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GENDER INEQUALITY IN THE MENA: MYTHS VERSUS FACTS

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ABSTRACT

The study uses a cross-sectional data set for 209 countries in order to examine the relationship between gender inequality and its determinants, such as the economic development, information communication technology (ICT), education, and institutions in the Middle East and North Africa (MENA) region. We test whether the regulation of social life by Islamic norms and values is related to gender inequality and whether the impacts differ for the MENA countries, as well as Arab and Muslim majority countries. The study finds that the impact of gender inequality differs for the MENA, Arab and Muslim majority countries only when control variables are excluded from the regressions. The apparently significant religious and oil impacts disappear once control variables, such as the institutional quality, education, and ICT, are incorporated into the regressions. The paper obtains empirical evidence against belief that the religion and oil are culprits responsible for holding women back in the MENA, Arab, and Muslim majority countries. Neither of these factors fully explains the facts.

Keywords*: Gender Inequality; MENA; ICT; Institutional Quality; Economic Growth; Religion*

JEL Classification*: D63, O15*

1. INTRODUCTION

Gender inequality and disparities between males and females have serious cost implications, and negatively affect human and economic development by creating more poverty, less economic growth with bad governance, and lower level living standards for their citizens (World Bank, 2003). However, it is commonly expected that the development of information and communication technologies (ICT) will improve human and economic development through its direct and indirect impacts on reducing gender inequality.

Our main focus in this study is on the Middle East and North Africa (MENA) region. We also consider Arab countries as a subgroup, and Muslim countries in a broader sense in the analysis. According to the World Bank reports for MENA (2004, 2012), there is a paradoxical situation in this region in terms of gender equality and development. Most countries in this region have increased women's education and health level through investments in social sectors. However, it does not reflect in the female labor force participation rate, and has not grown as much as expected. The World Bank estimates these countries need 150 or more years before they will catch up to the current world average (World Bank, 2012, p.3). Abdelali-Martini (2011) mentions that staying at home, instead of working, is seen as a symbol of prestige for women in MENA region, which may explain these trends.

Labor force participation is however is only one dimension of gender inequality relating to employment. Most studies (see for instance Rauch and Kostyshak, 2009; Moghadam, 2004; Ross, 2008; World Bank, 2012) used labor force participation to draw inference on the extent of gender inequality in the MENA and Muslim countries in general. However, gender inequality is a much broader concept involving labor market, empowerment, and reproductive health. Gender inequality in the Muslim countries, when viewed in a broader sense than simply labor force participation, needs a broader consideration with its many dimension. This study takes a broader view and considers several dimensions in the analysis.

Research on gender equality for the MENA region became more popular in the aftermath of the Arab Spring. However, studies analyzing gender equality in the

MENA region from the Islamic orientation point of view argue that Muslim countries still have some cultural and political drawbacks affecting equality within society (Fish, 2002; Inglehart and Norris, 2003). Therefore, Brotman et al. (2008) suggests understanding the role of political Islam (Law of Islam) in the MENA region before understanding the policy or traditional culture in this region.

However, gender inequality in a country may not be directly attributed to Islam. When we consider to what extent Muslim countries apply religious laws, there is diversity in the region. Therefore, some argue that the Muslim ratio (the ratio of Muslims to non-Muslims) should not be taken as an explanatory variable or direct measure of gender inequality in MENA.

Therefore, we maintain the first comparison for the MENA region, and then we compare them as Arab and non-Arab, Islamic and non-Islamic, oil exporting and non-oil exporting, and we include their interaction as well.

The study uses a cross-section data set for 209 countries from the year 2008 to investigate (1) the impact of the Muslim ratio, Islam, and oil on gender equality, especially for MENA region, while controlling for (2) the impact per capita income as a proxy for the level of economic development (3) the impact of ICT on gender equality, and (4) the impact of institutional and social infrastructure.

The econometric estimation uses gender inequality index (GII) as a measure of gender equality. GII is developed by the United Nations and based on three dimensions of gender inequality; the labor market, empowerment and reproductive health with five indicators: a labour force participation indicator relating to the labour market dimension; secondary level and above educational attainment, and parliamentary representation indicators relating to the empowerment dimension; adolescent fertility[1] and maternal mortality[2] indicators relating to the reproductive health dimension. GII ranges from 0 (no inequality) to 1 (complete inequality).

[1] It is defined as "number of births to women ages 15-19" (UNDP, 2010, p.232)

[2] According to UNDP(2010), maternal death is defined as "the death of women while pregnant or within 42 days after terminating a pregnancy due to any cause related do or by pregnancy not due to accidental or incidental causes" (p. 233).

The study uses the ICT index as an explanatory variable which is based on the number of computers per 100 persons, the number of internet users per 100 persons, the number of telephones per 100 persons, ICT expenditure as a share of GDP, ICT expenditure per capita, and mobile subscribers per employee. It is commonly expected that ICT should have impact on socioeconomic development and improving gender equality, especially for developing countries, through different pathways such as increasing productivity (Javala and Pohjola, 2002; Sitiroh, 2002;) and creating new job opportunities (European Commission, 2004; OECD, 2010). This optimistic view is supported by Gajjala and Mamidipudi (1999), Lagesen (2008), and Wajcman (2009), among others. On the other hand, the pessimistic view emphasizes that ICT increases gender inequality due to socioeconomic inequality (Arun et al., 2004; Gigler, 2004; Koutsouris, 2010). This view is based on the argument that some factors will limit women's access to ICTs in most countries, especially in rural areas, and this will increase the gender divide and affect women's empowerment process.

Another variable used in this study is institutional quality index that includes Political Risk Service (PRS) Group's six indicators, which are i) Bureaucratic quality, which shows the quality and strength of bureaucracy as shock absorber, ii) Composite risk rating, which shows political, economic and financial risk rates of the countries iii) Corruption, which is the failure of governance in the economic, financial, and political environment, iv) Democratic accountability, which shows the responsiveness of the government to its citizens, as well as free and fair elections of the government, v) Government Stability, which shows the ability of the government to stay in office and manage its programs vi) Law and order, which shows the strength of the legal system and practice of complying with laws. Since all six measures are highly correlated we construct an index of institutional quality from the underlying six series using principal components analysis.

Our study, thus, contributes in four ways to the existing studies. First, we used the gender inequality index to cover more than one dimension of gender equality. Previous studies used labor force activity rates of female and average years of schooling for female separately as a measure of gender inequality in employment and education, respectively. Second, The paper then uses the ICT index and institutional

index as explanatory variables, which are broadly considered in the literature from both pessimistic and optimistic point of views. Third, we test the impact of religion and oil on gender equality in MENA countries and Arab countries. Fourth, the paper avoids simple using a dummy variable in order to estimate the impact of Islamic religiosity. Dummy variables are poor substitutes for more analytical models and incorrect inferences may arise when the binary classification is not suitable. In order to measure the religion impact on gender equality, we used two different regressions in terms of the religion related explanatory variables, which are the Muslim ratio and social regulation of religion index (range between 0-10, lower is less regulation). In each regression, variables such as purchasing power parity (PPP), adjusted per capita income, average years of schooling, and dummies for MENA, oil exporters, Arabs, and Islam are used as control variables.

