On Culture and Income Inequality: Regression Analysis of Hofstede's International Cultural Dimensions and the Gini Coefficient

Mallory Malinoski, Xavier University

This study explores the relationship between international cultures and income inequality using data from 75 countries. I find that two of Hofstede's Dimensions of Culture, individualism and long-term orientation, exhibit a negative relationship with the Gini coefficient of a country. Understanding the relationship between culture and income inequality has significant policy and international business implications, because it suggests that some nations are culturally inclined to live in a less economically egalitarian environment.

Guiso et al. (2006) argue that economists have historically been reluctant to view culture as a determinant of economic occurrences. This is partly due to the lack of reliable data available on cultural dimensions. However, the quality of cultural data has improved in recent years, making it possible to identify systematic differences in economic behavior that relate to culture. This paper explores the relationship between specific cultural attributes in different countries and their respective degrees of income inequality. I compare Hofstede's Dimensions of Culture to the Gini coefficient in order to determine if certain nations are inclined to live in a socioeconomic climate that is naturally less egalitarian. The results show a distinct negative relationship between individualism and long-term orientation scores of a country and its level of income inequality.

It is important to understand a potential relationship between culture and inequality from both public policy and international business viewpoints. If certain countries exhibit cultural characteristics that foster income inequality, this evidence may assist in explaining why some countries are always struggling to achieve a greater degree of economic equality. Nations with high levels of income inequality suffer from reduced social cohesion and higher mortality rates, and are more susceptible to political instability (Kawachi et al. 1996). Since certain cultural attributes adversely impact economic equality, policymakers may take steps to guide the cultural climate in the nation to encourage equality through increases in personal savings and human capital investments. In the sphere of international commerce, multinational companies can use the potential relationship between culture and income inequality to adjust pricing tiers in countries with cultures that either foster or hinder income inequality.

Literature Review

This paper adds to the existing body of economic research that discusses international differences in income inequality. Li et al. (1998) finds that income inequality is relatively stable within a particular country over time, and that it varies significantly across countries. Their research draws upon the work of Bertola (1993) who argues that income inequality is partially derived from the political economy of a nation. In its simplest form, income inequality may arise because richer citizens are more likely to possess resources to lobby for policies that benefit them, but are damaging to the rest of the economy. Banjeree and Newman (1991) suggest that imperfect credit markets also serve as a catalyst for income inequality. Poor citizens may be less likely to improve their productivity by investing in human capital, making them unable to change their economic position. These arguments serve as the foundation for explaining income inequality on an international level.

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* *Mallory Malinoski is a native of Pittsburgh, PA. She received her B.S. in Economics and International Business from Xavier University in 2012.*

More recent economic literature has discussed these primary determinants of income inequality, but researchers have combined them with other social and economic forces to create a more cohesive explanation for the existence of income inequality among the countries of the world. Barro (2000) contends that political economy, credit market imperfections, sociopolitical unrest, and savings rates all influence the degree of income inequality in a nation. Barro also finds a small, yet significant relationship between income inequality and economic growth. The relationship follows the Kuznets curve, as inequality initially increases with economic growth, then decreases with further economic development. However, this relationship is only valid with a group of nations at one point in time, and fails to explain the relationship across countries over time. Because much of the literature regarding income inequality has ignored the explicit role of culture, it will be valuable to determine if it is a significant contributor to income inequality.

Economic Literature Using Hofstede's Dimensions

As cultural data has improved in recent years, economists are able to explore the effect of culture on a variety of economic variables. Specifically, several papers use Hofstede's Dimensions to measure culture and investigate connections with economic variables like GDP per capita and resource allocation efficiency. Tang and Koveos (2008) tested Hofstede's five cultural dimensions against GDP per capita. They observed a negative relationship between GDP per capita and power distance and long-term orientation scores of countries. This is due to the rationale that more hierarchical societies may be inefficient and bureaucratic, decreasing GDP per capita. Similarly, excessive concerns about the future may lead to greater savings rates and less expenditure per person in the short term. They also found a positive relationship between individualism and GDP per capita, because individuals are less dependent on others as an economy's manufacturing sector strengthens (Tang and Koveos 2008).

Similarly, Dodor and Rana (2007) suggest that power distance and uncertainty avoidance are negatively correlated with GNI per capita and the resource allocation efficiency of a country, because bureaucracy and high risk aversion inefficiencies may prevent economic growth. Conversely, individualism positively correlates with GNI per capita and resource allocation efficiency. This may occur because individuals are more likely to increase total national wealth by pursuing their own interests, according to the neoclassical view of economics proposed by Adam Smith. While many scholars utilize Hofstede's research to discover relationships between culture and economic outcomes, researchers have not yet carefully examined the relationship between culture and income inequality. Therefore, additional research could provide insight into whether or not there is a connection between the cultural climate and economic climate of a nation.

Model and Framework

I use a regression analysis framework to determine whether a relationship exists between income inequality and Hofstede's dimensions. Specifically, I use a log-log model to fit the data to produce a constant elasticity measurement. The dependent variable, income inequality, is measured using the most recent Gini coefficient available for each nation in the data set. The Gini coefficient is defined as the area between the "line of equality," which depicts perfect income equality, and the Lorenz curve, which represents the actual cumulative distribution of wealth. The Gini coefficient is typically expressed as a number between 0 (egalitarian) and 1 (totalitarian) and is generally expressed in percentage terms. I used the CIA World Factbook as the primary source for obtaining this data. Since Gini coefficients are not reported on an annual basis, the most recent Gini coefficient available for each country has been selected, and the control variables are adjusted to coordinate with the Gini year as closely as possible.

The independent variables, cultural characteristics, are measured using Geert Hofstede's (1980, 2001) five dimensions of culture: power distance, individualism v. collectivism, masculinity v. femininity, uncertainty avoidance, and long-term orientation. These scores range from a minimum value of 0 to a maximum value of 115. The data were obtained from Hofstede's research website (2010). Since Hofstede's dimensions are a set of values-based metrics, they do not drastically change over time because they reflect general societal attitudes (Hofstede 1980). It is important to note that several countries from each continent are represented in the data sample to more accurately represent international differences in culture and income inequality. [1] The definitions for each dimension are provided below.

Hofstede's Dimensions Explained

Power distance (PDI) measures the extent to which power is distributed, and describes the level of hierarchy and regard for authority in a particular society. Individualism (IND) measures the degree to which individuals base their actions on self-interest as opposed to the interests of a collective group. Masculinity (MAS) measures the tendency of a culture to favor aggressive "masculine" values, which emphasize competition and ambition as opposed to more caring "feminine" values, which emphasize the quality of life. Uncertainty avoidance (UAI) measures a society's tolerance for ambiguity and risk. Finally, long-term orientation (LTO) describes a society's preference for short-term fulfillment of social obligations rather than long-term values like perseverance (Hofstede 2001).

