Gender Inequality and Economic Growth: A Cross-Sectional Analysis of Muslim Countries

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Abstract

Although literature on the relationship between gender inequality and economic growth is vast, no study has been carried out exclusively in the context of the Muslim countries of the world. This study fills this gap by seeking to provide empirical evidence regarding the impact of gender-bias in Muslim countries on their GDP per capita. In addition, it also analyses factors that explicate the gender-bias in Muslim countries based on economic theories. Using cross-country regression analysis this study finds that there is a significant negative relation between female labour force participation and the GDP per capita. However, the result varies from continent to continent reflecting different cultural attitude. Female literacy rate is positively associated with the GDP while female-to-male income ratio has significant impact on GDP per capita.

Keywords: Gender inequality, economic growth, human capital, female literacy rate, and
female labour force participation

JELClassification Codes: O11, O15, O40, O47, O57

I. Introduction

Culture is not an inelastic entity and is subject to historical and social conditions in which societies live. While religions have a core argument/system/belief which is essentially immutable yet religions like Judaism and Islam for example, have governing laws regarding every aspects of life.[1] There is a grave economic consequence when societies borrow an element from religion and fuse it disproportionately with their culture and then try to portray it as a religious norm.[2] A classic instance of this is the Islamic civilisation which flowered in the Middle Ages in every domain of knowledge from metaphysics to alchemy to fine arts, drawing inspirations directly from the statements of the Qur'an and the Hadith.[3] Then it must be a sophisticated irony that in the last couple of centuries Muslim

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[1] In Islam the Divine Law governing every aspects of life is known as Sharee'ah while in Judaism it is known as Halaka.

[2] For ^example, conservative Muslim societies think women should always stay at home and even should not go to mosque as it may expose her to men but the Prophet explicitly orders men to allow women to go to mosque. (see Sahih Bukhari Vol 3, page 335)

[3] Seeking Knowledge is obligatory upon every Muslim'-a oft-quoted saying of The Prophet. The most famous Hadith book(Bukhari) has a special section named 'Book of Knowledge'. Numerous references are found in Qur'an e.g. the Qur'an - 35:28; 3:18; 58:11; 49:13; 20:114, emphasising the value of knowledge. Frank Rosenthal's(2006)''*Knowledge Triumphant: The Concept of Knowledge in Medieval Islam,''* is a classic book accounting all the theories of knowledge and education based on the Qur'an and the Hadith literature.

nations have discouraged and at times even resisted female education and employment and all that has to do with sound development resulting in rebellious personalities like Begum Rokeya (d. 1932) in the subcontinent who struggled for the Gender Equality in education from within the religious tradition.

This is where this study concerns itself- on the one hand it seeks to provide empirical evidence regarding the impact of gender-bias in Muslim countries on GDP per capita and on the other, what factors explicate the gender-bias in Muslim countries based on economic theories and facts. Certain studies e.g. Dollar and Gatti (1999a) find that countries associated with Islamic faith are prone to greater gender inequality. A recent article in *The Economist* (2010)[4] argues that societies that obstruct women's economic involvement would pay a heavy price in the form of lost 'human capital.' However, it also points out havoc caused by the excessive form of feminism[5] – the worst victim being the poor children deprived of parents' care and the next generation as e.g. in Switzerland, 40% of professional women are childless and rejects motherhood entirely.[6] The economic consequence is of course a decline in the future labour force and a diminishing return to human capital and negative externalities since child-rearing is linked to all these.[7]

Interestingly, Muslim countries offer a different perspective to the situation encountered in the West. Firstly, it is a society in which religion plays a dominant role from the economic policy to the personal life of its adherents. Secondly, in the last couple of decades, nearly all Muslim countries have experienced change in literacy rates, female participation in labour force and an upward pressure to reform policies regarding the Gender equality.[8] Thirdly, an interesting factor concerning Muslim countries is that these nations are not 'monolithic' as is generally thought by the western intelligentsia. Like Christianity, Islam has spread all over the globe from Morocco to Bosnia to Indonesia. A crucial implication of this is that countries differ enormously in terms of their female literacy rates, female labour etc. depending on the region they are located.[9] Finally, according to the analysis of this study, there is a fusion of religion and culture in these countries as regards the gender-issue to the extent that officials who execute economic policies frequently face challenging situations hence a sound economic policy is often hindered. All these reasons necessitate a careful examination of the relationship between gender and GDP per capita.

