.835	0.941	0.882	0.945	1.000
8	Brazil	0.941	0.919	0.978	0.821	0.950	0.935	0.964	0.978	0.915	1.000
9	Croatia	0.937	0.933	0.995	0.971	0.950	0.827	0.940	0.839	0.991	1.000
10	Italy	0.937	0.954	1.000	0.995	0.950	0.878	0.920	0.785	0.991	1.000
11	Suriname	0.937	0.900	0.948	0.792	0.917	0.952	0.975	0.978	0.947	1.000
12	Argentina	0.936	0.956	0.988	0.958	0.950	0.929	0.916	0.785	0.980	1.000
13	Mauritius	0.931	0.950	0.999	0.932	0.950	0.920	0.912	0.849	0.892	1.000
14	Paraguay	0.926	0.912	0.950	0.868	0.882	0.950	0.941	0.882	0.946	1.000
15	Cyprus	0.921	0.946	1.000	1.000	0.950	0.842	0.897	0.731	0.987	1.000
16	Lithuania	0.918	0.927	0.962	0.916	0.950	0.882	0.909	0.753	0.998	1.000
17	Ecuador	0.918	0.884	0.864	0.838	0.882	0.958	0.952	0.925	0.933	1.000
18	Costa Rica	0.912	0.945	0.976	0.945	0.946	0.915	0.880	0.699	0.974	1.000
19	Albania	0.910	0.916	0.952	0.927	0.950	0.840	0.904	0.763	0.972	0.996
20	Panama	0.902	0.875	0.941	0.739	0.880	0.959	0.930	0.860	0.941	0.994
21	Latvia	0.902	0.922	0.992	0.869	0.950	0.881	0.883	0.688	0.999	1.000
22	Bosnia and Herze-govina	0.901	0.899	0.997	0.948	0.950	0.726	0.904	0.753	0.983	1.000
23	Philippines	0.899	0.853	0.911	0.725	0.861	0.929	0.948	0.892	0.954	1.000
24	Colombia	0.897	0.877	0.913	0.806	0.889	0.904	0.918	0.828	0.936	1.000
25	Spain	0.893	0.915	1.000	0.999	0.950	0.737	0.872	0.677	0.981	0.999
26	Jamaica	0.891	0.879	0.938	0.818	0.915	0.850	0.903	0.839	0.879	1.000
27	Georgia	0.888	0.903	0.990	0.875	0.899	0.854	0.873	0.667	0.997	1.000

APPENDIX E: FORDHAM FRANCIS INDEX COUNTRY RANKINGS

Rank	Country	FFI	Materi-al Index	Water	Hous-ing	Food	Employment	Spiritual Index	Religious Freedom	Educa-tion	Gender
28	Ukraine	0.884	0.950	0.964	0.958	0.950	0.928	0.823	0.559	0.997	1.000
29	Honduras	0.882	0.883	0.900	0.813	0.863	0.961	0.881	0.785	0.872	1.000
30	Mexico	0.882	0.924	0.956	0.844	0.950	0.951	0.842	0.634	0.940	1.000
31	El Salvador	0.881	0.863	0.924	0.734	0.871	0.941	0.899	0.839	0.868	1.000
32	Dominican Republic	0.880	0.849	0.852	0.833	0.860	0.850	0.913	0.839	0.909	1.000
33	South Afri-ca	0.879	0.811	0.924	0.653	0.950	0.754	0.953	0.925	0.937	1.000
34	Thailand	0.872	0.953	0.975	0.931	0.914	0.993	0.798	0.527	0.964	0.999
35	Peru	0.864	0.864	0.859	0.746	0.904	0.960	0.864	0.688	0.938	1.000
36	Romania	0.853	0.912	1.000	0.786	0.950	0.927	0.798	0.516	0.986	1.000
37	Greece	0.853	0.910	1.000	0.990	0.950	0.728	0.800	0.527	0.975	0.998
38	Botswana	0.851	0.778	0.962	0.633	0.730	0.824	0.931	0.925	0.873	1.000
39	Cuba	0.849	0.948	0.943	0.931	0.950	0.968	0.760	0.441	0.998	1.000
40	Kuwait	0.848	0.977	0.990	1.000	0.950	0.968	0.737	0.419	0.956	0.998
41	Guatemala	0.836	0.835	0.927	0.636	0.852	0.970	0.836	0.796	0.770	0.953
42	Oman	0.836	0.943	0.933	0.967	0.947	0.927	0.740	0.441	0.920	1.000
43	Armenia	0.834	0.914	0.999	0.895	0.932	0.838	0.760	0.441	0.997	1.000
44	Bulgaria	0.826	0.917	0.995	0.860	0.950	0.871	0.743	0.419	0.984	0.996
45	Gabon	0.822	0.735	0.927	0.416	0.950	0.797	0.920	0.946	0.823	1.000
46	Tunisia	0.814	0.924	0.973	0.909	0.950	0.867	0.718	0.473	0.797	0.980
47	Sri Lanka	0.810	0.896	0.945	0.948	0.754	0.956	0.732	0.430	0.912	1.000
48	Jordan	0.806	0.944	0.969	0.986	0.950	0.874	0.688	0.333	0.979	1.000
49	Mongolia	0.798	0.722	0.640	0.585	0.766	0.950	0.882	0.699	0.983	1.000
50	Swaziland	0.781	0.706	0.741	0.575	0.749	0.777	0.863	0.774	0.831	1.000
51	Gambia	0.776	0.825	0.901	0.588	0.939	0.930	0.730	0.806	0.532	0.909
52	Cameroon	0.767	0.735	0.751	0.454	0.892	0.959	0.801	0.806	0.713	0.895
53	Malawi	0.757	0.709	0.865	0.401	0.790	0.924	0.808	0.914	0.613	0.942
54	Turkey	0.741	0.950	0.998	0.941	0.950	0.913	0.578	0.204	0.953	0.990
55	Zimbabwe	0.739	0.653	0.773	0.372	0.668	0.947	0.836	0.699	0.836	1.000
56	Azerbaijan	0.735	0.903	0.853	0.863	0.950	0.950	0.599	0.215	0.998	0.999