Hofstede's dimensions originate from a study of employees at IBM in 40 countries in the 1970s. Hofstede observed quantifiable differences among cultures at a group level using a set of four intangible dimensions; the long-term orientation dimension was added in 1991 (Hofstede 2010). To confirm the early results from Hofstede's IBM study, researchers performed six other cross-national studies from 1990 to 2002, and Hofstede's work is congruous with research from other cultural measures like the GLOBE (Global Leadership and Organizational Behavior Effectiveness) study (Hofstede 2010). In 2010, the World Values Survey extended the number of Hofstede's scores to cover 93 countries. The 75 countries used in the analysis can be found in the Appendix.

Control Variables

Several control variables are added to better observe the effects of Hofstede's cultural dimensions on income inequality. Average years of schooling (ASCH), the level of democracy in a country (DEM), and the degree to which a country participates in international trade (OPEN) are variables used in Barro's (2000) "Inequality and Growth in a Panel of Countries" to observe income inequality on an international level; they are also used in this analysis. The variables from Barro's work explain that the governance of a particular country has an effect on its level of income inequality. The average life expectancy of a nation (LEX) is also included as a control variable, because of the connection between income inequality and mortality rates in the study performed by Kawachi et al. (1996). I also added labor market controls, such as the average unemployment rate for the Gini year of a country (AUER). Unemployment rates may assist in explaining a potential cyclical portion of the level of income inequality in a nation. Finally, a global measure of innovation (INNO) controls for a country's technological progress, which may affect income inequality. By controlling for these factors, the effects of cultural dimensions on

[1] *Hofstede provides only one figure for certain world regions. Eastern Africa is comprised of Ethiopia, Kenya, Tanzania, and Zambia. Western Africa is comprised of Ghana, Nigeria, and Sierra Leone. The Middle East is comprised of Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, and the United Arab Emirates. All data is weighted by each country's respective population for the Gini year.*

income inequality are more accurately observed. Sources for the control data can be found in the References section.

Equations for Regression Analysis
For a more complete regression analysis, each independent variable is analyzed separately with control variables, together with control variables, and together with no control variables.

The equations used in the regression framework are as follows:

PDI: $\ln(\widehat{GINI_\iota}) = \widehat{\beta_1} + \widehat{\beta_2}\ln(PDI) + \ controls$
IND: $\ln(\widehat{GINI_\iota}) = \widehat{\alpha_1} + \widehat{\alpha_2}\ln(IND) + controls$
MAS: $\ln(\widehat{GINI_\iota}) = \widehat{\gamma_1} + \widehat{\gamma_2}\ln(MAS) + \ controls$
UAI: $\ln(\widehat{GINI_\iota}) = \widehat{\delta_1} + \widehat{\delta_2}\ln(UAI) + \ controls$
LTO: $\ln(\widehat{GINI_\iota}) = \widehat{\tau_1} + \widehat{\tau_2}\ln(LTO) + \ controls$

All (With Controls):
$$\ln(\widehat{\mathrm{GINI}_\iota}) = \widehat{\theta_1} + \widehat{\theta_2}\ln(\mathrm{PDI}) + \widehat{\theta_3}\ln(\mathrm{IND}) + \widehat{\theta_4}\ln(\mathrm{MAS}) + \widehat{\theta_5}\ln(\mathrm{UAI}) + \widehat{\theta_6}\ln(\mathrm{LTO}) + \mathrm{controls}$$

All (No Controls):
$$\ln(\widehat{GINI_\iota}) = \widehat{\varphi_1} + \widehat{\varphi_2}\ln(PDI) + \widehat{\varphi_3}\ln(IND) + \widehat{\varphi_4}\ln(MAS) + \widehat{\varphi_5}\ln(UAI) + \widehat{\varphi_6}\ln(LTO)$$

Table 1: Variables Used in Regression Analysis

Variables	
Dependent Variable	Most Recent Gini Coefficient
Independent Variables	Power Distance Index
Hofstede's Dimensions	Individuality Index
	Masculinity Index
	Uncertainty Avoidance Index
	Long-Term Orientation Index
Control Variables	
Education	Average Years of Schooling – Barro (2000)
Labor Market	Average Unemployment Rate for Gini Year
Government/Political Economy	Democracy Index – Barro (2000)
Trade	Openness – Barro (2000)
Life Expectancy	Average Life Expectancy
Technology	Global Creativity Index (R&D)

Hypotheses
Using the definitions provided by Hofstede, I hypothesize the following outcomes for my regression analysis:

H1: Power distance is positively associated with income inequality ($\widehat{\beta_2} > 0$).
If a typical citizen in a country is accepting of power inequalities and highly regards a distinct hierarchical system, then the nation may be more likely to have greater imbalances in wealth control, all else being equal.

H2: Individualism is positively associated with income inequality $(\widehat{\alpha_2} > 0)$.
If a typical citizen of a country emphasizes the pursuit of self-interest rather than the interest of a group, then the nation may be more likely to have greater variation in incomes. Some individuals would successfully use their resources to differentiate themselves, while others would struggle to earn a living. If a culture is more collectivist in nature, it is assumed that variations in incomes would be lower, as individuals would aggregate their resources for the benefit of the group, all else being equal.

H3: Masculinity is moderately positively associated with income inequality $(\widehat{\gamma_2} > 0)$.
If a typical citizen highly regards traits like competitiveness and ambition, the country may be more likely to have greater income inequality, because feminine traits like overall welfare and ensuring a high quality of life are less imperative, all else being equal.

H4: Uncertainty avoidance is slightly negatively associated with income inequality $(\widehat{\delta_2} < 0)$.
If a typical citizen in a given country is highly risk-averse, then the country may encourage safer investment strategies, which would limit dramatic differences in income among individuals, all else being equal.

H5: Long-term orientation is negatively associated with income inequality $(\widehat{\tau_2} < 0)$.
If a typical citizen is concerned with long-term planning, individuals would be more likely to increase personal savings and make strategic investment decisions, which may decrease the gap among poorer and wealthier citizens, all else being equal.

Data Analysis

The data table provides descriptive statistics for all variables used in the regression analysis. The mean score for power distance was 59, characterized by some European countries such as the Czech Republic and Spain (57), as well as East Asian nations like Taiwan (58) and South Korea (60). These countries have a moderate comfort level with hierarchy in society. The minimum power distance scores were reflected in European nations like Austria (11) and Denmark (12). These countries have less preference for social hierarchy. Conversely, countries like Malaysia and Slovakia (104) exhibited high power distance scores. The standard deviation for power distance scores was approximately 21, indicating that the scores were fairly spread about the mean. This finding highlights the diversity of world cultures.