Using the cross-country regression analysis this study finds that there is a significant negative relation between female labour force participation and GDP per capita. However, the result varies from continent to continent reflecting different cultural attitude. Female literacy rate is positively associated with the GDP while female-to-male income ratio has significant impact on GDP per capita.

The fundamental questions that this study seeks to answer are formulated as follows:
1) What factors explain the gender-bias in Muslim countries?
2) To what extent Gender-inequality affect GDP per capita?

The remainder of this study is organised as follows: section II explains the theory and hypotheses pertaining to gender-equality and development; section III outlines the sources and nature of the data used; section IV illustrates the statistics and its result, while section V summarises and draws policy implications.

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[4] page-7.Vol 394, No 8663, Jan2-8,2010
[5] Feminism that only fights for Women's Right without giving concern to various side effects on others e.g. children.
[6] *Ibid,* page 49-51.
[7] Children are dependent on their mothers. They need proper care otherwise there are various social –hazards if they are spoiled. If women reject motherhood then birth-rates would shrink to an extent that may threaten future labour supply.
[8] By Gender-equality we mean equal opportunity in education and labour-wage.
[9] As stated earlier Religion encourages educating and fair-dealing but cultural superstitions and economic misery prevents societies to be otherwise. That is why European Muslim countries have anhigh literacy rate in comparison with the Arab World.

II. Gender Inequality and Growth: Theoretical Framework

As a result of the contribution made by numerous feminist economists there is a vast literature available at disposal on the negative relation between gender-inequality and GDP growth and other economic benefits such as externalities (see e.g. Hill and King 1995; Dollar and Gatti 1999; Knowles, Lorgelly and Owen 2002; Klasen, 1999 and 2002; Abu-Ghaida and Klasen 2004, Klashen and Lamanna, 2008a). However, none of the previous studies to our knowledge have focused exclusively on the Muslim countries. Gender-inequality is difficult to define in a Muslim context owing to the fact that Muslims believe that the economic responsibilities of managing family generally rest on man.[10] Thus contrary to the Western norm it is expected that male percentage of the labour force would be higher but there is an important cultural dimension associated with it. Thus the average female percentage of labour force in Asian Muslim countries is - 35.35, that of Europe - 43.9, that of Africa - 40.57 and that of Arab world - 20.14. Similarly, the mean female literacy rate in Muslim nations of Asia is 72.09, those of Europe-96.21, those of Africa- 47.7, and those of Arab World- 78.5, again reflecting cultural variation and perhaps also the poor economic conditions. Arab countries are comparatively conservative while Africans are mostly poor (so both male and female are required to work), and European Muslim do not face any cultural barriers and Asian Muslims rather fare in-between.

The main theory that seeks to explain the relation between gender equality and economic growth is the 'human capital' theory (Becker, 1964). It is argued that the innate intellectual[11] (not physical) abilities of male and female are same. Therefore when a less qualified male is preferred over a comparatively higher qualified female there is an artificial restriction on the pool of talent that subsequently harms the economic performance (Dollar and Gatti, 1999b). But this may not hold true if the unemployment rate is very high which happens to be the case in many Muslim countries.[12] With regard to education, increase in literacy rates would reduce fertility levels; promote health for the child as well as for the society by making mothers more aware about the fruit of gaining education. Many East Asian countries (including the Muslim ones) have achieved rapid growth in export sector using low-paid female workers (see e.g. Seguino, 2000). This is an instance where Gender-inequality rather than equality stimulates growth. Other studies as well find similar results (see Erturk and Cagatay, 1995; Standing, 1999). A number of Economists (e.g. Haddad, Hoddinott, and Alderman 1997; King, Klasen, and Porter 2008) demonstrate that the earnings of female enhance their bargaining power within the family that can have a range of growth-promoting effects as women's saving and consumption patterns are different from that of man (e.g. Stephanie Seguino and Maria Sagrario Floro 2003). The analysis of present study is in harmony with the results found in (Seguino, 2000) regarding inequality in the labour force.