APPENDIX E: FORDHAM FRANCIS INDEX COUNTRY RANKINGS

Rank	Country	FFI	Materi-al Index	Water	Hous-ing	Food	Employment	Spiritual Index	Religious Freedom	Educa-tion	Gender
57	Russian Federation	0.724	0.890	0.968	0.722	0.950	0.945	0.588	0.204	0.997	1.000
58	Nepal	0.719	0.764	0.898	0.426	0.915	0.973	0.676	0.581	0.596	0.892
59	Iraq	0.718	0.831	0.865	0.856	0.760	0.849	0.621	0.312	0.793	0.968
60	Saudi Ara-bia	0.718	0.966	0.970	1.000	0.950	0.943	0.534	0.161	0.944	0.998
61	Tajikistan	0.714	0.791	0.727	0.947	0.641	0.888	0.645	0.269	0.998	1.000
62	Rwanda	0.713	0.736	0.749	0.600	0.657	0.994	0.691	0.484	0.683	1.000
63	Bangladesh	0.713	0.794	0.855	0.587	0.827	0.955	0.641	0.441	0.597	1.000
64	Malaysia	0.708	0.965	0.980	0.960	0.950	0.968	0.519	0.151	0.931	1.000
65	Senegal	0.703	0.729	0.770	0.466	0.877	0.897	0.678	0.871	0.428	0.834
66	Ghana	0.700	0.587	0.865	0.147	0.950	0.982	0.834	0.860	0.715	0.943
67	Morocco	0.699	0.866	0.851	0.765	0.950	0.908	0.565	0.323	0.671	0.833
68	India	0.698	0.735	0.931	0.385	0.846	0.964	0.663	0.462	0.693	0.909
69	Myanmar	0.678	0.848	0.804	0.795	0.835	0.967	0.542	0.172	0.928	0.997
70	Guinea-Bissau	0.669	0.578	0.755	0.205	0.776	0.932	0.775	0.914	0.578	0.881
71	Angola	0.654	0.658	0.482	0.506	0.825	0.931	0.650	0.462	0.708	0.840
72	Uganda	0.648	0.569	0.774	0.188	0.752	0.958	0.738	0.602	0.702	0.952
73	Pakistan	0.645	0.798	0.911	0.600	0.781	0.949	0.522	0.312	0.568	0.803
74	Egypt	0.643	0.938	0.991	0.947	0.950	0.868	0.441	0.118	0.751	0.965
75	Togo	0.604	0.485	0.618	0.116	0.829	0.931	0.751	0.839	0.604	0.837
76	Mali	0.598	0.624	0.730	0.238	0.950	0.919	0.572	0.806	0.336	0.693
77	Indonesia	0.592	0.813	0.862	0.597	0.907	0.937	0.431	0.086	0.928	0.999
78	Sierra Leo-ne	0.570	0.489	0.606	0.130	0.750	0.966	0.666	0.849	0.457	0.761
79	Guinea	0.533	0.588	0.757	0.194	0.825	0.983	0.484	0.774	0.253	0.580
80	Central African Republic	0.512	0.545	0.683	0.216	0.647	0.926	0.481	0.548	0.368	0.552
81	Chad	0.510	0.431	0.508	0.120	0.610	0.929	0.603	0.677	0.382	0.847
82	China	0.490	0.877	0.940	0.742	0.890	0.954	0.273	0.022	0.951	0.999
83	Niger	0.425	0.476	0.573	0.105	0.898	0.949	0.380	0.817	0.155	0.436
84	Afghani-stan	0.407	0.581	0.534	0.311	0.756	0.908	0.284	0.140	0.317	0.519

DATA SOURCES

- UNESCO
- UN Habitat
- UNFAO
- World Bank
- UNICEF
- Pew Research Center
- Transparency International
- Fractionalization Data from The Macro Data Guide

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