Relative Gender Differentials and Islam in Non-Arabic Nations: A Regional Analysis

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Abstract

This paper examines the influence of a variety of variables on various measures of gender inequality, with a special emphasis on the regional impact of Islam in non-Arabic nations. The results indicate that improvements in institutional quality and GDP per capita reduce gender inequality, while ethnic fragmentation and being landlocked generally increases such inequality. The impact of Islam varies by region, for the most part being associated with a worsening in relative gender performance. However, once we account for differences in birth rates, given the literature on the relatively higher birth rates among Muslims, the negative impact of Islam on gender inequality disappears for all regions.

I. Introduction

Gender inequality continues to be a major problem in developing countries. Simple neoclassical economic theory would seem to link this problem to the lack of overall economic growth and development. As rapid growth begins to occur, employment opportunities for women will increase and various measures of gender inequality will decline. Alternatively, there is another perspective that argues that there are deep seated institutional or cultural practices that prevent, in some circumstances, a reduction in gender inequality.

One of the most deep seated types of institutional or cultural practices is religious belief and practice. For example, it is argued by some that Islam has a significant negative influence on gender inequality. Specifically, certain practices are thought to limit females' power and autonomy, thus restricting their economic opportunities. The patriarchal nature of Islam is thought to limit educational opportunities for women and limit their access to health care. This and direct limits on women's activities outside the home greatly limit employment opportunities. Fish (2002) has found that there is a strong connection between the subjection of women that occurs in Islam and the lack of development of democracy. The implication of his work is that Islamic states are more autocratic so as to repress women's rights more effectively. However, the effect is much stronger and more consistent for Arab countries in particular (Donno and Russett, 2004). Noland (2005) too finds the autocratic nature of many nations with large Muslim populations as being more reflection of being Arabic rather than Islamic.

With the above in mind, this paper will focus on the relationship between Islam and relative gender performance in the non-Arabic world. It appears that most papers

studying the influence of Islam concentrate on Arab countries or a sample of countries which include Arab countries. Literature on the impact of Islam for non-Arab countries appears to be limited, if non-existent. However, one must recognize that religions are not homogeneous, monolithic entities. The practices of Islam vary both through time and by region. Thus one would expect that the impact that Islam might well vary from region to region, let alone from one point to another in time. This paper will seek to empirically analyze whether the impact of Islam on relative gender performance varies by regions of the non-Arabic world's economy. In addition, if in some regions Islam is found to have a negative impact on relative gender performance, an attempt will be made to determine what aspect of Islamic practice (not doctrine) might account for this impact. Relative gender performance is meant to capture male to female differentials and is measured in a variety of ways, which will be discussed later.

This paper is organized as follows. Section II will look at some of the literature on gender inequality and the impact of Islam in the non-Arabic world. Section III will discuss the empirical model utilized to examine the relationship between relative gender performance and variations in Islam. In Section IV, the estimation results are discussed. In Section V, the model established in Section III is extended to include fertility aspects related to Islam. Finally, Section VI will summarize the paper and present conclusions.

II. Some Literature

As stated above, the neoclassical view emphasizes the role of economic growth and development in reducing gender differentials. It does not deny that discriminatory institutions may create such differentials, however the argument is that individual firms which engage in such practices will bear additional costs, since employers will not be

hiring the most productive workers. In addition, a society that chooses not to educate or provide health care to a significant part of its population will find significant costs in terms of lost output and growth. As competition increases with economic development employers and governments not engaging in gender bias will possess a distinct advantage. This kind of analysis was first made with respect to discriminatory practices by Becker (1971). Thus in simple terms, development will tend to counteract gender discrimination and thus gender differentials would be reduced. The empirical work of Forsythe, Korzeniewicz and Durrant (2000) provides evidence in support of this proposition.

A different perspective is provided in the work of Boserup (1970). She has argued that initially economic development is likely to lead to increased gender inequality. Economic growth and development involve significant structural change to the economy. The existing institutional and cultural practices have become solidified with time, especially those specifying men's and women's roles. This is particulary true for societies with patriarchal institutional arrangements. With polarization and the creation of strong male dominated hierarchies, growth is likely to enhance gender inequality. Other studies have indicated that "while such patriarchal institutional legacies might have shaped gender inequalities and the status of women in the past, they have become displaced in recent years by world models and standards developed through the transnational environment" (Forsythe, Korzeniewicz, and Durrant, 2000). The empirical results derived in the paper support this notion.

A much more conservative viewpoint emerges from the work of Morrison and Jütting (2005). They explain gender differentials as being the result of the impact of

deep-seated, hard to change institutional structures. The kinds of institutions referred to here are cultural factors. They include the existence of polygamy, the extent to which early marriage occurs, who has dominant influence and authority over children, and the occurrence of genital mutilation (among others). The view here is that economic growth is not likely to alter these cultural practices and thus gender differentials are likely to persist. A similar viewpoint as above is found in Self and Grabowski (forthcoming) where they find that both economic development and reform of malleable institutions reduces gender inequality and promotes general gender development, but deep seated institutions limit the impact of reform and development on gender development and gender related inequality.

There is also a literature that finds Islam to be a set of practices or institutions which provide an environment for the development and persistence of gender differentials. Dollar and Gatti (1999) use various measures of gender differentials as the dependent variable and utilize a variety of right hand variables to explain these differentials. They find strong evidence that increases in per capita income lead to improvements in various measures of gender inequality. However, they also find that the Muslim variable (measuring the share of the population that follows the religion) is consistently associated with higher gender inequality.