The rest of the paper is organized as follows. Section 2 introduces underlying economic theory. Section 3 explains the empirical model and estimation methodology. In Section 4, we present the data and empirical results. Finally, Section 5 concludes the paper.

2. ECONOMIC THEORY ON GENDER EQULITY, ICT AND INSTITUTIONAL-SOCIAL INFRASTRUCTURE

The objective of this study is to examine the relationship between gender gap, information communication technology (ICT), and institutional and social infrastructure (religion particularly), in the MENA region and other Muslim countries as well.

Firstly, we briefly explain several main concepts used in this study before empirical analysis. Women are faced in life with "unequal human capabilities" (Nussbaum, 2002, p. 46). Amartya Sen, winner of the 1998 Nobel Prize in economics, gives the main theoretical framework on gender discrimination by developing a "capability approach." According to Sen's approach, focusing on what women are able to be or are able to do is much more important than focusing on what she can consume or the income she receives. (Sen, 2001, 2005) However, the neoclassical economic theory explains the problem as a part of lower level economic growth and development.

According the neoclassical theory, when growth of a country increases, it will create new employment opportunities for women. However, the neoclassical approach ignores dynamics and outcomes within the family, and the intra-family distribution of income, while taking income as the overall welfare of persons and utility as people's psychological happiness or satisfaction (Hicks, 2002; Sen, 2005). The social structure, including the family, is a main cause of the inequalities. Gender inequality leads to decreased access of women to markets and educational and health services, then, in turn, it reduces the well-being of the children and the country's economic growth (WB Global Monitoring Report, 2007).

Another concept used in this study is ICT. One of the major questions in the literature, both on theoretical and empirical grounds, is whether ICT can help to improve gender equality within society. We can define ICT as technology and tools such as the telephone, radio, and internet that people share, distribute, use to gather information, and use to communicate with the others. The gender and technology relationship have been examined by numerous studies in the literature by using different perspectives, approaches, and theoretical viewpoints. Studies from a feminist point of view largely focus on women's exemption from using information technology due to reasons such as society and technology itself. We can classify studies examining the gender and technology relationship under two broad headings. Scholars sharing the first view assume that technology is gender neutral, and what really matters is how technology is used (Lohan and Faulkner, 2004). The women who have limited opportunities for participating in social and economic life due to constraints, such as time and socio-cultural norms, may become more active by using ICT applications and ICT tools. A second group of scholars assume that technology is gendered, because it is developed and shaped by society. However, in turn, technology itself affects society as well (Hodgkinson, 2000; Wajcman, 2009). Lohan and Faulkner (2004) classify the feminist studies on technology as "women in technology" studies, and "women and technology" studies (p. 320). While women in technology studies generally focused on the reasons for there being fewer women in technology-related occupations, women and technology studies developed two opposite approach to the outcomes of technology, which are optimistic and pessimistic approach. According to the results of a study conducted about the impact of ICT expansion in the Middle East region for

the period of 1995-2003 by Shirazi (2008), expansion of the ICT decreases the digital divide and promotes democracy and freedom in the region.

On the other hand, generally, most countries and international organizations define rights by the laws. However, there is still a broken link in applying these laws because of beliefs, cultures, stereotypes, lack of accountability systems, etc. (Rao and Kelleher, 2003). World Bank defines the governance as "the traditions and institutions by which authority in a country are exercised for the common good." According to Cheema (2005), good governance and quality of institutions have a positive impact on the level of economic development, efficiency, sustainability, degree of access, and participation. Therefore, institutions shape rules and regulations, and economic activities of agents such as firms and families (Branisa et al., 2010). Then good governance provides efficient and effective allocation of resources and powers. Branisa et al. (2010) found that social institutions which take women away from decision making or the bargaining process are positively associated with low level education for girl, high rate of child mortality, and negatively associated with governance measured as rule of law, voice, and accountability (p. 18).

Although our discussion centers on these aspects of MENA countries, we should keep in mind that the region is heterogeneous in terms of institutions, laws, and income, while they are similar in terms of language and culture. The majority of the people in the MENA region are Muslim or Arab.

In the literature, religious practices and gender relations are examined by several studies and it is generally concluded that Islam as a reason of persistent gender inequality. For example, Fish (2002) analyzed the impact of Islam on literacy rate, sex ratio, women's political participation, and GEM by using cross-section data and concluded that that as overall, status of women in Muslim countries are inferior rather than in non-Muslim countries. However, Fish explained that the only reason of this result is due to the democratic deficit in these countries. Additionally, Donna and Russett (2004) concluded that the effect if Islam is much stronger and consistent in Arab countries. Noland (2005) reached to the similar conclusion and explained the reason of autocratic nature of nations with higher Muslim population as a reflection of being Arab rather than Islamic.

According to the Inglehart and Norris (2003), the reason of cultural conflict between Islamic countries and the West is not their political system (democracy), but gender equality. They found that Muslim societies are significantly less supportive on equal opportunities and rights for women.

Rauch and Kostyshak (2009) analyzed the gender gap in education and labor force participation in Muslim countries. They used the Muslim percentage of county's population as an explanatory variables and found that gender gap in 100% Muslim countries is 18.3% higher than a country with 0% Muslim population share. However, when they added a dummy variable for Arab countries, Muslim ratio was loosing its significance. They concluded that Arab effect explains Islamic effect (p. 182). According to their suggestion, if it is not Islamic effect, there are two reasons to explain the results; social pressure on married Arab women due to the common belief of supporting them by husbands, and very strong beliefs and expectations about mothers to continue their careers as mothers at home.

Another important issue for the MENA is that, most countries in this region are oil-exporting countries, and in the studies, oil sector is classified as male dominated sector, which discourage women to enter labor market (Moghadam, 2004; Ross, 2008). This argument is used in the literature while explaining the reason of low-level labor force participation rate of female in MENA. Ross (2008) used cross national regressions on female labor force by using oil rents per capita as an explanatory variable with some other control variables such as income, income squared, working age, Islam as a share of Muslims, dummy for MENA, and dummy for Communist states. The results showed that the Islam does not have effect on female labor force, while oil rents have significant negative impact on female labor force. However, World Bank compare Egypt and Indonesia in 2012 MENA report and conclude that even if these countries have similar oil reserves, diversification in exports, and potential for employing female, female labor force participating rate in Egypt is half of Indonesia. In this case, we have to use some other variables rather than religion or oil while explaining the gender inequality or gender gap in MENA region.

3. DATA AND EMPIRICAL METHODOLOGY

The focus of this study is to investigate impact of religion, institutional quality, and ICT on gender equality, especially for MENA region. Cross-sectional estimation is used for 209[3] countries for the year 2008 to investigate the empirical questions.

We use two empirical specifications to investigate the impact of religion, region, ICT and institutional quality on gender equality. Specifications do differ mainly in terms of their independent variables, although control variables also differ slightly across the specifications. Dummies are used for Islamic countries, MENA region, oil exporter countries, and Arabs to compare them with the others. All specifications use GII as a dependent variable as a measure of gender equality. Lower values of GII represent higher gender equality for the countries. The first specification uses Muslim ratio as independent variable that proxies extent of Islamic impact in country's culture, laws, and standards. Muslim ratio is obtained by dividing the Muslim population in the country by the total population. We use ICT index, which is constructed by using six measures of ICT access and density in the specification. These are (1) number of computers per 100 persons, (2) the number of internet users per 100 persons, (3) the number of telephones per 100 persons, (4) ICT expenditure as a share of GDP, (5) ICT expenditure per capita, and (6) mobile subscribers per employee. In order to gain some insights about the relationship between ICT and gender inequality, Figure 1 plots GII against six measures of ICT access and use. Simple regressions fits are also represented in each plot. Figure 1 show that all measures of ICT are negatively related to GII, implying the improvement in ICT use and access reduces gender inequality.