Most of the aforementioned arguments are consistent with our hypothesis that Muslim countries, in contrast to the Western countries, have a variegated relation between the Gender-inequality and GDP per capita. Component wise, the coefficient of female-workforce will be significantly negative while that of female literacy rate and earnings ratio will be positively associated with GDP per capita (rather weakly). While testing these hypotheses this research is expected to encounter the problem of Heteroskedasticity as the scatter diagrams show the dispersion of potential disturbance terms which is typical in cross-country regression. Our model also suffers from the lack of sophisticated variables usually found in such in-depth analysis. Increase in educational attainment takes time to assimilate in the labour force in order to affect the growth but our regression model is confined to a period of one year since it is a cross-country analysis. Finally, there is a wide variation in the figures collected for various variables e.g. Arab countries have higher growth but lower percentage

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[10] According to Islamic tradition Economic responsibility of providing the family falls on father and managing inside household activities including educating children lies on the shoulder of mother.

[11] Although these studies do not mention 'intellectual ability' by name; we believe that men and women are equal in this respect.

[12] According to World Bank.com

of female labour as opposed to African countries, so the coefficient of female labour will not be uniform for all countries. Similar situation is expected for female literacy rate although to a much lower extent.

III. Data

There are over fifty Muslim countries in the world. In addition, Muslims live in large number in some countries notably in India (over 160 millions) but also in China (about 20 millions) and in the United States. However, for the purpose of present study, it was decided to include only those countries that have an official recognition as a Muslim nation and a predominant Muslim populace. Under these considerations, the researcher finds it prudent to confine the sample within the OIC (Organisation of Islamic Conference) members. However, for few countries some data were unavailable so it was decided to restrict the sample only for 50 countries out of the OIC's 57 members.

All data are cross-sectional data and they are collected from the year 2007. The sample covers only for one year. For the variable 'female literacy rate' the data is assembled from the World Bank website. Female literacy rate is measured as number of literate women per 100. 'Female percentage of labour force' is measured in % (percentage) and its data is also collected from the World Bank. However, in Muslim countries women have significant household economic activities that are seldom accounted for statistical calculation. Therefore, *'femlbr'* variable may be understated. 'Female-to-male' earnings ratio is the ratio of estimated female income to estimated male income in (US\$ PPP) measured using points covering the range from 0 to 1. Their data is collected from UNDP website. Finally, the GDP per capita data is collected from CIA fact book website and it is measured in PPP (US\$). Below is a summary of the data used in regression:

Figure 1: Summary of the data used in regression

Variable	Obs	Mean	Std. Err.	[95% Conf. Interval]
IGDPM	50	8.349264	.1752796	7.997027 8.701502
Femlitcy	50	67.718	3.596108	60.49135 74.94465
femlbr	50	35.432	1.612306	32.19195 38.67205
lf2minc	50	-.8883997	.0618294	-1.012651 -.7641489

IGDPM is the log of GDP per capita and its mean is 8.35 with a Standard Error of 0.175. *Femlitcy* has relatively high Std. Err. of 3.59 compared to its mean 67.7. This is because some African countries have a very low literacy rate e.g. 18.2, 21 etc. The variation in *femlbr* var. is explained by the fact that Arab countries all together have very low mean- 20.14 compared to the overall mean of other nations which is 35.43. The trends in *f2minc* also show variation as maximum value is 0.9 while minimum value is 0.16. The correlation between dependent and explanatory variables is positive except for the *femlbr*.

IV. Statistics for Cross-section Analysis and Findings

Independent variables: the independent variables in regression are female literacy rate, percentage of female labour force and female to male income ratio. Earlier works (e.g. (Klashen and Lamanna ,2008b) focused on years of secondary education, primary schooling etc. as educational variables whereas this study has chosen the literacy rate instead, chiefly because all Muslim countries are developing countries in which the literacy rate has a significant impact on the GDP as remarked by (Sing, 2009).Other RHS (right hand side) variables are standard measures of gender-inequality on growth. Log GDP per capita income is the dependent variable.