Empirical work by Forsythe, et al. (2003) and Forsythe, Korenicwicz, and Durrant (2000) lend additional empirical support to this conclusion. They use both cross-sectional and longitudinal models to analyze this and other variables' influence on gender disparity. Economic development as measured by increases in per capita income does

reduce gender inequality, measured a number of different ways. The longitudinal models suggest that these inequalities were less likely to decline in Muslim countries.

Of course one must always be aware of the fact discussed earlier that the Muslim religion is practiced in a wide variety of forms throughout various regions of the world. In addition, research discussed earlier indicates that it might not be Islam per se that generates gender differentials, but some factor connected with being Arab. Thus in the next section of the paper an attempt will be made to determine whether the impact of Islam (in the non-Arabic world) on various measures of gender disparity does vary by region. But, before proceeding to that section of the paper, it will be useful to focus on a possible explanation for the empirical results discussed in the previous paragraphs. Perhaps the most important factor influencing the projected earnings of women is the fact of childbirth and the time required to raise children. In most of the world it is women who devote the most time to child rearing. This activity reduces the lifetime earnings possibilities for women. In addition, frequent pregnancies disrupt both formal education and the process of accumulating knowledge via experience (learning by doing).

Dharmalingam and Morgan (2004, pp. 541-542) find that "Muslims are more likely than Hindus to intend to have another child. Specifically, for those with two or more living children, Muslims are twice as likely as Hindus to intend to have another child. Furthermore, given the intent to have no more children, Muslim women are half as likely as Hindu women to use contraceptives and thus are at a higher risk of having an unwanted child." Morgan, et al. (2002) examined fertility evidence for four Asian countries: India, Malaysia, Philippines, and Thailand. The results indicate that Muslim wives, compared to non-Muslim wives, "usually have more children, are more likely to

desire additional children, and are less likely to be using contraception when they desire no more children" (p.533). Attempts were made to control for education and household consumption. This does not change the results.

The above results lead to the following hypothesis. Perhaps the fertility level characteristics of Muslim communities are the main factor leading to gender inequality. This hypothesis will be examined later in the paper. This is in addition to testing the hypothesis that the impact of Islam on gender differentials differs by region of the world.

III. Estimation Model and Data

The model to be estimated is based upon the notion that relative gender performance is a function of institutions, economic growth, culture, openness, and ethnic fragmentation. The literature discussed earlier focused on the hypothesis that rapid growth is likely to enhance gender equity, subject to existing institutions and culture. The latter two may blunt or offset the impacts of economic growth (this is similar to Boserup's analysis). In addition, the mores and values of the rest of the world can transform practices within a country if it is open to new ideas, not just open to trade. Finally, ethnic tensions are likely to pose a barrier to effective government policy making.

The empirical estimations are carried out in a cross-country framework. It is important to mention here that given the lack of variability in most of the explanatory variables and data limitations, a cross-country estimation was the only plausible estimation method. The first empirical model that will be estimated can be written as

(1) $RGP = a + b(INSTQUAL) + c(MUSIM(80)*SASIA) + d(MUSLIM(80)*SEASIA)$

$$+ e(MUSLIM(80)*AFRICA) + f(EF) + g(LANDLOCK) + h(LAMER) + i(SASIA)$$
$$+ j(SEASIA) + k(AFRICA) + \varepsilon$$

The left-hand side variable, *RGP*, is relative gender (female to male) performance and will be measured in a variety of ways, all of which will be discussed below. The right-hand side includes a variety of explanatory variables. The first is a measure of institutional quality (*INSTQUAL*). This variable is taken from Kaufman, et al. (1999a, 1999b). It is the average measure of six dimensions of quality: voice and accountability, political stability and the absence of political violence, government effectiveness, light regulatory burden, rule of law, and freedom from graft (time period 1997-1998). The argument here is that societies with better quality institutions are likely to give women greater opportunities.

Three variables are used to try and capture the regional impact of Islam. They are *MUSLIM(80)*, the proportion of population that followed Islam in 1980 (taken from La Porterba, et al. (1999), multiplied times three regional dummies: Southeast Asia *(SEASIA),* South Asia *(SASIA),* and Sub-Saharan Africa *(SSAFRICA).* The purpose here is to try to be able to identify and isolate regional variations as they relate to Islam.[1]

Another factor that is likely to influence relative gender performance, as discussed above, is ethnic fragmentation as measured by an index (*EF*). This measures the probability that two randomly selected individuals from a country are from different ethnic groups and is taken from Alesina, et al. (2003). The argument here is that ethnic

[1] Percentage of Muslim population data was gathered for 1998 from CIA and other country-specific census data. The correlation between the percentage of Muslim population in 1980 and the percentage of Muslim population in 1998 was around 98%. This implies that there has been very little change in this variable over time. Thus, trying a panel estimation with two data points or re-running the same cross-country regression with the more recent Muslim data would not add meaningfully to the results.

fragmentation is likely to result in greater instability and violence. Most often the main victims of such violence are women and children.