Table 2: Descriptive Statistics

	PDI	IND	MAS	UAI	LTO	GINI	YEAR	ASCH	AUER	DEM	OPEN	LEX	INNO
Mean	59	46	49	67	49	36	2005	9	8	7	98	75	43
Median	62	40	48	70	49	34	2006	10	7	7	77	76	41
Variance	456	547	398	525	509	74	24	6	31	3	5,207	41	111
Standard Dev.	21.34	23.39	19.96	22.92	22.57	8.59	4.85	2.37	5.53	1.77	72.16	6.43	10.51
Sum	3,749	2,914	3,121	4,283	3,160	2,322	10,025	582	521	452	6,261	4,807	2,743
Minimum	11	12	5	8	9	23	1997	4	2	2	24	8	25
Maximum	104	91	110	112	100	59	2010	13	40	10	409	83	64
Skew	-0.15	0.29	0.23	-0.37	0.25	0.69	-1.38	-0.49	3.26	-0.99	2.64	-1.98	0.12
Kurtosis	-0.35	-1.23	0.96	-0.56	-0.81	-0.20	2.72	-0.68	16.82	0.74	8.65	5.52	-1.16
Gini Correlation	0.35	-0.50	0.04	0.01	-0.40	1	N/A	-0.42	-0.02	-0.42	-0.04	-0.23	-0.37

The mean score for individualism in the sample is 46, and is characteristic of nations like Israel (47) and India (48). Citizens in these countries strike a balance between the goals of an individual and those of society. Low individualism scores are reflected in South American nations like Venezuela (12) and Colombia (13), as well as Asian nations like South Korea (18), Bangladesh (20), and China (20). These countries are more collectivist in nature according to Hofstede. High individualism scores are dominant in some Western nations like the United States (91) and Australia (90). The standard deviation for individualism was approximately 23, signaling that the scores were fairly spread about the mean.

The mean score for masculinity in the sample is 49, and is characteristic of countries like Singapore (48) and Brazil (49). These countries balance feminine cultural traits of social welfare with masculine-like competition. Scandinavia is home to the countries with the lowest masculinity scores: Sweden (5) and Norway (8) had the lowest masculinity scores of the sample. High masculinity scores are found in other European nations like Belgium (94) and Slovakia (110). This cultural difference within Europe is important to note, as many foreigners are unaware of the distinct cultural parallels within Europe. The standard deviation for masculinity scores was approximately 20, indicating that the scores were fairly spread about the mean.

The mean score for uncertainty avoidance was 67, and is typical of the Baltic states of Latvia (63) and Lithuania (65). Singapore (8) exhibits the lowest uncertainty avoidance score of the sample. High uncertainty avoidance is prominent in some economically-crippled European nations like Portugal (104) and Greece (112). These nations are very uncomfortable with ambiguity, and the current Euro crisis may be extremely taxing on the citizens in these nations, as their economic future remains uncertain. The standard deviation for uncertainty avoidance was almost 23, showing that the scores were fairly spread about the mean.

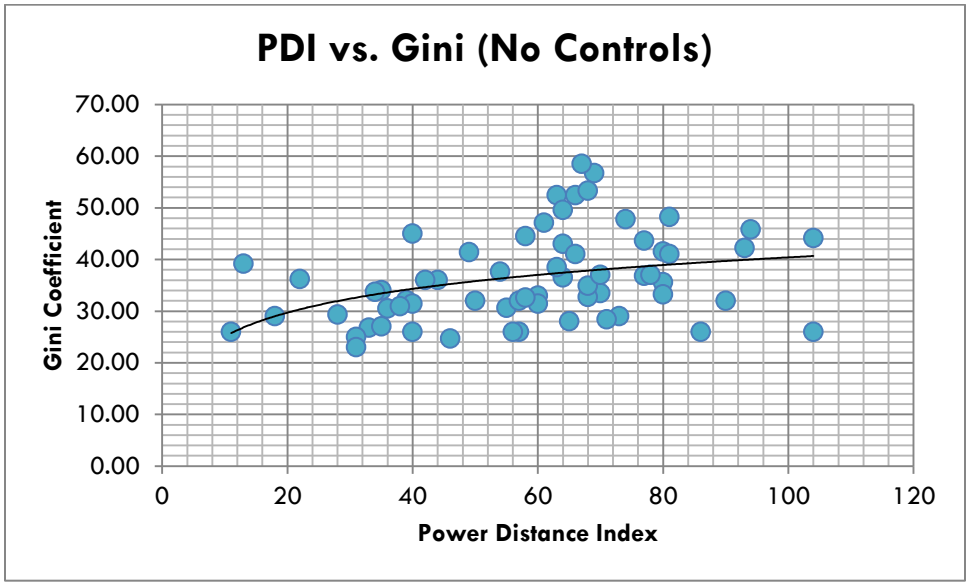
The mean score for long-term orientation was 49, and can be found in nations like Slovenia (48) and Spain (49). Low long-term orientation scores are prevalent in Western Africa 2 (9) and Venezuela (16). This may be due to political and social instability, where citizens are more concerned about their immediate needs. High long-term orientation scores can be found in East Asian nations like Taiwan (93) and South Korea (100). A future-centric focus may lead to higher savings rates, and may explain the recent economic growth in these nations. The standard deviation for long-term orientation scores was approximately 22.5, signifying that the scores were spread about the mean.

Finally, the average Gini coefficient in the sample was 36%. The timing differences in Gini coefficients in the sample range from 1997 (New Zealand) to 2010 (Argentina). This is because the Gini coefficient is not calculated on a regular basis by the United Nations. However, most scores in the data set have been calculated in the mid-2000s. Countries near the average Gini score are Lithuania (36%) and Eastern Africa (36.5%). 3 The country with the lowest degree of income inequality in the sample is Sweden (23%). The countries that suffer with the greatest levels of income inequality in the sample are Brazil (57%) and Colombia (59%). These high levels of inequality may lead to political unrest according to Kawachi et al. (1996). The standard deviation for Gini coefficients is approximately 8.5, showing that Gini coefficients are fairly spread out about the mean value of 36%.