The institutional-social infrastructure quality is proxied by six variables obtained from PRS. These six indicators are (i) Corruption, (ii) Rule of Law, (iii) Bureaucratic Quality, (iv) Composite Risk Rating, (v) Government Stability, and (vi) Democratic Accountability. The graphical presentation of GII against the above six measures the institutional quality given in Figure 2 suggests that all measures are negatively related to GII, implying that improvements in institutional quality leads to reduction in

[3] Although there are 209 countries in our sample, number of observations in each regression varies because of missing values in the variables entering the regression equations.

gender inequality. Simple regression fits shown in Figure 2 also all have negative signs. Since all six measures are highly correlated we construct an index of institutional quality from the underlying six series using principal components analysis.

Here, the main argument is that better institutional quality and higher-level access to ICTs provides better gender equality levels for the countries by providing better opportunities to the women. In both regression specifications, the PPP adjusted per capita income, total average years of schooling for age 15+ are used as additional control variables. Definition of all variables are given in Table 1 and descriptive statistics in Table 2.

The GII is computed for the year 2008. Other variables are averages over 2000-2008. Taking averages over a longer span for the other variables increases the number of observations available in the regression, but more importantly incorporates the lagging impact of education, intuitional quality, and ICT[4].

The empirical estimations are carried out in a cross-country framework due the data limitations. We estimate several variant of the following basic cross-section regression specification:

$$log(GII_i) = \mu + log(MUSRATIO_i) + \gamma' \log(X_i) + \varepsilon_i \qquad (1)$$

where *i* denotes the country.

GII = Gender Inequality Index

MUSRATIO = Muslim population/total population

X = vector of control variables

ε = error term.

Control variables include the following:

ICTI = ICT Index created by using factor analysis

[4] Results are qualitatively the same when only 2008 data is used, but several parameter estimated become insignificant and estimates lose their precision due to increased number of missing values.

INSTQ = Institutional Quality Index created by using factor analysis

PPP2010 = PPP adjusted per capita income

Following dummy variables are defined in order to examine the impact category they relate:

ARAB = 1 for Arab countries, 0 for others

ISLAMIC = dummy to measure to what extend country is Muslim, it is defined as 1 if MUSRATIO>0.75, 0 otherwise

MENA = 1, if the country is in the MENA region, 0 otherwise

OIL = 1, if the country is a major oil exporter, 0 otherwise

The second specification uses social regulation of religion index (range between 0-10, lower is less regulation) as the independent variable to check the robustness of the results. The second cross-section regression is specified as follows:

$$log(GII_i) = \mu + log(MSRI_i) + \gamma' \log(X_i) + \varepsilon_i \qquad (2)$$

where,

MSRI = social regulation of religion index (range between 0-10, lower is less regulation)

and other variables are as defined below Eq. (1).

There are six measures of ICT, relating to access to or use of ICT. An option is to include each ICT measure in a separate regression. Unfortunately, this will exclude other dimensions. Alternatively, all six ICT measures can be included in the regression. A problem with this approach is the likely multicollinearity. Pearson correlation coefficients given in Table 3 show that some of the ICT variables are highly correlates, leading to suspect for multicollinearity. In order to overcome these difficulties, we form an ICT index, denoted ICTI, based on principal components. Table 4 gives the details of the principal components analysis on six ICT variables. First principal component explains 72% of the total variation in these six ICT measures. Therefore, we create an index of ICT using the weights relating to first principal component (PC 1), which are given in the first column of panel 2 of Table 4.

As for ICT variables, analogous concerns relates to six measures of institutional quality. In order avoid misspecification or multicollinearity, we prefer to create and

index of institutional quality, denoted INSTQ. Principal component analysis results are given in Table 5 for six dimensions of institutional quality considered in the study. There are two eigenvalues exceeding 1 and one can possibly include two principal components. Noting that the second components explains only 19% of the total variation in the six institutional quality variables, we decided to keep only the first principal component, which explains 58% of the total variation.

We used four dummies to capture the regional and religion effects. In order examine the interaction of ARAB, ISLAMIC, MENA, and OIL categories with the measure of extend of religiosity. The interaction dummy indicates whether the category it represents has impact on gender inequality beyond and above the average impact of religiosity measures MUSRATIO or MSRI. If, for instance the coefficient of the interaction term MUSRATIO*ARAB is positive and significant, it means that negative impact of religiosity on gender equality is more than other countries.

In studies involving impact of religiosity, often a dummy variable is added to discriminate between Muslim and non-Muslim countries or MENA countries and non-MENA countries to control for differences between the two categories, *ceteris paribus*. In this study, we particularly avoid such use of dummy variables to measure the impact of Islamic religiosity on gender equality. We rather use MUSRATIO and MSRI, which indicates degree of a country in terms of extend of Islamic regulation. Dummy variable are only used to control for only Muslim dominance (a country with more than 75% muslim population), Arab, and MENA effects, but not for measuring the impact of Islamic religiosity on gender equality. There is rising trend in the literature (see Jacobsen and Newman, 1995) to use of dummy variables to control for gender differences, while use of interactions with other variables, such as race, has decreased. There are two major problems with use of dummy variables in order discriminate Muslim and non-Muslim countries. First, a dummy variable that classifies a country as Muslim does not make any differentiation on religiosity, Saudi Arabia and Turkey, for instance, are classified as the same. Second, traditional way of using dummy variables in the gender equality regression is useful for quantifying discriminatory outcomes, but do not provide a comprehensive analysis on the discriminatory process and how causes of the discriminatory outcome.

4. EMPIRICAL RESULTS

First, simple regressions estimation results are presented in Table 1. Simple regressions of GII on MUSRATIO and MSRI illustrate the likely misleading results that may arise from misspecified regressions. Simple regressions are also estimated on dummy variables in order serve as a benchmark to compare the results and show outcome of possible specification in Eq. (1) and Eq. (2). They also show the misleading results that arise from the use of dummy variables. According to the Breusch-Pagan and White test results, error terms are heteroskedastic and therefor we used generalized least squares using White method to get consistent estimates of the *t* statistics and corresponding *p*-values. The number of observations used in each regression varies due the data availability for related variables.

Table 6 presents results for benchmark bivariate regression. In each case logarithm of GII is regressed on one on the MSRI and MUSRATIO, as well on dummy variables MENA, ARAB, ISLAMIC and OIL. These regressions are most likely to be misspecified and are presented here in order show possible misleading inferences may arise. Three dummy variables, MENA, ARAB, and ISLAMIC all have positive and significant coefficients at 1 percent level. The size of the coefficients are, 0.32, 0.23, and 0.22 for ISLAMIC, MENA, and ARAB. These estimates imply that, gender equality is on average worse in countries with Muslim population ratio grater than 75%, in the MENA countries, and ARAB countries. Indeed, on the GII scale ISLAMIC, MENA, and ARAB countries are 1.38, 1.26, and 1.25 points above the average of the other countries. Considering that the average of GII is 0.54, these are highly significant numbers, being about 2.5 times worse. Interestingly, MENA region and Arab countries are indeed better than the whole of the countries with Muslim population ratio of 75% or higher. The OIL dummy is interestingly negative, although it is not significant. There seems to be no significant impact of oil on the gender equality.