Finally, *LANDLOCK* is used as an explanatory variable. It is a dummy variable which takes a value of 0 if a country has open coasts on oceans or 1 otherwise (taken from Easterly and Levin, 2003). Landlocked nations are generally less open to international trade and other external influences. Thus institutions are likely to be more insular in nature and less susceptible to change through time. Thus traditional societies that are patriarchal in nature are likely to remain so with relative gender differences persisting through time.

Dummy variables for Latin America (*LAMER*), South Asia (*SASIA*), Southeast Asia (*SEASIA*), and Sub-Saharan Africa (*SSAFRICA*) are also used. These are entered into the equation to capture regional effects independent of those associated with Islam.

There are a variety of variables used to measure the relative gender performance of women to men. *GDI04* is the gender development index published in the Human Development Report for 2004. This is an index of healthy life, knowledge, and income constructed in a way that reflects inequalities between men and women. An increase in the index implies that conditions have improved for women relative to men. A gender inequality index (*GI*) has been calculated by Forsythe and Korzeniewicz (2000) and will also be utilized here. It is calculated by taking the human development index for 2004 (*HDI2004*) (which is an overall index of human development incorporating measures of healthy life, knowledge, and income) and is combined with *GDI04* in the following manner

$$GI = (HDI04 - GDI04)/HDI04,$$

where *GI* is a measure of gender inequality.

The above two measures of relative gender performance are aggregate in nature. A variety of less aggregated measures are also used. The ratio of female to male literacy (*Lit Ratio*), taken from the Human Development Report 2005, and the ratio of females to males attending secondary education (*Edu Ratio*), taken from Barro and Lee (1993), are used as measures of relative educational opportunities. In addition, the ratio of female to male life expectancy (*Lifexp Ratio*), taken from the world Health Organization, World Health Statistics 2005, and the female to male adult mortality ratio (*Mort Ratio*), taken from World Development Indicators, 2004, are used as measures of relative health. Finally, female labor force participation (*FEM LAB*) measured as a percent of the total labor force, is used to measure the extent to which women are active in the labor force and is taken from World Development Indicators, 2006.

The reader will note that *GDP* per capita (in log form, *LGDP*) does not appear in equation (1). This is because there is likely a close correlation between the institutional quality variable and *GDP* per capita. Thus equation one will be re-estimated substituting *LGDP* for *INSTQUAL*.

The data represent 68 non-Arab countries that were former colonies. The sample is very similar to that used Acemoglu, et. al. (2000) and Sylwester (2003) with the exception that Arab countries have been eliminated from the sample. Thus it includes some developed as well as less developed countries that were colonies. The list of countries included is found in Appendix 1. Table 1 provides descriptive statistics related to the variables being utilized in the analysis. The variables related to relative gender performance show that, with the exception of female to male life expectancy ratio (*Lifexp*

Ratio), all other variables show that females do relatively worse compared to males. The average crude birth rate is quite high at 35.45. Additionally, about 15% of the countries are land locked and on average 18% of the population of all countries combined follow Islam. In terms of ethnic differences one finds that there is a little over 50% possibility that any two people selected at random would belong to different ethnic groups.

Certain characteristics and patterns emerge when we look at the data regionally[2]. Here we see that in general Latin American countries fare better than the other regions in terms of measures of relative gender performance. This is followed by Southeast Asia, South Asia, and finally Sub-Saharan African countries. The ranking remains unchanged when we look at fertility rates among the countries by region. However, the ranking is a little changed when we look at other variables such as per capita GDP where Latin America is the highest, followed closely by Southeast Asia, but thereafter we find Sub-Saharan African countries in third place followed by South Asia. In terms of the proportion of the population that conforms to Islam (*Muslim(80)*) we find that Southeast Asia is the leader followed by South Asia and Sub-Saharan Africa with Latin American countries having the smallest proportion of their average population following Islam. Interestingly enough, Sub-Saharan African countries lead in terms of female labor force participation followed closely by Latin America with Southeast Asia in third place and South Asia trailing at the end. One needs to remember that female labor force participation values have not been adjusted for agricultural labor which is typically dominated by women in developing countries.

[2] Regionally segregated descriptive statistics Tables available upon request.

IV. Estimation Results

The results from estimating equation (1) are presented in Table 2A. As can be seen, the institutional quality variable is statistically significant and negative for *Mort Ratio* and statistically significant and positive for *GDI04*. Thus good quality institutions reduce female to male mortality rates and raise gender development.

(TABLE 2A Goes Here)

The *LANDLOCK* variable has a statistically significant positive effect on *GI* and *FEM LAB* and a statistically significant negative effect on *GDI04, Lifexp Ratio*, and *Edu Ratio*. Thus landlocked countries will have higher levels of gender inequality, while having lower levels of overall gender development and female to male life expectancy. However, such countries tend to have a higher female labor participation rate. This is likely due to the fact that landlocked countries are generally agricultural in nature with women heavily employed in agriculture.

The *EF* variable has a significant negative on *Lit Ratio*. Thus ethnic fragmentation lowers the female to male literacy rate.

In terms of the Muslim regional interaction terms several patterns emerge. The South Asian regional interaction term has a statistically significant negative effect on *Lit Ratio, Edu Ratio*, and *GDI04* and a statistically positive effect on *Mort Ratio*. Thus Islam in South Asia reduces the female to male literacy ratio, overall gender development, female to male secondary education attainment and increases the female to male mortality ratio.