[2] *Western Africa is comprised of Ghana, Nigeria, and Sierra Leone.*

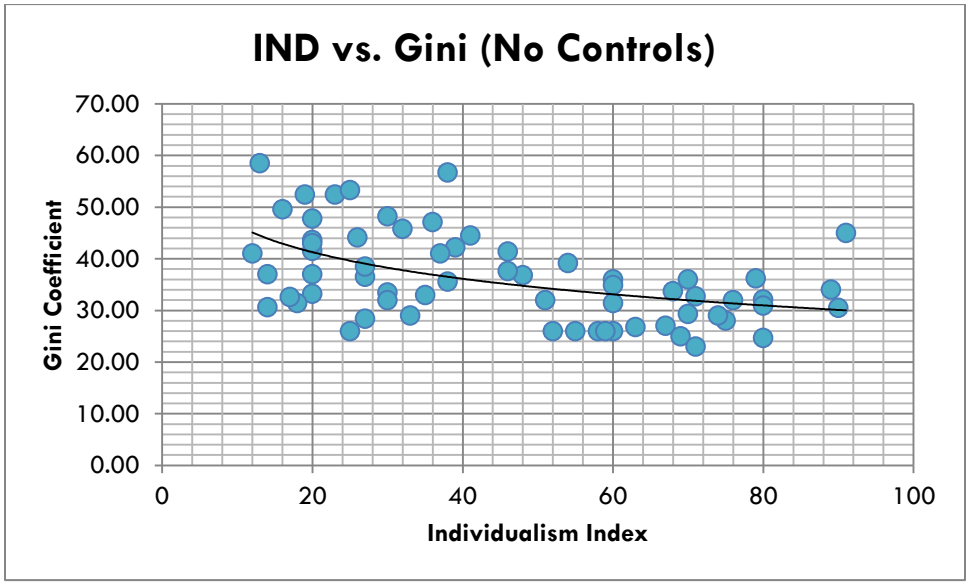
[3] *Eastern Africa is comprised of Ethiopia, Kenya, Tanzania, and Zambia.*

Figure 1: Plots of Hofstede's Dimensions against the Gini Coefficient (No Controls)



A scatterplot of power distance scores and Gini coefficients yielded a weak positive relationship between power distance scores and Gini coefficients for the sample using the log-log model. This observation is consistent with H_1 and suggests that more hierarchical societies have more income inequality.

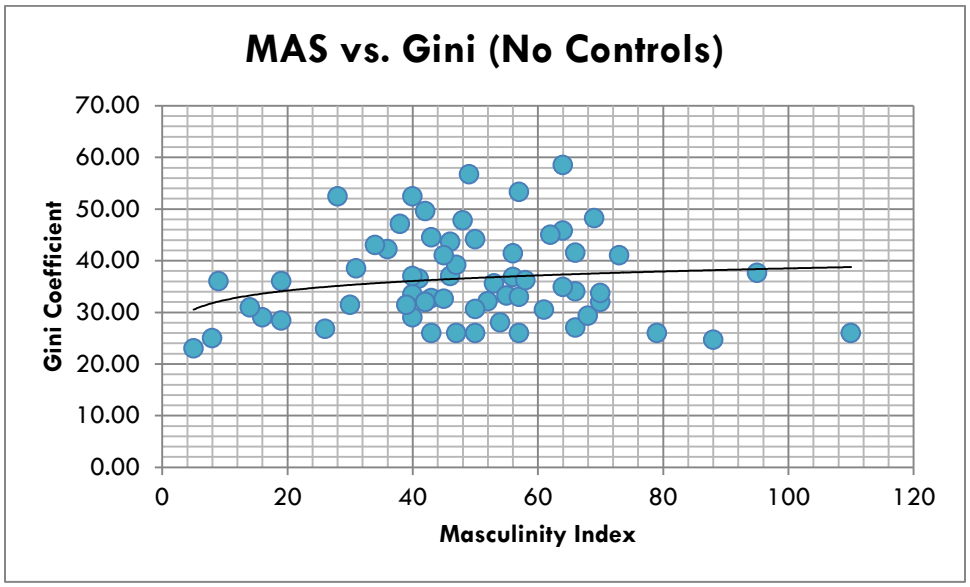
Figure 2: Plots of Individualism Index against the Gini Coefficient



A scatterplot of individualism scores and Gini coefficients shows that there is a distinct negative relationship between individualism and the Gini coefficient. This relationship is contrary to the hypothesized results presented in H_2. This could be because more collectivistic societies may be more susceptible to productivity inefficiencies from group freeriding. Citizens in more

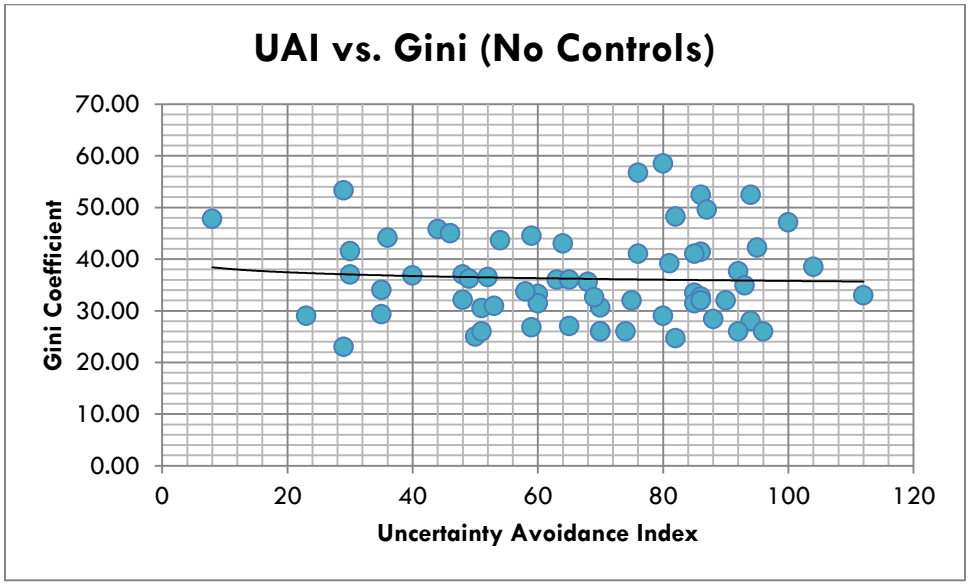
individualistic societies may be more inclined to work harder to ensure a sufficient standard of living for themselves.

Figure 3: Plots of Masculinity Index against the Gini Coefficient



It is evident from a scatterplot of masculinity scores and Gini coefficients that there is a positive relationship between masculinity scores and income inequality as predicted in H_3. However, it is extremely weak. It is doubtful that these results will be statistically significant even with control variables added.