The main regression model used is depicted below:

$$lGDPM = \propto + \beta_1 femlitcy - \beta_2\ femlbr + \beta_3\ lf2inc + \varepsilon \qquad (1)$$

where,

1) lGDPM= log of GDP per capita income in Muslim countries
2) $\propto$= constant
3) Femlitcy= female literacy rate
4) Femlbr= female percentage of labour force
5) lf2inc= log of female-to-male income ratio
6) ε = usual error term

Regression equation has been carried out for all the Muslim countries. In addition, four other sub-regressions have been carried out according to their geographical location and cultural diversity such as- Asia, Europe, Africa and Arab nations.[13] We have also attempted different functional forms so as to extract the best possible estimate with the highest R^2. The sample contain no 'Outlier' value which is important for such medium sample and variables are not endogenous since correlation between the residuals and the RHS variables are 0 (see Table:3 in the appendix).The model does not suffer from *Multicolinearity* as none of the RHS variables has r^2 higher than 0.8. Therefore, T-test and F-test are unaffected.

Table 1: Test of Regression (GDP per capita against female literacy rate, female percentage of labour force, female to male income ratio)

log of gdp per capita income in PPP(US$)(Main Equation)	
Variable	
female literacy rate	0.026 (5.97)**
female percentage of labour force	-0.053 (5.54)**
log of female to male income ratio(PPP)	0.230 (0.91)
Constant	8.668 (15.59)**
Observations	50
R-squared	0.657
Absolute value of t statistics in parentheses	

* significant at 5%; ** significant at 1%
***Number in bracket is T-statistics

Table 2: Test of Regression continent wise (GDP per capita against female literacy rate, female percentage of labour force, female to male income ratio)

log of GDP per capita income in PPP(US$)[a]				
Variable	**Eqn.1**	**Eqn.2**	**Eqn.3**	**Eqn.4**
female literacy rate	0.030 (1.26)**	-0.115 (1.21)	0.013 (2.102)	0.033 (2.06)
female percentage of labour force	-0.071 (.87)**	0.12 (1.29)	-0.079 (1.44)	-0.098 (1.92)
log of female to male income ratio(PPP)	4.801 (0.88)	-3.87 (1.13)	1.458 (0.56)	5.538 (2.27)
Constant	6.78 (3.18)**	16.496 (2.63)	9.338 (8.42)	7.538 (4.10)
Observations	8	9	21	12
R-squared	0.61	0 .41	0.55	0.74
Absolute value of t statistics in parentheses				

* significant at 5%; ** significant at 1%
***Number in bracket is T-statistics
[a]Eqn.1 represents **Asia**, Eqn.2 -**Europe**, Eqn.3-**Africa**, Eqn.4-**Arab World**

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[13] Some countries although are technically Asians (former USSR countries) have a European cultural attachment so we grouped them as Europeans.

The R^2 in regression output shows a value of 0.657 that confirms the significant relationship between variables although it is not a very strong. The model is log-lin (semi log) except for the variable *lf2minc* which is a log-linear which is the definition of elasticity. The coefficient of β_1 is 0.03 which implies 1 unit rise in literacy rate would lead to 3% increases in GDP per capita which is not very insignificant. The coefficient for labour is -0.05. Thus 1% rise in female-workforce would reduce GDP per capita by 5% which is significant. β_3 is 0.23 which means 1% rise in *f2minc* ratio, increases GDP per capita by 0.23%.