From the plots in Figure 3, we see that both MUSRATIO and MSRI are positively related to GII, implying that there is direct and inverse relation between gender

equality and the Muslim majority as well as Islamic regulation (regulation of social life with Islamic values of norms)

Table 6 also presents regressions of log GII against MUSRATIO and MSRI, included in each regression one of the ARAB, MENA, or ISLAMIC dummy variables. MUSRATIO has a positive and significant coefficient when MENA and OIL dummies are in the regression. The coefficient of MUSRATIO is negative but insignificant when ISLAMIC dummy is in the regression and positive but insignificant when ARAB dummy is in the regression. In each case, ARAB, MENA, and ISLAMIC dummy variables have positive and significant coefficients. These results imply that Muslim population ratio has a negative impact on gender equality, and Arab, MENA, and Muslim majority countries are worse than the average.

How representative the Muslim population ratio as a proxy for extends of Islamic regulation of the social life could be disputable. The MSRI ranking is probably a better proxy for the Islamic religiosity of the social life. The regression results given in Table 6 indicate that MSRI has indeed significant and negative relationship with GII, when any of the ARAB, MENA, and ISLAMIC dummy variables is in the regression. In the case of OIL dummy the coefficient of MSRI is still negative but insignificant. Here the finding is that extend of regulation of social life by religious norm and values do not increase gender inequality, it rather reduces it. In terms of the ARAB, MENA, and ISLAMIC dummy variables is in the regressions with MRSI, we again find that these have positive and significant estimates. The OIL dummy is again negative but insignificant. The findings here shed serious doubts on the use of Muslim population ratio as a proxy for extend of Islamic regulation of social life.

As we discussed previously, the regression results in Table 6 are misleading when there are other significant variables affecting the gender inequality. We consider three variables here: per capita GDP, access to and use of ICT, education, and institutional quality. These regressions additionally include ARAB, MENA, and ISLAMIC dummy variables and their interaction with religion variable (MUSRATIO or MSRI). The dummy variables are included whether the Arab, MENA, and Muslim majority countries are on average different than other countries. The interaction terms captures

whether regulation of social life by Islamic norms and values do have different effect on gender inequality in the Arab, MENA, and Muslim majority countries.

Regression estimation results for when the MUSRATIO variable is used as a proxy are given in Table 7. These estimates have one result that cannot go unnoticed: The MUSRATIO variable is insignificant in all regression, except the case where only OIL dummy is used and other control variables are excluded. Since the regressions with excluded control variables are possibly misspecified, this exceptional regression can be ignored. The message is clear and great consideration. There is no relation between gender inequality and Muslim population ratio. Muslim population ratio is the variable most commonly used in the previous studies that found an adverse effect from this variable on gender equality. Our results are certainly challenging to those. What then accounts for gender inequality differences, if it is not religion? The results in Table 7 finds strong an consistent negative significant relationship between gender inequality and three control variables, which are INSTQ, ICTI, and BLYEAR15. Institutional quality, ICT and education accounts for most of the gender differences across the countries and Muslim population ratio has no impact. Interestingly, we find that per capita income is not related or even inversely related to gender inequality, implying that an increase in income does not help eliminate the gender gap.

In terms of the interaction terms Table 7 shows that the interaction of MUSRATIO with ARAB, MENA, and ISLAMIC dummy variables is negative and significant when other control variables are in the regression. The OIL interaction term is found to be insignificant. Therefore, in terms of the impact of Muslim population ratio on gender inequality Arab, Mena, and Muslim majority countries do indeed better than the other countries. However, ARAB, MENA, and ISLAMIC dummy variables, which capture the average of the category they represent relative to all other observations, keep their significance and adverse impact on GII. This however does not change the fact that higher Muslim majority does not make the gender inequality worse; it even does improve it, particularly in the MENA region.

We have shown above that MUSRATIO is probably not a proper measure of the extend of the regulation of social life Islamic norms and values. MSRI is based on a ranking and better represents the extend of religious regulation of social life. The

regression results relating to MSRI are given in Table 8. The results in Table 8 do enhance the results in Table 6 and indeed are more noteworthy. The most important finding is again the coefficient of MSRI is all uniformly negative, and sometimes even significant. This is again a clear and strong rejection of the belief that extend of Islamic norms and values in social life has an adverse impact on gender equality. Our findings show that higher regulation of social life by Islamic norms and values does not have any adverse impact on GII. Gender differences are more accounted by variables such institutions, ICT, and education. Again, per capita income does not improve gender equality. The last and probably the most important finding relates to the central focus of our study. In Table 8, when control variables are introduced all of the ARAB, MENA, and ISLAMIC dummy variables became insignificant. Furthermore, the interaction of these variables with the Islamic regulation variable MSRI are all insignificant. The data does not support a myth that the gender gap in Muslim majority countries is a mere result of religion, which is often echoed.

4. CONLUSION

Gender inequality—the disparities between males and females in opportunity and security—has serious cost implications and these are negatively effecting the human and economic development. Gender equality has become a more visible issue for the Arab, and more generally MENA countries following the Arab Spring. Gender inequality, or gender issues more broadly, for the Muslim countries are more pronounced than other countries and regions, usually from social, anthropological, or political angles. Oil and religion are singled out as factors placing women and girls of the Muslim countries in a more disadvantageous position than women and girls in other developing countries. This study examined the relationship between gender inequality in the MENA countries and more broadly in Muslim countries, by taking into account of the impact economic development, ICT, education, and institutions in the MENA region and tested whether the impacts differ for the MENA countries. The major focus of the study is to test the impact of regulation of social life by the Islamic norms and values on the gender inequality. Most studies have used gender inequality in employment and education as basic indicators of gender inequality and usually their impacts on economic growth is studied. This study considers broader measures of gender inequality and its determinants. For instance, improvements in ICT,

education, and institutional quality have direct impacts on the welfare of women and directly impact the gender gap. Therefore, impacts of improvements in the determinants of gender inequality should be considered more broadly rather than simply examining the impact of classification by religion or by some other social norms. Thus, this study utilizes broader concepts of gender equality and its determinants. Rather than traditional measures such as the labor force participation rate of females relative to males, the study uses gender inequality index, which are based on variables that measure several dimensions of gender inequality. The study uses a cross-sectional dataset for 209 countries. Empirical evidence obtained in the study shows that the religion has only significant effect on gender inequality when other determinants, such as the economic development, education, ICT, and institutional quality are excluded from the model. Additionally, the classification dummies for Arab, MENA, and Muslim majority countries, as well as their interaction with the religion variable, are not significant. However, ICT, education, and institutional quality have a significantly positive impact on gender equality, implying improvements in these variables reduces gender inequality. No other significant difference has been found relating to religion and oil across the MENA, Arab, and Muslim majority countries. The apparently significant religious and oil impacts disappeared once institutional variables are incorporated into the regressions. The paper obtains empirical evidence against the belief that the religion and oil are culprits responsible for holding women back in the Muslim countries. Neither of these factors fully explains the facts.