For Sub-Saharan Africa the *MUSLIM(80)* interaction term has a statistically significant negative effect on *Lit ratio* and *GDI04*, while having a significant positive

impact on *GI*. Thus in Sub-Saharan Africa, Islam is associated with a reduced ratio of female to male literacy and reduced gender development. It is also associated with an increase in gender inequality.

For Southeast Asia the *MUSLIM(80)* interaction term has a statistically significant negative effect on *Edu Ratio* and *Mort Ratio*, but a statistically significant positive effect on *GDI04*. Thus Islam in Southeast Asia reduces the female to male mortality ratio and raises overall gender development while lowering female to male secondary enrollment.

These results indicate that there is a regional pattern in terms of the impact of Islam on relative gender performance. Both South Asia and Africa seem to represent regions in which Islam has negative effects on relative gender performance. However, in Southeast Asia Islam would seem to have a beneficial impact on at least some measures of relative gender performance.

Table 2B contains the results of re-estimating equation (1) by substituting *LGDP* for *INSTQUAL*. Since *GDP* per capita is part of the *GDI04* and *GI* variables, these two left-hand side variables were dropped. Looking at *MUSLIM(80)* and *SASIA* one can see that there are significant negative signs for *Lit Ratio* and *Edu Ratio*, and a significant positive sign on *Mort Ratio*. Thus in South Asia, Islam is associated with a lower female to male literacy, a lower female to male secondary enrollment ratio, and a higher ratio of female to male mortality.

For Sub-Saharan Africa the *Muslim(80)* interaction term has a statistically significant negative sign for *Lit Ratio* and *Mort Ratio*. Thus Islam in this region is associated with a relative decline in female literacy and a decline in female to male mortality.

In Southeast Asia, the *Muslim(80)* interaction term has a negative and significant sign for *Lit Ratio* and *Edu Ratio*. Thus Islam is associated with declines in female to male literacy and female to male secondary enrollment.

Finally, *LGDP* has significant positive signs for *Lit Ratio*, *Edu Ratio*, *Lifexp Ratio*, and *Mort Ratio*. Thus growth is associated with improvements in relative gender performance almost across the board, after controlling for other relevant influences.

The results here are different from those utilizing *INSTQUAL*. These show that once we control for income, Islam in Southeast and South Asia is associated with reductions in the relative position of women. However, in Sub-Saharan Africa Islam lowers the female to male mortality ratio.

In summary, Islam is associated with negative impacts on relative gender performance in various regions with the type of impact varying from region to region. There also appears to be strong evidence that in *GDP* per capita is associated with positive improvements in relative gender performance.

V. Relative Gender Performance, Regional Variation in Islam, and Fertility Rates

As mentioned in the introduction, the impact of Islam on relative gender performance may very well be related to the impact of the religion on birth rates. That is, previous studies have found a distinctive demographic pattern for Muslim groups. A number of scholars have argued that Islam is characterized by relatively high fertility rates and that these rates do not decline rapidly with economic growth. Fertility is a primary determinant of human capital accumulation (both formal and informal) and the earnings profile likely to be attained by females. As a result, it is hypothesized that the fertility behavior associated with Islam may be critical in terms of its impact on relative

gender performance. In order to determine whether this characteristic is indeed important, the following equation is also estimated:

(2) $RGP = a + b(INSTQUAL) + c(MUSLIM(80)*BIRTHAV) + d(MUSLIM(80)*SASIA) + e(MUSLIM(80)*SEASIA) + f(MUSLIM(80)*AFRICA) + g(EF) + h(LANDLOCK) + i(LAMER) + j(SASIA) + k(SEASIA) + \ell(AFRICA) + \varepsilon.$

The additional variable included in this equation is the interaction term multiplying *MUSLIM(80)* times *BIRTHAV*. The latter variable measures the average crude birth rate for each country from 1975 to 1995 and is taken from La Porterba (1999). Ideally, it would have been best to have the crude birth rate for the Muslim part of the population. However, this data was not available.

One needs to address possible reverse causality and endogeneity issues between the *MUSLIM(80)*BIRTHAV* variable and the dependent variables. The *MUSLIM(80)* variable is not the cause for concern, but the *BIRTHAV* variable which measures the average crude birthrate from 1975 to 1995 may be endogenous to the other measures of relative gender performance and inequality. The reverse causality issue is addressed by the choice of year(s) for the variables. The *BIRTHAV* variable relates to a period prior to the period for all of the different dependent variables. Thus there is no concern relating to gender inequality having an impact on birth rates in prior years. However, endogeneity concerns cannot be addressed by choice of year. In order to test for endogeneity and whether an OLS or an instrumental variables analysis would be the most appropriate estimation method, an augmented regression test (Durbin-Wu-Hausman Test) is carried out. This is a procedure suggested by Davidson and Mackinnon (1993). This is carried out by including the residuals of each endogeous right-hand side variable, as a

function of all exogenous variables, in a regression estimation of the original model. This will indicate for which left-hand side variables an instrumental variable analysis should be utilized. Two other variables with endogeneity concerns would be the *INSTQUAL* and the *LGDP* variable. One could argue that countries with higher institutional quality and/or higher standard of living would have less gender inequality and vice versa. The same test will be performed for the *INSTQUAL* and *LGDP* variables.

The results of the estimating equation (2) are presented in Tables 3A and 3B. It includes *MUSLIM(80)*BIRTHAV* as a variable, where *BIRTHAV* is the average crude birthrate for each country (1975-1995). Ideally, this would represent just the birthrate for the Muslim population, but this is not available.