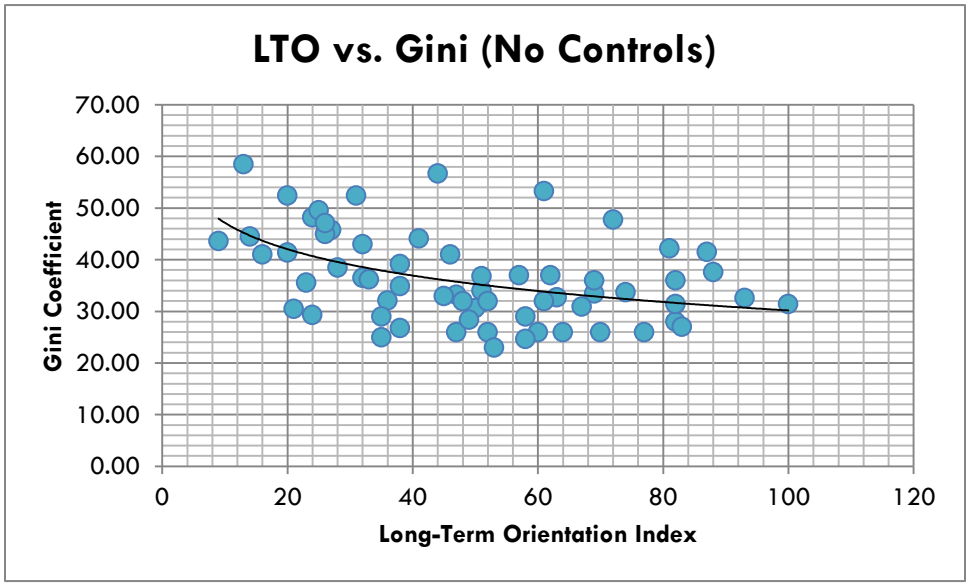
Figure 4: Plots of the Uncertainty Avoidance Index against the Gini Coefficient



A scatterplot analysis of uncertainty avoidance scores and Gini coefficients shows a weak negative relationship between uncertainty avoidance and the Gini coefficient. This is consistent

with H_4, which predicted a slight negative relationship between uncertainty avoidance scores and income inequality. Adding control variables will not likely make these results statistically significant.

Figure 5: Plots of the Long-Term Orientation Index against the Gini Index



Evidence from this scatterplot of long-term orientation scores and Gini coefficients suggests a moderately strong negative relationship between long-term orientation scores and the Gini coefficient. These results match the prediction made in H_5, and suggest that cultures that are future-focused may save more for the future, decreasing income gaps among citizens.

Regression Analyses

Seven different regression models were tested to observe the effects of Hofstede's Dimensions on income inequality. The results can be found in Table 3. From the analysis, it is evident that there is a positive relationship between power distance scores and the Gini coefficient, but it is weaker than the original hypothesized results suggested in H_1. The results demonstrate that a 1% increase in power distance scores result in a 0.12% increase in the Gini coefficient, ceteris paribus. This relationship is only statistically significant at the 10% level when all dimensions and controls are included in the analysis. It is important to note, however, that my results are significant at the 13% level when power distance is regressed separately with the control variables. Therefore, I conclude that there is a weak to moderate positive relationship between power distance and the Gini coefficient using the log-log model.

There is a fairly strong relationship between individualism scores and the Gini coefficient, but the relationship is contradictory to what I hypothesized in H_2. All individualism coefficients in the analysis were negative, suggesting that an increase in individualism in a country may reduce the level of income inequality in a nation. More specifically, a 1% increase in individualism scores decreases the Gini coefficient by 0.01%-0.16% depending on the model, ceteris paribus. While these results conflict with the reasoning provided in H_2, it is plausible that a more individualistic society is more self-reliant. Following a classical economic argument provided by Adam Smith, individuals may enter into mutually-beneficial contracts and increase overall wealth by acting in accordance with their self-interests. More collectivistic societies may be less efficient, because of

potential group free-riding. Since the results were significant at the 5% level with control variables and 1% with no control variables, it is conclusive that there is a distinct negative relationship between a country's degree of individualism and its level of income inequality.

Table 3: Analysis of Key Findings

	PDI	IND	MAS	UAI	LTO	All (Controls)	All (None)
R^2	0.3055	0.3496	0.2890	0.2998	0.3604	0.4867	0.4215
Adjusted R^2	0.2187	0.2683	0.2001	0.2123	0.2805	0.3781	0.3716
Root MSE	0.20309	0.1966	0.2055	0.2039	0.1949	0.1812	0.1821
N	64	64	64	64	64	64	64
Estimations from Regressions							
Intercept	3.5265	4.5770	4.2100	4.6363	3.7991	3.9277	4.4446
Standard Error	(1.7120)	(1.6264)	(1.6922)	(1.7198)	(1.6062)	(1.6297)	(0.4429)
Coefficient	0.1195§					0.1196*	0.0798
Standard Error	(0.0729)					(0.0718)	(0.0630)
		-0.1601**				-0.1299**	-0.0129***
		(0.0637)				(0.0618)	(0.0501)
			0.0482			0.0390	0.0456
			(0.0482)			(0.0429)	(0.0419)
				-0.1040		-0.0652	-0.0670
				(0.0758)		(0.0691)	(0.0517)
					-0.1430***	-0.1609***	-0.1639***
					(0.0527)	(0.0523)	(0.0442)
Significance	§ p = 0.13	* p ≤ 0.10	**p ≤ 0.05	*** p ≤ 0.01			
Control Coefficients							
ASCH	-0.0775	-0.0425	-0.0746	-0.1040	-0.1181	0.0415	
	(0.1351)	(0.1567)	(0.1553)	(0.0758)	(0.1473)	(0.1533)	
AUER	-0.0935*	0.0425	-0.0991*	-0.0212	-0.0884*	-0.0664	
	(0.0549)	(0.1567)	(0.0562)	(0.1608)	(0.0526)	(0.0516)	
DEM	-0.1389	-0.1490	-0.1476	-0.1186	-0.1498	-0.0775	
	(0.1128)	(0.1084)	(0.1140)	(0.1166)	(0.1075)	(0.1051)	
OPEN	-0.0989**	-0.1093**	-0.0759	-0.0948	-0.0476	-0.0967**	
	(0.0512)	(0.0494)	(0.0502)	(0.0510)	(0.0489)	(0.0489)	
LEX	0.2814	0.1341	0.2744	0.4182	0.4439	0.1677	
	(0.4318)	(0.4245)	(0.4417)	(0.4331)	(0.4129)	(0.3994)	
INNO	-0.1534	-0.0583	-0.2792	-0.4299	-0.1844	0.0684	
	(0.2039)	(0.2005)	(0.1871)	(0.2134)	(0.1813)	(0.2269)	
Classical Assumption Verification of Error Terms							
Skew	0.6238	0.2024	0.6545	0.5144	0.4669	0.3603	0.2717
Kurtosis	-0.0692	-0.218	0.1783	0.2111	0.1190	-0.3307	-0.5281
JB Statistic	4.1634	0.5636	4.6540	2.9413	2.3630	1.6763	1.5311