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Figure 1. Gender Equality and ICT

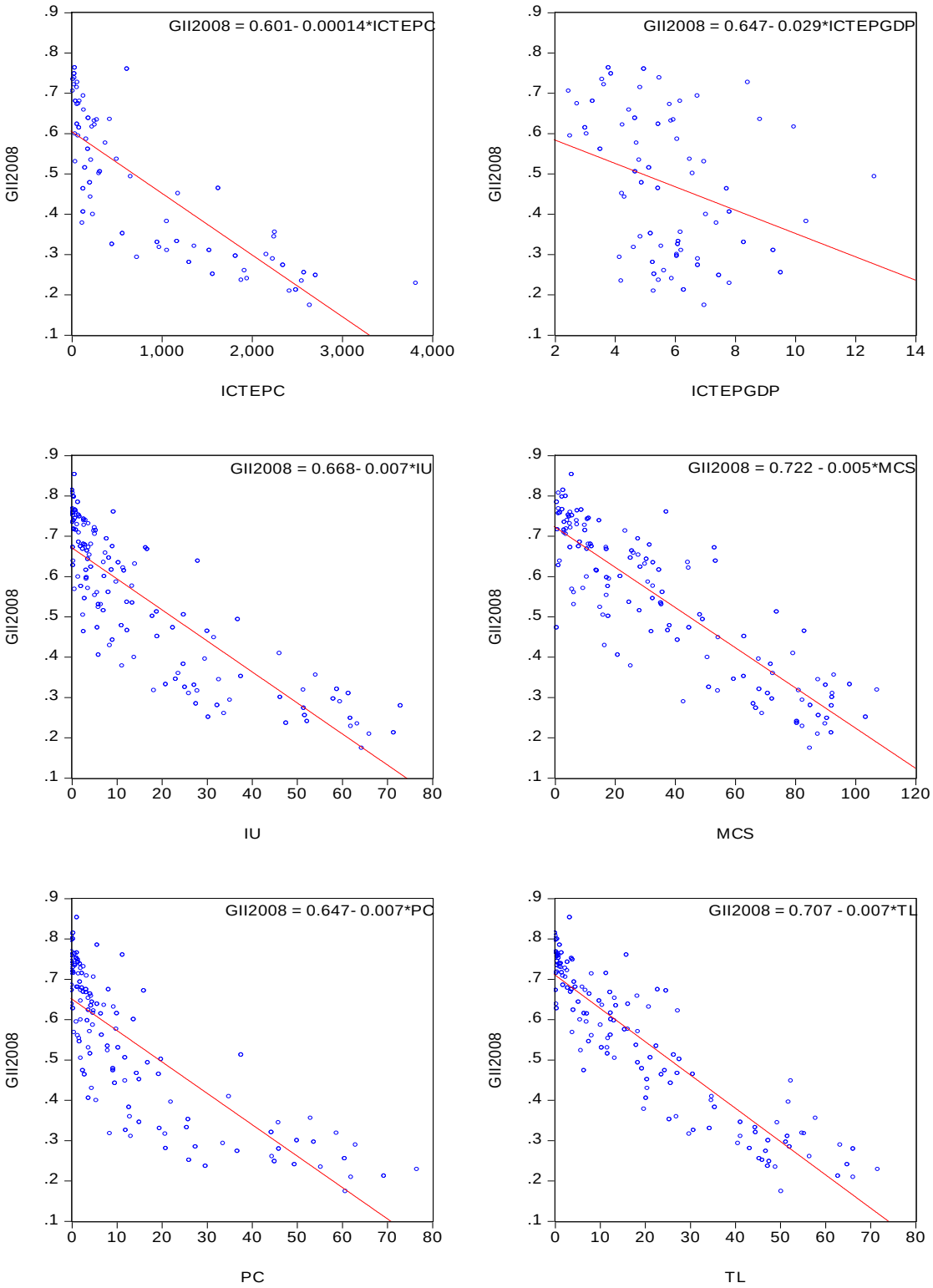

Figure 2. Gender Equality and Institutional Quality

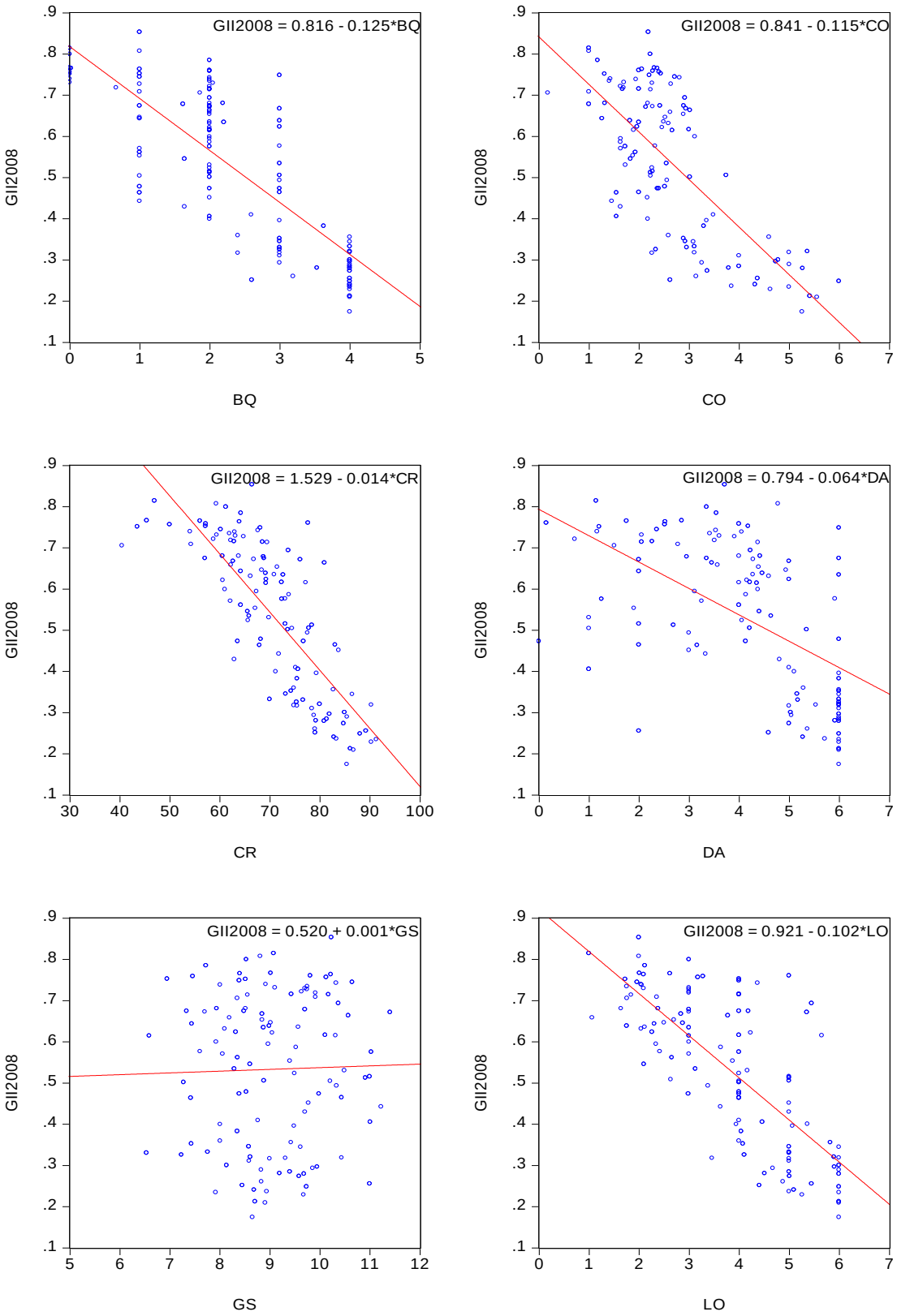

Figure 3. Gender Equality and Other Variables

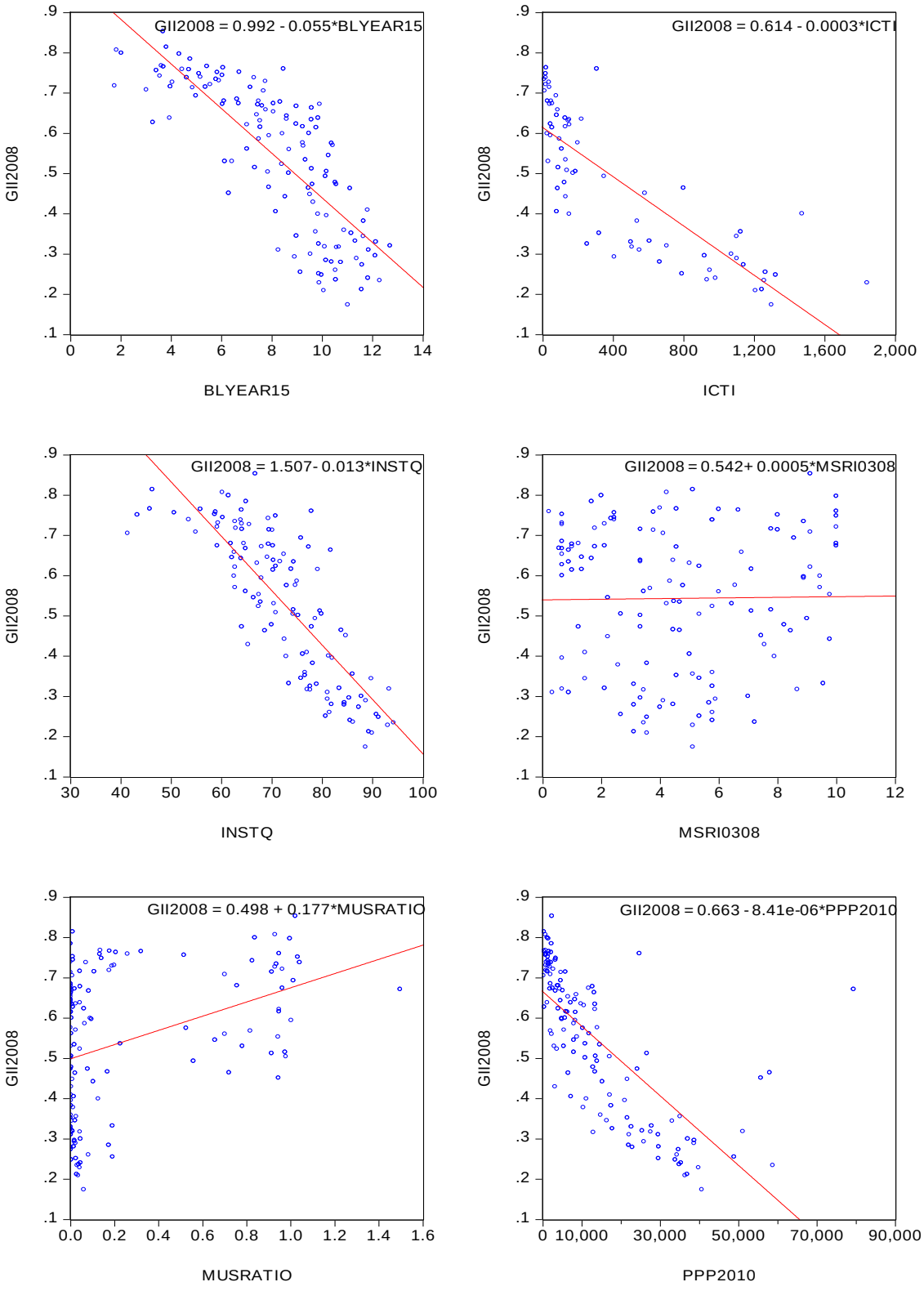

Table 1. Variable Definitions

Variable	Description
GII	Gender Inequality Index, (0=no inequality, 1=equality)
MUSRATIO	Muslim rates, female (% of total population, defined as Muslims/population)
MSRI0308	Modified Social Regulation of Religion Index, averages from 2003, 2005 and 2008 International Religious Freedom Reports (0-10, lower is less regulation)
PPP2010	Gross national income per capita (PPP 2008 US $)
IU	Internet users (per 100 people)
MCS	Mobile cellular subscriptions (per 100 people)
PC	Personal Computers (per 100 inhabitants)*
TL	Telephone lines (per 100 people)
UR	Urban population (% of total)
BLST	Barro-Lee: Average years of total schooling, age 15+, total
ICTEPC	Information and communication technology expenditure per capita (current US$)
ICTEPGDP	Information and communication technology expenditure (% of GDP)
BQ	Bureaucracy Quality (L)
RR	Composite Risk Rating
CO	Corruption (F)
DA	Democratic Accountability (K)
GS	Government Stability (A)
LO	Law & Order (I)
ICTI	ICT index, constructed from ICT variables by using principle component analysis
INSTQ	Institutional quality index, constructed form institutional variables
MENA	Dummy for MENA region (1=MENA, 0=others)