(TABLE 3A Goes Here)

As can be seen, some very interesting results emerge. The variable *MUSLIM(80)*BIRTHAV* has a statistically significant negative effect on *Lit Ratio*, *GDI04*, and *Lifexp Ratio*. It has a statistically significant positive effect on *GI*. Thus Muslim countries characterized by rapid population growth are associated with reduction in female to male literacy rates, overall gender development, and female to male life expectancy. Alternatively, it is associated with increases in gender inequality.

Looking at the regional interaction results for *MUSLIM(80),* a number of additional interesting results emerge. All three regional interaction terms are positive and statistically significant for *GDI04* and *Lifexp Ratio*. All three variables are negative and statistically significant for *GI*. Thus Islam in all regions improves overall gender development and the ratio of female to male life expectancy. In all three regions Islam reduces the gender inequality. In South Asia and Sub-Saharan Africa Islam is associated

with increases in the female to male literacy rate and in Southeast Asia Islam is associated with reductions in the female to male mortality ratio. None of the Muslim interaction variables have a significant impact on *Edu Ratio* or *FEM LAB*.

In summary, once one accounts for the high birth rates associated with Muslim nations, the negative impact of Islam on relative gender performance disappears. The implication is that the negative impact of Islam on relative gender performance found in the first set of estimations is related to its impact or relationship with high birthrates. In addition, regional differences persist.

As discussed in the previous section, there are some endogeneity issues with respect to *MUSLIM(80)*BIRTHAV, INSTQUAL* , and *LGDP* that must be dealt with. Durbin-Wu-Hausman tests were conducted for the *Muslim(80)*BIRTHAV* variable. These results indicate endogeneity with the variable measuring female to male literacy(*Lit Ratio).* With respect to the *INSTQUAL* variable the Durbin-Wu-Hausman test indicates that there are no endogeneity problems with any of the dependent variables. With respect to the *LGDP* variable the Durbin-Wu-Hausman test indicates that endogeneity problems exist with the variable measuring female to male literacy (*Lit Ratio).*

The results of the instrumental variables analysis is presented in Table 4. Given the difficulty of finding instruments to carry out the analysis, the model has been simplified by eliminating the regional dummy variables, *LANDLOCK, INSTQUAL*, and *EF*. The instrument used for *MUSLIM(80)*BIRTHAV* was settler mortality rates, which comes from Acemoglu, Johnson, and Robinson (2001). The instrument used for *LGDP* was a dummy variable which took the value one if the country was a tropical country and

zero otherwise. Both instruments are exogenous to the dependent variables since one is historical in nature while the other is geographical. In order to carry out the instrumental variables analysis, two-stage least squares regression is carried out with heteroscedasticity consistent standard errors. This addresses the question whether *MUSLIM(80)*BIRTHAV* and *LGDP,* as explained by the exogenous instrumental variables, explain cross-country differences in the dependent variable *Lit Ratio*. The instrumental variables results in Table 4 are consistent with the earlier OLS results and show that indicate that *MUSLIM(80)*BIRTHAV* has a negative and statistically significant impact on *LIT RATIO* while *LGDP* has a positive and statistically significant impact on *Lit Ratio,* after accounting for endogeneity issues.

The estimation results represented in Table 3A are recalculated using *GDP* per capita as a substitute for *INSTQUAL*. These results are presented in table 3B. Once again the negative effects on relative gender performance disappear, for the most part, in all regions. Only in Southeast Asia is there any detrimental effect associated with Islam. There it is associated with a statistically significant reduction in the secondary enrollment ratio of women to men.

VI. Summary and Conclusion

This paper sought to examine those variables which influence relative gender performance, measured a variety of different ways. Particular emphasis was placed on analyzing the impact of Islam (in the non-Arabic world) with the purpose of determining whether there were regional variations in its impact.

Generally, improvements in institutional quality and *GDP* per capita tended to be associated with improvements in relative gender performance while ethnic fragmentation

and being landlocked tended to worsen relative gender performance. Islam is associated with different effects in different regions, most of them inimical to relative gender performance

Since there is a literature that argues that birthrates in Muslim countries are high, an attempt was made to determine whether this aspect of Islam accounted for the negative impact on gender performance in several regions. Indeed this does seem to be the case. Once this aspect is accounted for, Islam in all three regions had a positive impact on relative gender performance (with the exception of *Edu Ratio* in South East Asia).

References:

Acemoglu, D., S. Johnson, and J.A. Robinson, 2001, "The Colonial Origins of Comparative Development," *American Economic Review*, 19 (5), pp. 1369-1401.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, and R. Wacziang, 2003, "Fractionalization," *Journal of Economic Growth* 8(2), pp. 155-199.

Barro, R. and J.W. Lee, 1993, "International Comparisons of Educational Attainment," *Journal of Monetary Economics*32, pp. 362-394.

Becker, G.S., 1971, *The Economics of Discrimination* (Chicago: University of Chicago Press).

Boserup, E., 1970, *Women's Role in Economic Development* (New York: St. Martins Press).

Davidson, R. and J.G. Mackinnon, 1993, *Estimation and Inference in Econometrics* (New York: Oxford University Press).