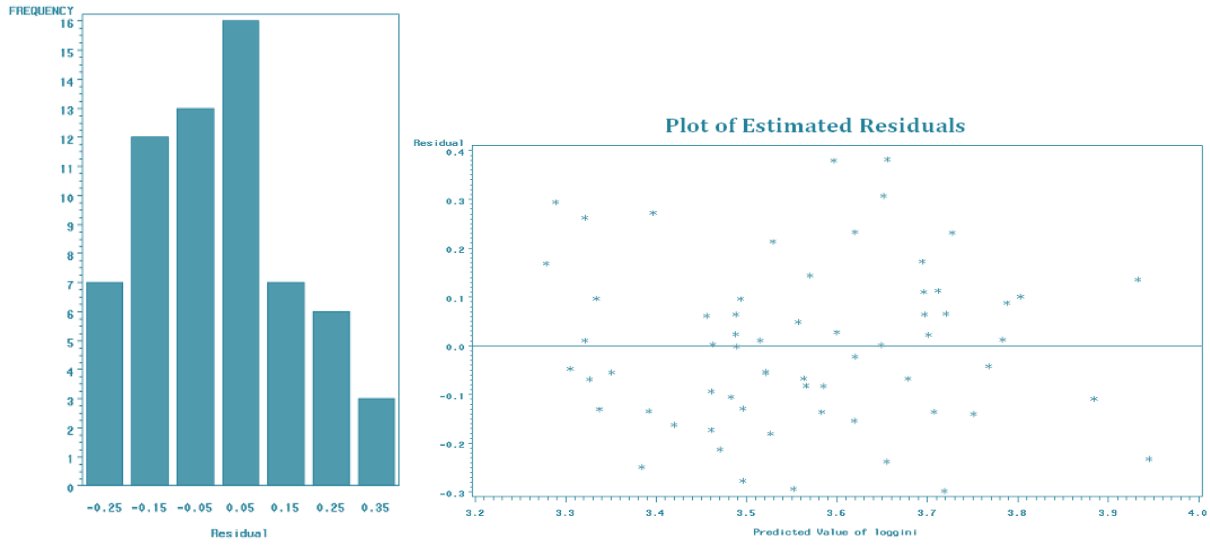
Since all JB Statistics are less than 5.99, it is assumed that the error terms come from a normal distribution ($\alpha = 0.05$).

While there seems to be a positive relationship between masculinity scores and the Gini coefficient, it is not statistically significant in any of the models used in the analysis. These results are consistent with those hypothesized in H_3. Similarly, there is no statistically significant relationship between uncertainty avoidance and the Gini coefficient, although the negative relationship between them confirms the prediction made in H_4. While these relationships are interesting to note, they do not verify that differences in masculinity and uncertainty avoidance among cultures affect income inequality.

Finally, there is a very strong negative observed relationship between long-term orientation scores and the Gini coefficient using the log-log model. A 1% increase in long-term orientation scores would decrease the Gini coefficient by 0.14-0.16% depending on the model, ceteris paribus. In each regression model, long-term orientation scores were statistically significant at the 1% level. This is consistent with the prediction in H_5, which suggests that citizens in countries that place a strong emphasis on long-term planning may be more likely to save a greater portion of their income. This higher savings rate would in turn decrease the degree of income inequality in a country.

My findings also adhere to the classical assumptions that my error terms derive from a normal distribution as shown in Figure 2. All skewness and adjusted kurtosis measures from each model were close to zero. Likewise, the Jarque-Bera statistic calculated for each model confirms the assumption that the error terms come from a normal distribution at the 5% level, as all values were less than the critical value of 5.99. My histogram of the error term looks fairly normally distributed, and my plot of the estimated residuals is fairly scattered around zero. This confirms that my models do not contain heteroskedasticity.

Figure 2: Histogram of Error Terms and Plot of Estimated Residuals (All Dimensions and Controls)



Limitations of the Analysis

There are several limitations to this analysis. The first limitation is the possibility of multicollinearity in the control data set, which occurs when predictive variables are highly correlated. There is a moderate difference between the R^2 value and the adjusted R^2 value for each regression model; suggesting the presence of multicollinearity. However, it is important to note that multicollinearity is hard to detect, and that none of my explanatory variables have a

pair-wise correlation above 0.72. [4] Despite the possibility of mild multicollinearity, the results of the analysis remain important for policy purposes.

The second limitation pertains to the use of Hofstede's Dimensions as cultural variables. While Hofstede's measures are frequently used as guidelines to understanding differences among international cultures, they are imperfect. Hofstede's Dimensions do not accurately reflect individual differences in values. Similarly, they fail to reflect the values of diverse subcultures within a country. Hofstede's Dimensions may oversimplify the cultural climate of a particular country.

The third limitation concerns the timing differences in the Gini coefficient calculation. The results would be more accurate if all of the income inequality calculations were from the same period. Likewise, the results of my analysis might have been different if I used another income inequality measure like the Theil Index, which can break down inequality figures across a number of geographic regions. However, the Gini coefficient is a more popular measure of inequality, and is available for a greater number of countries than the Theil Index. There are also some minor discrepancies in the data set, as international economic data is often incomplete and imperfect in less-developed nations. These discrepancies are catalogued in the Appendix.

Finally, while the data sample includes countries from each continent of the world, certain parts of the world are less represented than others. While there is a strong presence of European and North American nations in the data set, there is a marked absence of Central Asian nations, Central American nations, and small island nations. It is probable that cultural data for these nations will surface in the future, as globalization will undoubtedly open these areas up to international business activity. Therefore, future studies may more accurately reflect cultural differences in a greater number of countries.

Conclusion

Since low individualism and long-term orientation scores may lead to greater income inequality, cultures that possess these characteristics are more inclined to live in a less egalitarian economic climate. For example, Latin American nations typically have individualism scores well below the sample mean of 46. The mean individualism score for Latin American nations is 26, 0.84 standard deviations below the sample mean. [5] They also exhibit long-term orientation scores that are lower than the mean of 49. The average long-term orientation score for Latin American nations is only 24, 1.11 standard deviations below the mean. It is not surprising that the Gini coefficients in the region are higher than the mean of 36%: Latin American Gini coefficients averaged 50%, 1.56 standard deviations above the mean.