ISLAMIC	Dummy for ISLAMIC countries, defined as musratio>0.75 (1=ISLAMIC, 0=others)
ARAB	Dummy for ARAB countries (1=ARAB, 0=others)
OIL	Dummy for oil exporting countries (1=oil exporters, 0=others)

Table 2. Descriptive Statistics

	GII2008	MUSRATIO	ICTI	INSTQ	PPP2010	BLYEAR15
Mean	0.541691	0.222167	445.0510	71.03810	13520.63	8.110979
Median	0.575000	0.024342	172.8742	70.34421	7998.000	8.507800
Maximum	0.853000	1.497795	1841.810	94.20640	81011.00	12.70540
Minimum	0.174000	0.000000	8.788922	37.39489	176.0000	1.756600
Std. Dev.	0.178498	0.352492	476.3772	11.54864	15222.12	2.580580
Skewness	-0.326616	1.478222	0.951921	-0.234275	1.806750	-0.455654
Kurtosis	1.837390	3.749630	2.674077	2.861430	6.597644	2.366115
Jarque-Bera	10.29975	79.84653	11.34796	1.362809	198.2532	7.393750
Probability	0.005800	0.000000	0.003434	0.505906	0.000000	0.024801
Sum	75.29500	45.76643	32488.72	9732.220	2474275.	1167.981
Sum Sq. Dev.	4.396886	25.47139	16339338	18138.47	4.22E+10	952.2931
Observations	139	206	173	137	183	144

Table 3. Pearson Correlation Coefficients between Measures of ICT

	LPC	LIU	LTL	LMCS	ICTEPC	ICTEPGDP
LPC	1.00					

LIU	0.71	1.00				
	(40.8)	-----				
LTL	0.76	0.48	1.00			
	(48.0)	(22.4)	-----			
LMCS	0.67	0.87	0.45	1.00		
	(36.6)	(70.7)	(20.9)	-----		
ICTEPC	0.35	0.16	0.24	0.11	1.00	
	(15.2)	(6.50)	(10.3)	(4.35)	-----	
ICTEPGDP	-0.23	-0.37	-0.08	-0.38	0.02	1.00
	(-9.87)	(-16.2)	(-3.29)	(-16.7)	(0.83)	-----

Notes: *t*-statistic for the significance of the Pearson correlation coefficients are given in parentheses.