Dharmalingam, A. and P. Morgan, 2004, "Pervasive Muslim-Hindu Fertility Differences in India," *Demography* 41(3), pp. 527-545.

Dollar, D. and R. Gatti, 1999, "Gender Inequality, Income, and Growth: Are Good Times Good for Women?" The World Bank, Development Research Group.

Donno, D. and B. Russett, 2004, "Islam and Authoritarianism and Female Empowerment: What are the Linkages?", *World Politics* 56, pp. 582-607.

Easterly, W. and R. Levine, 2003, "Tropics, Germs and Crops: How Endowments Influence Economic Development," *Journal of Monetary Economics* 50, pp. 3-39.

Fish, S., 2002, "Islam and Authoritarianism," *World Politics* 55, pp. 4-37.

Forsythe, N., R.P. Korzeniewicz and V. Durrant, 2000, "Gender Inequalities and Economic Growth: A Longitudinal Evaluation," *Economic Development and Cultural Change* 48, pp. 573-617.

Forsythe, N., R.P. Korzenicwicz, N. Majid, G. Weathers, and V. Durrant, 2003, "Gender Inequalities, Economic Growth, and Economic Reform: A Preliminary Longitudinal Evaluation," Employment Paper 2003/45, International Labour Office, Geneva.

Kaufman, D., A. Kraay, and P. Zoido-Lobatón, 1999a, "Aggregating Governance Indicators," World Bank Research Working Paper 2195.

Kaufman, D., A. Kraay, P. Zoido-Lobatón, 1999b, "Governance Matters," World Bank Research Working Paper 2196.

La Porterba, R., F. Lopez-de-Silances, A. Shleifer, and R.W. Vishny, 1999, "The Quality of Government," *Journal of Law, Economics, and Organization* 15, pp. 222-279.

Morgan, P. S. Stash, H.L. Smith, and K.D. Mason, "Muslim and Non-Muslim Differences in Female Autonomy and Fertility: Evidence From Four Asian Countries," *Population and Development Review* 28(3), pp. 515-537.

Noland, M., 2005, "Explaining Middle Eastern Authoritarianism," Working Paper Number WP 05-5, Institute for International Economics

Self, S. and R Grabowski," Gender Development, Institutions and Level of Economic Development," *Review of Development Economics* (Forthcoming).

Tables

Table 1: Descriptive Statistics

	GDI04	*GI*	*Lit Ratio*	*Edu Ratio*	*Lifexp Ratio*	*Mort Ratio*	*Fem Lab*	*Muslim(80)*	*EF*	*Landlock*	*Birthav*
Mean	0.64	0.01	0.82	0.75	1.06	0.75	40.88	18.03	0.55	0.15	35.45
Median	0.69	0.01	0.87	0.78	1.06	0.76	41.66	1.50	0.61	0.00	36.02
Maximum	0.95	0.05	1.09	1.38	1.12	1.12	52.16	99.40	0.93	1.00	51.21
Minimum	0.28	-0.09	0.37	0.20	1.01	0.43	26.48	0.00	0.04	0.00	15.07
Std. Dev.	0.19	0.02	0.19	0.33	0.03	0.18	5.95	28.77	0.25	0.36	10.76
Observations	63	60	61	49	63	67	68	68	68	68	68

Table 2A: OLS Results with Institutional Quality

	GDI04	*GI*	*Lit Ratio*	*Edu Ratio*	*Lifexp Ratio*	*Mort Ratio*	*FemLab*
Instqual	0.02**	0.001	0.01	0.02	0.001	-0.02**	-0.01
T stat	*(2.22)*	*(0.84)*	*(1.43)*	*(0.97)*	*(0.46)*	*(-1.9)*	*(-0.02)*
*MUSLIM(80)*SASIA*	-0.002**	0.002	-0.003**	-0.005*	-0.0002	0.003***	0.02
T stat	*(-2.16)*	*(1.13)*	*(-2.36)*	*(-1.6)*	*(-0.88)*	*(4.03)*	*(0.4)*
*MUSLIM(80)*SEASIA*	0.01*	-0.0003	-0.005	-0.02**	0.001	-0.02***	-0.38**
T stat	*(1.64)*	*(-0.77)*	*(-1.28)*	*(-2.26)*	*(1.02)*	*(-3.93)*	*(-2.02)*
*MUSLIM(80)*SSAFRICA*	-0.002**	0.0003**	-0.003***	-0.001	0.0001	-0.0002	-0.02
T stat	*(-2.87)*	*(1.98)*	*(-3.47)*	*(-0.86)*	*(0.85)*	*(-0.4)*	*(-1.04)*
EF	-0.038	0.01	-0.14**	-0.13	-0.01	0.08	-1.03
T stat	*(-0.57)*	*(1.14)*	*(-2.68)*	*(-0.96)*	*(-0.67)*	*(0.82)*	*(-0.32)*
LANDLOCK	-0.08**	0.01**	-0.06	-0.18**	-0.02***	0.04	6.06***
T stat	*(-1.9)*	*(2.19)*	*(-1.09)*	*(-2.56)*	*(-3.2)*	*(1.19)*	*(4.62)*
LAMER	-0.02	0.007	0.11**	0.47***	0.03**	-0.11	-5.93**
T stat	*(-0.33)*	*(1.57)*	*(2.31)*	*(3.28)*	*(1.97)*	*(-1.63)*	*(-1.92)*
SASIA	-0.05	0.02	-0.006	0.14	-0.01	-0.16	-14.82***
T stat	*(-0.39)*	*(0.94)*	*(-0.04)*	*(0.48)*	*(-0.47)*	*(-1.62)*	*(-3.8)*
SEASIA	-0.38	0.02	0.29	0.69**	-0.04	0.9***	10.19
T stat	*(-1.48)*	*(0.77)*	*(1.3)*	*(1.9)*	*(-0.67)*	*(3.04)*	*(0.93)*
SSAFRICA	-0.21**	-0.004	-0.04	0.1	-0.01	0.15	-1.82
T stat	*(-2.38)*	*(-0.26)*	*(-0.62)*	*(0.59)*	*(-0.6)*	*(1.45)*	*(-0.48)*
n	58	55	58	46	60	62	63
R-Square	0.76	0.27	0.71	0.68	0.56	0.68	0.46