African nations also exhibit low individualism and long-distance orientation scores. This may help explain why African nations constantly struggle to achieve greater economic equality. The mean individualism score for West and East African nations in the sample is 24, 0.94 standard deviations below the mean of 46. Similarly, the mean long-term orientation score for African nations is 21, 1.28 standard deviations below the sample mean of 49. The average score for African Gini coefficients is about 40%, 0.44 standard deviations above the average score of 36%. However, income inequality figures in Africa are likely understated, due to poor and inconsistent data collection methods. Moreover, only 7 African nations were used in the sample. From these results, it is evident that these regions exhibit cultural characteristics that may foster income inequality.

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[4] The full correlation list is available in the Appendix.

[5] Latin America = Argentina, Brazil, Chile, Colombia, El Salvador, Mexico, Peru, Uruguay, and Venezuela. The figures were not adjusted by population size.

The findings from this analysis suggest that cultures that exhibit either collectivist or short-term orientation tendencies may suffer from higher levels of income inequality. This may be due to the inefficiencies of a collectivist society, and the potentially low savings rates of short-term oriented countries. These findings have important implications for both policymakers and multinational corporations. It is seemingly difficult for one or two entities to reprogram the cultural norms of a country in order to foster a more equal economic climate. However, policymakers and employers can try to implement several incentives to achieve a more self-sufficient and future-focused society. Employers can start to offer promotions and pay raises for individual performance reviews, rather than group performance reviews. This will incentivize individuals to become more self-sufficient, reducing the inefficiencies of group performance.

Policymakers can also push its citizens to be more future-focused by stressing the need to save and highlighting the benefits of strategic human capital investments. If a society realizes the long-term benefits of human capital investments like education, it may lead to a more equal economic climate. Finally, multinational corporations can use the relationship between culture and income inequality to offer a greater number of products in different pricing tiers for individuals in highly unequal countries like Colombia. This would capture a greater share of the market in a particular country. Similarly, they can consolidate tiers in more equal countries like Sweden.

It is likely that economic literature exploring the role of culture as a primary determinant of economic occurrences will increase in the coming years. Guiso et al. (2006) argue that improved data collection methods will strengthen the validity of cultural data in the future. It would be valuable to verify the results of this study by comparing Hofstede's Dimensions to another measure of income inequality. Also, future research may use Hofstede's Dimensions or the results of the GLOBE study published in 2010 to make connections with other economic variables, such as poverty rates or unemployment rates. It would be beneficial to determine if certain international cultures are more inclined to live in poor economic conditions, signaling the existence of a potential poverty trap.

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APPENDICES

Appendix 1: Data Set

COUNTRY	PDI	IND	MAS	UAI	LTO	GINI	YEAR	ASCH	AUER	DEM	OPEN	LEX	INNO
East Africa [1]	64	27	41	52	32	36.50	2004	4.00	13.80	3.33	51.64	52.4	25.30
West Africa [2]	77	20	46	54	9	43.60	2003	5.10	10.80	3.84	59.63	48.4	28.75
Middle East [3]	80	38	53	68	23	35.60	2005	5.97	12.90	3.07	68.95	69.9	29.89
Argentina	49	46	56	86	20	41.40	2010	9.30	7.90	6.84	41.72	75.7	38.36
Australia	36	90	61	51	21	30.50	2006	12.00	4.90	9.22	41.80	81.2	49.85
Austria	11	55	79	70	60	26.00	2007	9.60	4.40	8.49	112.24	79.9	50.75
Bangladesh	80	20	55	60	47	33.20	2005	4.80	40.00	5.87	40.38	64.6	28.05
Belgium	65	75	54	94	82	28.00	2005	10.60	8.40	8.05	156.76	78.9	49.05
Brazil	69	38	49	76	44	56.70	2005	6.60	9.80	7.12	23.68	71.7	37.75
Bulgaria	70	30	40	85	69	33.50	2008	9.80	6.30	6.84	132.56	73.3	38.42
Canada	39	80	52	48	36	32.10	2005	11.30	6.80	9.08	72.19	80.3	56.33
Chile	63	23	28	86	31	52.40	2009	9.60	9.60	7.67	76.88	78.7	38.84
China	80	20	66	30	87	41.50	2007	7.30	4.20	3.14	70.07	78.5	46.43
Colombia	67	13	64	80	13	58.50	2009	7.30	12.00	6.55	40.56	73.2	32.32
Croatia	73	33	40	80	58	29.00	2008	8.90	13.70	6.81	94.17	76.3	37.98
Czech Rep	57	58	57	74	70	26.00	2005	13.10	8.90	8.19	134.38	75.9	47.30
Denmark	18	74	16	23	35	29.00	2007	10.20	2.80	9.52	100.64	78.2	56.96
El Salvador	66	19	40	94	20	52.40	2002	6.00[4]	10.00	6.47	64.66	69.5[5]	29.14
Estonia	40	60	30	60	82	31.40	2009	12.00	13.80	7.68	133.62	73.5	49.18
Finland	33	63	26	59	38	26.80	2008	10.30	6.40	9.19	90.45	79.7	57.50
France	68	71	43	86	63	32.70	2008	10.20	7.40	7.77	55.41	81.3	49.25
Germany	35	67	66	65	83	27.00	2006	12.20	10.30	8.38	84.16	79.6	54.89
Great Britain	35	89	66	35	51	34.00	2005	9.10	4.70	8.16	56.31	79.8	55.96
Greece	60	35	57	112	45	33.00	2005	9.80	9.90	7.92	54.10	78.7	34.18
Hong Kong	68	25	57	29	61	53.30	2007	9.70	4.00	5.92	391.16	82.2	58.80
Hungary	46	80	88	82	58	24.70	2009	11.60	10.00	7.21	166.82	73.7	48.12
India	77	48	56	40	51	36.80	2004	4.00[6]	9.20	7.28	43.10	62.7[7]	34.52
Indonesia	78	14	46	48	62	37.00	2009	5.70	8.10	6.53	56.94	71.2	27.78
Iran	58	41	43	59	14	44.50	2006	6.40	15.00	1.94	58.64	70.9	28.41
Ireland	28	70	68	35	24	29.30	2009	11.60	11.80	8.79	159.60	80.2	54.10
Israel	13	54	47	81	38	39.20	2008	11.90	6.10	7.48	89.09	80.8	54.08
Italy	50	76	70	75	61	32.00	2006	9.00	7.00	7.83	54.00	81.0	40.69
Japan	54	46	95	92	88	37.60	2008	11.30	4.00	8.08	29.00	82.8	50.32
Korea (South)	60	18	39	85	100	31.40	2009	11.50	3.70	8.11	85.32	79.6	53.68
Latvia	44	70	9	63	69	36.00	2005	10.10	7.50	7.05	108.06	71.7	39.80
Lithuania	42	60	19	65	82	36.00	2005	10.60	4.80	7.24	118.91	71.8	38.49
Luxembourg	40	60	50	70	64	26.00	2005	9.90	4.50	8.88	285.06	78.9	52.65
Malaysia	104	26	50	36	41	44.10	2009	9.40	3.70	6.19	190.27	74.5	44.05
Malta	56	59	47	96	47	26.00	2007	9.90	5.90	8.28	165.97	79.9	40.69[8]
Mexico	81	30	69	82	24	48.20	2008	8.40	4.00	6.93	60.56	76.2	30.45
Netherlands	38	80	14	53	67	30.90	2007	11.10	4.60	8.99	123.41	79.8	56.31
New Zealand	22	79	58	49	33	36.20	1997[9]	12.10[10]	7.00	9.26	53.45[11]	78.5[12]	53.79
Norway	31	69	8	50	35	25.00	2008	12.70	2.60	9.80	76.21	80.7	52.60
Pakistan	55	14	50	70	50	30.60	2007	4.90	6.50	4.55	35.03	66.2	26.75