Table 4. Principal Components Analysis for ICT Variables

Eigenvalues: (Sum = 6, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	4.327790	3.411771	0.7213	4.327790	0.7213
2	0.916019	0.514848	0.1527	5.243809	0.8740
3	0.401172	0.212875	0.0669	5.644981	0.9408
4	0.188297	0.076862	0.0314	5.833278	0.9722
5	0.111435	0.056148	0.0186	5.944713	0.9908
6	0.055287	---	0.0092	6.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6
IU	0.457105	-0.072455	0.037535	-0.350778	-0.738488	-0.340568
MCS	0.393626	0.108080	-0.882818	-0.094406	0.184597	0.104984
PC	0.451561	-0.151255	0.332668	-0.331151	0.131003	0.731932
TL	0.438775	-0.152986	0.061346	0.863761	-0.161871	0.089571
ICTEPC	0.456564	-0.096779	0.261934	-0.093239	0.613846	-0.572777
ICTEPGDP	0.176724	0.963026	0.190220	0.060040	-0.019729	0.034221

Ordinary correlations:

	IU	MCS	PC	TL	ICTEPC	ICTEPGDP
IU	1.000000					
MCS	0.747295	1.000000				
PC	0.905661	0.649285	1.000000			
TL	0.833670	0.692431	0.834266	1.000000		
ICTEPC	0.879996	0.686383	0.932208	0.857917	1.000000	
ICTEPGDP	0.285567	0.327755	0.234674	0.215600	0.280318	1.000000

Table 5. Principal Components Analysis for Institutional Variables

Eigenvalues: (Sum = 6, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	3.490817	2.343106	0.5818	3.490817	0.5818
2	1.147711	0.573784	0.1913	4.638528	0.7731
3	0.573927	0.236902	0.0957	5.212454	0.8687
4	0.337025	0.045238	0.0562	5.549479	0.9249
5	0.291787	0.133053	0.0486	5.841266	0.9735
6	0.158734	---	0.0265	6.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6
BQ	0.471875	-0.145008	0.015312	-0.348141	-0.653495	0.455866
CO	0.420636	-0.302056	-0.379821	0.747692	-0.119624	-0.119209
DA	0.375058	-0.323539	0.774252	0.124676	0.361191	0.095838
GS	0.170397	0.840784	0.212435	0.380496	-0.079610	0.260390
LO	0.448811	0.123418	-0.454916	-0.284811	0.640767	0.291012
RR	0.478815	0.246794	0.062915	-0.279849	-0.106094	-0.785047

Ordinary correlations:

	BQ	CO	DA	GS	LO	RR
BQ	1.000000					
CO	0.666272	1.000000				
DA	0.601891	0.511101	1.000000			
GS	0.131999	0.006152	0.016843	1.000000		
LO	0.647051	0.615757	0.399624	0.291216	1.000000	
RR	0.744457	0.551842	0.528325	0.464761	0.739462	1.000000

Table 6. Simple Regression Estimation Results

Dep. Var: LOG(GII2008)

	Model 1.1	Model 1.2	Model 1.3	Model 1.4	Model 1.5	Model 1.6	Model 1.7	Model 1.8	Model 1.9	Model 1.10	Model 1.11	Model 1.12
ISLAMIC	0.3171 (0.0508)***				0.3253 (0.0833)***				0.3860 (0.0588)***			
C	-0.7369 (0.0383)***	-0.6977 (0.0362)***	-0.7037 (0.0369)***	-0.6581 (0.0346)***	-0.7452 (0.0769)***	-0.6189 (0.0584)***	-0.6288 (0.0594)***	-0.5387 (0.0465)***	-0.6292 (0.0496)***	-0.6204 (0.0509)***	-0.6242 (0.0516)***	-0.6256 (0.0509)***
MENA		0.2117 (0.0635)***				0.1333 (0.0782)*				0.2671 (0.0747)***		
ARAB			0.2331 (0.0626)***				0.1589 (0.0778)**				0.2884 (0.0732)***	
OIL				-0.1491 (0.1138)				-0.2087 (0.1050)**				-0.1338 (0.1191)
LOG(MUSRATIO)					-0.0009 (0.0140)	0.0212 (0.0119)*	0.0195 (0.0120)	0.0327 (0.0105)***				
LOG(MSRI0308)									-0.0966 (0.0353)***	-0.0664 (0.0363)*	-0.0682 (0.0365)*	-0.0274 (0.0352)
R-squared:	0.1054	0.0281	0.0362	0.0157	0.1076	0.0478	0.0522	0.0695	0.1464	0.0479	0.0571	0.0192
Log Likelihood:	-55.2150	-60.8099	-60.1583	-61.6679	-55.5589	-60.0039	-59.6894	-58.4250	-52.0455	-59.4199	-58.7052	-61.4250
S.E.R:	0.3670	0.3825	0.3833	0.3849	0.3670	0.3791	0.3783	0.3748	0.3598	0.3800	0.3805	0.3857
SBC:	0.8907	0.9736	0.9782	0.9863	0.9188	0.9837	0.9791	0.9607	0.8801	0.9893	0.9931	1.0190
F-statistic:	15.6698	3.8439	4.9235	2.1153	8.0821	3.3647	3.6885	5.0054	11.3228	3.3203	3.9329	1.2914
Prob(F-stat):	0.0001	0.0520	0.0282	0.1482	0.0005	0.0375	0.0276	0.0080	0.0000	0.0392	0.0220	0.2783
WhiteTest:	15.7810***	6.3663**	7.1160***	0.9436	10.1405***	3.0527*	3.3589**	0.4589	7.6924***	3.1429**	3.4385**	0.6406
BPG Test:	15.7810***	6.3663**	7.1160***	0.9436	9.4689***	2.8839*	3.1212**	1.6938	8.6280***	4.0090**	4.3051**	0.9486
Jarque Bera Test:	10.2702***	13.4014***	12.7350***	15.3255***	9.7578***	13.1215***	12.8869***	13.4300***	8.9542**	12.5167***	11.9543***	15.0180***

Table 7. Regression Results for GII and Using The Muslim Population Ratio

Dep. Var: LOG(GII2008)