Note: Constant term included in estimation but results not presented; * , **, *** stand for statistical significance at 90%, 95% and 99% respectively.

Table 2B: OLS Results with Per Capita GDP

	Lit Ratio	*Edu Ratio*	*Lifexp Ratio*	*Mort Ratio*	*FemLab*
LGDP	0.04**	0.08**	0.01**	-0.08***	-0.84
T stat	*(2.41)*	*(1.92)*	*(2.1)*	*(-4.41)*	*(-1.25)*
*MUSLIM(80)*SASIA*	-0.003**	-0.004*	-0.0001	0.002***	0.02
T stat	*(-2.73)*	*(-1.8)*	*(-0.89)*	*(7.36)*	*(0.35)*
*MUSLIM(80)*SEASIA*	-0.01**	-0.03**	-0.0002	-0.01	-0.18
T stat	*(-2.01)*	*(-2.64)*	*(-0.16)*	*(-1.5_*	*(-0.9)*
*MUSLIM(80)*SSAFRICA*	-0.002**	0.00006	0.0002	-0.001**	-0.02
T stat	*(-2.87)*	*(0.04)*	*(1.5)*	*(-2.47)*	*(-0.99)*
EF	-0.12**	-0.08	-0.01	0.07	-1.6
T stat	*(-2.44)*	*(-0.62)*	*(-0.53)*	*(1.02)*	*(-0.51)*
LANDLOCK	-0.04	-0.16**	-0.01*	-0.01	5.29***
T stat	*(-0.92)*	*(-2.28)*	*(-1.8)*	*(-0.25)*	*(4.002)*
LAMER	0.09**	0.37***	0.03***	-0.15***	-6.45***
T stat	*(2.7)*	*(4.15)*	*(4.16)*	*(-3.99)*	*(-2.9)*
SASIA	0.004	0.12	0.003	-0.27***	-16.48***
T stat	*(0.03)*	*(0.47)*	*(0.24)*	*(-4.8)*	*(-5.51)*
SEASIA	0.46**	1.21**	0.02	0.21	0.32
T stat	*(1.97)*	*(2.26)*	*(0.48)*	*(0.75)*	*(0.03)*
SSAFRICA	-0.02	0.05	0.002	-0.01	-3.91
T stat	*(-0.35)*	*(0.42)*	*(0.15)*	*(-0.1)*	*(-1.22)*
n	61	48	63	66	67
R-Square	0.73	0.71	0.58	0.77	0.46

Note: Constant term included in estimation but results not presented; * , **, *** stand for statistical significance at 90%, 95% and 99% respectively.

Table 3A: OLS Results with Fertility Rates and Institutional Quality

	GDI04	*GI*	*Lit Ratio*	*Edu Ratio*	*Lifexp Ratio*	*Mort Ratio*	*FemLab*
INSTQUAL	0.02**	0.001	0.01	0.02	0.001	-0.02**	-0.03
T stat	*(2.55)*	*(0.7)*	*(1.61)*	*(0.95)*	*(0.58)*	*(-1.93)*	*(-0.06)*
*MUSLIM(80)*BIRTHAV*	-0.003***	0.00003**	-0.0003**	-0.00001	-0.00005**	0.0001	-0.005
T stat	*(-2.99)*	*(2.6)*	*(-2.63)*	*(-0.07)*	*(-2.51)*	*(0.73)*	*(-1.08)*
*MUSLIM(80)*SASIA*	0.01**	-0.001**	0.008*	-0.004	0.002**	-0.002	0.25
T stat	(2.38)	(-2.1)	(1.8)	(-0.42)	(2.27)	(-0.28)	(1.15)
*MUSLIM(80)*SEASIA*	0.01***	-0.001**	0.002	-0.02	0.003***	-0.02***	-0.22
T stat	(3.74)	(-2.65)	(0.6)	(-1.6)	(3.5)	(-5.54)	(-1.03)
*MUSLIM(80)*SSAFRICA*	0.01**	-0.001*	0.01**	-0.001	0.003**	-0.005	0.21
T stat	(2.64)	(-1.83)	(2.08)	(-0.06)	(2.7)	(-0.78)	(1.006)
EF	0.02	0.0006	-0.08	-0.13	0.002	0.05	0.3
T stat	(0.29)	(0.13)	(-1.58)	(-0.82)	(0.21)	(0.56)	(0.09)
LANDLOCK	-0.03	0.008	-0.02	-0.17**	-0.01**	0.02	6.76***
T stat	(-0.81)	(1.14)	(-0.32)	(-2.36)	(-2.02)	(0.55)	(4.73)
LAMER	-0.03	0.01**	0.08*	0.47***	0.02**	-0.1	-6.25**
T stat	(-0.53)	(2.19)	(1.83)	(3.19)	(1.93)	(-1.6)	(-2.06)
SASIA	-0.09	0.02	-0.06	0.14	-0.02	-0.14	-15.91***
T stat	(-0.78)	(1.31)	(-0.43)	(0.45)	(-1.1)	(-1.51)	(-4.15)
SEASIA	-0.35)	0.01	0.29	0.68*	-0.04	0.91***	9.49
T stat	(-1.62)	(0.67)	(1.4)	(1.85)	(-0.8)	(3.26)	(0.86)
SSAFRICA	-0.26***	0.003	-0.09	0.09	-0.02	0.17**	-2.9
T stat	(-3.37)	(0.22)	(-1.5)	(0.52)	(-1.5)	(1.95)	(-0.8)
n	58	55	58	46	60	62	63
R-Square	0.81	0.31	0.74	0.67	0.61	0.68	0.46