COUNTRY	PDI	IND	MAS	UAI	LTO	GINI	YEAR	ASCH	AUER	DEM	OPEN	LEX	INNO
Peru	64	16	42	87	25	49.60	2009	9.50	8.10	6.40	42.88	73.5	30.34
Philippines	94	32	64	44	27	45.80	2006	8.40	7.90	6.12	106.19	71.3	28.98
Poland	68	60	64	93	38	34.90	2005	9.70	18.20	7.05	74.82	75.2	38.02
Portugal	63	27	31	104	28	38.50	2007	7.50	8.00	8.02	71.93	78.6	42.40
Romania	90	30	42	90	52	32.00	2008	10.40	4.40	6.60	94.42	72.8	36.83
Russia	93	39	36	95	81	42.20	2009	8.80	8.40	4.26	54.59	66.9	35.85
Serbia	86	25	43	92	52	26.00	2008	9.50	18.80	6.33	85.00	73.9	36.31
Singapore	74	20	48	8	72	47.80	2009	8.70	3.00	5.89	408.51	80.6	59.64
Slovakia	104	52	110	51	77	26.00	2005	11.60	11.70	7.35	149.45	74.2	39.05
Slovenia	71	27	19	88	49	28.40	2008	9.00	6.70	7.69	141.20	78.4	45.07
Spain	57	51	42	86	48	32.00	2005	9.80	9.20	8.16	56.51	80.3	43.81
Sweden	31	71	5	29	53	23.00	2005	11.70	5.80	9.50	89.27	80.5	62.12
Switzerland	34	68	70	58	74	33.70	2008	10.00	2.60	9.09	91.17	81.3	63.52
Taiwan	58	17	45	69	93	32.60	2000	6.60[13]	3.00	7.52	110.03	73.5	46.43
Thailand	64	20	34	64	32	43.00	2006	6.00	2.10	6.55	150.07	68.6	37.63
Turkey	66	37	45	85	46	41.00	2007	6.20	10.20	5.73	49.20	71.7	34.11
U.S.A.	40	91	62	46	26	45.00	2007	12.40	4.60	8.18	28.38	79.1	56.57
Uruguay	61	36	38	100	26	47.10	2007	8.20	9.20	8.10	61.04	76.1	34.18
Venezuela	81	12	73	76	16	41.00	2009	6.10	7.90	5.18	52.43	74.0	27.41
Vietnam	70	20	40	30	57	37.00	2004	4.90[14]	1.90	2.94	135.90	73.8[15]	36.71

Appendix 2: Data Discrepancies

1. East Africa: Ethiopia (42% total population), Kenya (25%), Tanzania (26%), Zambia (7%)
2. West Africa: Ghana (13%), Nigeria (84%), Sierra Leone (7%)
3. Middle East: Egypt (48%), Iraq (20%), Kuwait (2%), Lebanon (3%), Libya (4%), Saudi Arabia (20%), United Arab Emirates (3%)
4. El Salvador – Used data from 2000 for Average Years of Schooling.
5. El Salvador – Used data from 2000 for Life Expectancy.
6. India – Used data from 2005 for Average Years of Schooling.
7. India – Used data from 2005 for Life Expectancy.
8. Malta – Used Italy's Innovation Index.
9. New Zealand – Gini coefficient from 1997.
10. New Zealand – Used data from 2000 for Average Years of Schooling.
11. New Zealand – Used data from 2000 for Openness Index.
12. New Zealand – Used data from 2000 for Life Expectancy.
13. Taiwan – Used China's score for Average Years of Schooling.
14. Vietnam – Used data from 2005 for Average Years of Schooling.
15. Vietnam – Used data from 2005 for Life Expectancy.

Appendix 3: Correlation Data Matrix

	ln(PDI)	ln(IND)	ln(MAS)	ln(UAI)	ln(LTO)	ln(GINI)	ln(ASCH)	ln(AUER)	ln(DEM)	ln(OPEN)	ln(LEX)	ln(INNO)
ln(PDI)	1	-0.58	0.20	0.14	-0.03	0.37	-0.45	0.26	-0.47	-0.04	-0.39	-0.60
ln(IND)	-0.58	1	-0.12	-0.04	0.20	-0.50	0.63	-0.05	0.50	0.06	0.41	0.61
ln(MAS)	0.20	-0.12	1	0.12	-0.06	0.19	-0.12	0.19	-0.16	-0.14	-0.02	-0.16
ln(UAI)	0.14	-0.05	0.12	1	-0.07	-0.05	0.05	0.38	0.12	-0.36	-0.04	-0.35
ln(LTO)	0.03	0.20	-0.06	-0.07	1	-0.45	0.30	-0.25	0.25	0.36	0.33	0.44
ln(GINI)	0.37	-0.50	0.19	-0.05	-0.45	1	-0.40	0.01	-0.38	-0.28	-0.25	-0.40
ln(ASCH)	-0.45	0.63	-0.12	0.05	0.30	-0.40	1	-0.20	0.65	0.30	0.72	0.72
ln(AUER)	0.26	-0.05	0.19	0.38	-0.25	0.01	-0.20	1	-0.20	-0.32	-0.37	-0.48
ln(DEM)	-0.47	0.50	-0.16	0.12	0.25	-0.38	0.65	-0.20	1	0.11	0.57	0.61
ln(OPEN)	-0.04	0.06	-0.14	-0.36	0.36	-0.28	0.30	-0.32	0.11	1	0.24	0.4
ln(LEX)	-0.39	0.41	-0.02	-0.04	0.33	-0.25	0.72	-0.37	0.57	0.24	1	0.70
ln(INNO)	-0.60	0.61	-0.16	-0.35	0.44	-0.40	0.72	-0.48	0.61	0.40	0.70	1