	Model 2.1	Model 2.2	Model 2.3	Model 2.4	Model 2.5	Model 2.6	Model 2.7	Model 2.8	Model 2.9	Model 2.10
LOG(MUSRATIO)	0.0275 (0.0102)***	0.0008 (0.0094)	-0.0010 (0.0141)	-0.0100 (0.0109)	0.0210 (0.0119)*	-0.0153 (0.0088)*	0.0193 (0.0120)	-0.0127 (0.0086)	0.0296 (0.0108)***	-0.0042 (0.0091)
C	-0.5829 (0.0445)***	3.5462 (1.1711)***	-0.7456 (0.0772)***	3.2980 (1.2198)***	-0.6196 (0.0587)***	3.7305 (1.5287)**	-0.6293 (0.0597)***	3.6720 (1.4261)**	-0.5504 (0.0476)***	3.4056 (1.3773)**
LOG(PPP2010)		0.1394 (0.0576)**		0.1165 (0.0578)**		0.0768 (0.0668)		0.0969 (0.0632)		0.0964 (0.0733)
LOG(INSTQ)		-0.8917 (0.3181)***		-0.8609 (0.3172)***		-0.8803 (0.3642)**		-0.8989 (0.3494)**		-0.7966 (0.3407)**
LOG(ICTI)		-0.2376 (0.0431)***		-0.2221 (0.0437)***		-0.1959 (0.0572)***		-0.2130 (0.0538)***		-0.2246 (0.0548)***
LOG(BLYEAR15)		-0.2619 (0.1206)**		-0.1791 (0.1216)		-0.2429 (0.1068)**		-0.2184 (0.1122)*		-0.2484 (0.1265)*
ISLAMIC			0.3340 (0.0841)***	0.1928 (0.1064)*						
LOG(MUSRATIO)*ISLAMIC			0.1567 (0.1726)	0.6503 (0.3974)						
MENA					0.1443 (0.0761)*	0.2339 (0.0931)**				
LOG(MUSRATIO) *MENA					0.5137 (0.2568)**	-0.6371 (0.3396)*				
ARAB							0.1703 (0.0761)**	0.2319 (0.1046)**		
LOG(MUSRATIO) *ARAB							0.2933 (0.2552)	-0.5819 (0.3932)		
OIL									-0.1288 (0.1144)	0.1314 (0.1341)
LOG(MUSRATIO)*OIL									0.0368 (0.0485)	0.0128 (0.0325)
R-squared:	0.0388	0.7802	0.1081	0.7916	0.0516	0.8172	0.0539	0.8154	0.0746	0.7872

Log Likelihood:	-60.6474	16.0215	-55.5224	17.8835	-59.7277	22.4766	-59.5650	22.1385	-58.0461	17.1598
S.E.R:	0.3795	0.2013	0.3683	0.1991	0.3798	0.1865	0.3793	0.1874	0.3752	0.2012
SBC:	0.9572	-0.0936	0.9542	-0.0254	1.0156	-0.1566	1.0132	-0.1470	0.9910	-0.0047
F-statistic:	5.4540	45.4356	5.3744	33.6417	2.4145	39.6014	2.5257	39.1355	3.5763	32.7720
Prob(F-stat):	0.0210	0.0000	0.0016	0.0000	0.0694	0.0000	0.0603	0.0000	0.0158	0.0000
WhiteTest:	0.0948	0.8154	6.7701***	0.7016	2.2216*	0.9356	2.3160*	0.9094	0.8426	1.7159
BPG Test:	1.6357	1.1369	6.3125***	0.8192	2.0989	1.1289	2.1674*	1.0307	1.7457	1.9395*
Jarque Bera Test:	14.2839***	2.8510	9.7354***	2.2976	13.0906***	1.9325	12.8290***	1.8482	13.0125***	1.1590

Table 8. Regression Results for GII and Using The Modified Social Regulation of Religion Index

Dep. Var: LOG(GII2008)

	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5	Model 3.6	Model 3.7	Model 3.8	Model 3.9	Model 3.10
LOG(MSRI0308)	-0.0380	-0.0440	-0.1037	-0.0682	-0.0709	-0.0732	-0.0723	-0.0714	-0.0463	-0.0595
	(0.0338)	(0.0360)	(0.0397)**	(0.0420)	(0.0368)*	(0.0355)**	(0.0370)*	(0.0350)**	(0.0354)	(0.0369)
C	-0.6282	3.3728	-0.6212	3.2418	-0.6151	3.9018	-0.6193	3.8852	-0.6032	3.3217
	(0.0510)***	(1.1478)***	(0.0530)***	(1.2429)**	(0.0512)***	(1.4763)**	(0.0520)***	(1.3779)***	(0.0506)***	(1.3196)**
LOG(PPP2010)		0.1569		0.1298		0.1159		0.1357		0.1120
		(0.0624)**		(0.0623)**		(0.0633)*		(0.0624)**		(0.0741)
LOG(INSTQ)		-0.8368		-0.8203		-0.9653		-0.9946		-0.7654
		(0.3250)**		(0.3206)**		(0.3591)***		(0.3487)***		(0.3522)**
LOG(ICTI)		-0.2602		-0.2438		-0.2306		-0.2451		-0.2359
		(0.0398)***		(0.0447)***		(0.0533)***		(0.0496)***		(0.0500)***
LOG(BLYEAR15)		-0.2844		-0.1743		-0.1619		-0.1480		-0.2625
		(0.1092)**		(0.1452)		(0.0925)*		(0.0954)		(0.1139)**
ISLAMIC			0.2758	0.0341						
			(0.0795)***	(0.1313)						
LOG(MSRI0308)*ISLAMIC			0.0631	0.0514						
			(0.0511)	(0.0672)						
MENA					-0.6856	0.3076				
					(0.3974)*	(0.6147)				
LOG(MSRI0308)*MENA					0.4780	-0.0220				
					(0.1941)**	(0.3233)				
ARAB							-0.5633	0.1494		
							(0.3859)	(0.7632)		
LOG(MSRI0308)*ARAB							0.4322	0.0605		
							(0.1903)**	(0.4036)		
OIL									-1.3057	-0.3172
									(0.3506)***	(0.2377)

LOG(MSRI0308)*OIL									0.6781 (0.1757)***	0.2267 (0.1525)
R-squared:	0.0071	0.7927	0.1482	0.8033	0.0575	0.8290	0.0650	0.8300	0.0780	0.8058
Log Likelihood:	-62.2497	17.0189	-51.9059	18.8142	-58.7336	23.5649	-58.1420	22.9751	-57.2484	19.2495
S.E.R:	0.3866	0.1973	0.3608	0.1953	0.3795	0.1822	0.3804	0.1830	0.3754	0.1941
SBC:	0.9949	-0.1282	0.9143	-0.0569	1.0155	-0.1967	1.0214	-0.1838	0.9935	-0.0697
F-statistic:	0.9558	47.4043	7.5972	35.0094	2.6655	41.5447	2.9896	41.1533	3.6962	35.5709
Prob(F-stat):	0.3300	0.0000	0.0001	0.0000	0.0505	0.0000	0.0335	0.0000	0.0136	0.0000
WhiteTest:	0.0057	0.6769	5.2289***	0.9079	2.6230*	1.3016	2.7346**	1.4421	0.5840	2.0588*
BPG Test:	0.7412	0.5841	5.8609***	0.8318	3.2133**	1.4732	3.3281**	1.4850	0.8145	2.3197**
Jarque Bera Test:	15.2656***	4.8317*	8.7764**	2.2904	12.3598***	1.7196	11.7739***	1.4008	13.8659***	0.7648