Note: Constant term included in estimation but results not presented; * , **, *** stand for statistical significance at 90%, 95% and 99% respectively.

Table 3B: OLS results with Fertility and Per Capita GDP

	Lit Ratio	*Edu Ratio*	*Lifexp Ratio*	*Mort Ratio*	*FemLab*
LGDP	0.03**	0.09**	0.005**	-0.08***	-0.95
T stat	*(2.28)*	*(1.9)*	*(1.95)*	*(-4.42)*	*(-1.4)*
*MUSLIM(80)*BIRTHAV*	-0.0002**	0.0002	-0.00005**	0.00001	-0.01*
T stat	*(-2.37)*	*(0.83)*	*(-2.98)*	*(0.16)*	*(-1.71)*
*MUSLIM(80)*SASIA*	0.01	-0.01	0.002**	0.002	0.31*
T stat	(1.47)	(-1.26)	(2.72)	(0.44)	(1.74)
*MUSLIM(80)*SEASIA*	-0.002	-0.03**	0.002**	-0.008	0.05
T stat	(-0.37)	(-2.25)	(2.07)	(-1.6)	(0.2)
*MUSLIM(80)*SSAFRICA*	0.007*	-0.008	0.003***	-0.002	0.29
T stat	(1.86)	(-0.82)	(3.22)	(-0.4)	(1.6)
EF	-0.07	-0.12	0.005	0.06	0.004
T stat	(-1.34)	(-0.78)	(0.51)	(0.99)	(0.001)
LANDLOCK	-0.02	-0.18**	-0.007	-0.008	5.86***
T stat	(-0.48)	(-2.67)	(-0.98)	(-0.27)	(4.22)
LAMER	0.07*	0.38***	0.03***	-0.15***	-6.97***
T stat	(1.8)	(4.52)	(3.4)	(-3.96)	(-3.23)
SASIA	-0.05	0.15	-0.01	-0.27***	-18.16***
T stat	(-0.45)	(0.62)	(-0.78)	(-4.71)	(-6.08)
SEASIA	0.41*	1.25**	0.01	0.21	-1.55
T stat	(1.8)	(2.22)	(0.24)	(0.78)	(-0.14)
SSAFRICA	-0.08	0.1	-0.01	-0.004	-5.54*
T stat	(-1.05)	(0.68)	(-1.04)	(-0.06)	(-1.71)
n	61	48	63	66	67
R-Square	0.75	0.71	0.63	0.77	0.47

Note: Constant term included in estimation but results not presented; * , **, *** stand for statistical significance at 90%, 95% and 99% respectively.

Table 4: IV Results

	Lit Ratio
*MUSLIM(80)*BIRTHAV*	*-0.00005***
T Stats	(-2.67)
LGDP	0.05**
T Stats	*(2.93)*

Note: Constant term included in estimation but results not presented; * , **, *** stand for statistical significance at 90%, 95% and 99% respectively.

Appendix 1

List of Countries

ANGOLA
ARGENTINA
AUSTRALIA
BAHAMAS, THE
BANGLADESH
BARBADOS
BELIZE
BENIN
BOLIVIA
BRAZIL
BURKINA FASO
BURUNDI
CAMEROON
CANADA
CENTRAL AFRICAN REPUBLIC
CHAD
CHILE
COLOMBIA
CONGO
COSTA RICA
COTE D'IVOIRE
DOMINICAN REPUBLIC
ECUADOR
EL SALVADOR
ETHIOPIA
FIJI
GABON
GAMBIA, THE
GHANA
GUATEMALA
GUINEA
GUYANA
HAITI
HONDURAS
HONG KONG
INDIA
INDONESIA

JAMAICA
KENYA
MADAGASCAR
MALAYSIA
MALI
MALTA
MAURITANIA
MAURITIUS
MEXICO
NEW ZEALAND
NICARAGUA
NIGER
NIGERIA
PAKISTAN
PANAMA
PAPUA NEW GUINEA
PARAGUAY
PERU
RWANDA
SENEGAL
SIERRA LEONE
SINGAPORE
SOUTH AFRICA
SRI LANKA
SURINAME
TANZANIA
TRINIDAD AND
TOBAGO
UGANDA
UNITED STATES
URUGUAY
VENEZUELA