Cross-sectional data are often candidate for Heteroskedasticity which if found, makes T-test and F-Test invalid. After conducting Breusch-Pagan Test this study finds x^2 to be 3.94 which is much lower than $x^2_{critical}$- 7.8 at 5% level with 3 degrees of freedom from Chi-squared Distribution table. So, the Null that residuals are 'not heteroskedastic' is accepted. In order to test the correct specification of the model *'Ramsey Reset Test'* is required since a number of variables (of gender-inequality) affect GDP per capita. The researcher has conducted regression with 1, 2, and 3 variables one after another along with the different functional forms. Different F-values are calculated for different models e.g. with only 2 variables; without log function, and with the complete model (3 variables with log) etc. In all cases F-value is found to be greater than F_{crit} at 5% level with F (2, 44) although the difference is close. Therefore, this study rejects the null that model has 'no omitted variables.' Other variables or other functional forms are required or the result should be treated with caution. We have carried out T-test to find out the significance of the coefficients in the model. T_{crit} is found using appropriate degrees of freedom at 5% level to be 2.013. Using the t-values from the Stata- 1 results, this study finds all coefficients to be significant including the constant except for *'f2minc ratio.'* Finally, F-test has been conducted to show whether the model as a whole has explanatory power. Using the output of the main model, F-value is calculated to as 28.93 which is greater than F_{crit} 2.90. So the model does have explanatory power. All the test results demonstrate the validity of the assumptions of this study although due to the Ramsey Test result the results should be treated with some caution.

V. Summary and Policy Implication

Recapitulating all the arguments and the empirical results the answer to our first question is that it is the cultural and regional affiliation rather than religion that mainly explains the gender-inequality in the Muslim countries contrary to Hill and King (1995) study. Perhaps historical timing too among other things has some bearings. However, a detail analysis of this factor is outside the scope of this study.[14] As regards the second question, our hypotheses state that Literacy rate and Income-ratio are positively related to GDP per capita. As such it is a win-win strategy (Klashen and Lamanna 2008c) to reemphasise the importance of education and deter discrimination in wages. Female percentage of workforce is negatively associated with GDP per capita mostly due to variation in Arab countries in which oil has a significant impact on the income.

However, our sample covers only one year period and education takes time to be fully integrated into the labour force and to affect GDP per capita. In addition, developing countries generally suffer from poor data (Klashen and Lamanna, 2008d) hence many economic activities contributed by women appear unaccounted. Furthermore, what is generally regarded as the Gender-inequality in the West may not always serve the same purpose in the case of Muslim countries.

Taking all these into account, the result should be treated with some degree of concern. The drawbacks of excess Gender-equality[15] in the form of poor human capital, and some negative externalities as discussed in section-1 should constitute for further research.

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[14] So many different factors are involved besides culture, historical timing etc. For example, political disorder may be liable.

[15] By the word excess we try to imply that too much of Individualism may cause havoc to the society. Human beings are interdependent. It is the notion of 'family in the traditional societies by which people lived throughout centuries.

Acknowledgement

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Destruction of family life may have severe consequences on the economy as man is not a machine. A detailed analysis of these factors lies outside the scope of this study.

[21] The   World   Bank   -2010
      http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/0,,menuPK:476823~pagePK:6416
      5236~piPK:64165141~theSitePK:469372,00.html
[22] The CIA Fact Book-2010 https://www.cia.gov/library/publications/the-world-factbook/
[23] UNDP-2010 http://hdrstats.undp.org/en/indicators/

Appendix

Table 3:   Correlation the variables used in the study

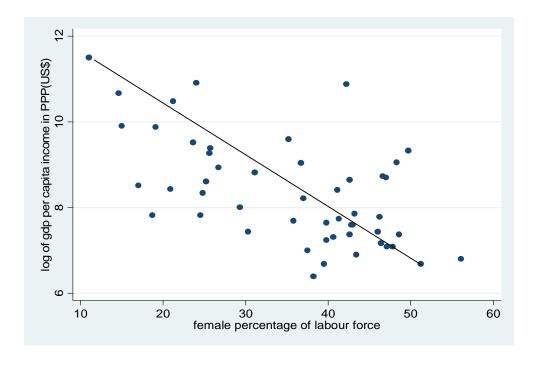corr GDPM femlitcy femlbr lf2minc
(obs=50)

	GDPM	femlitcy	femlbr	lf2minc
GDPM	1.0000			
femlitcy	0.6414	1.0000		
femlbr	-0.5948	-0.1771	1.0000	
lf2minc	0.2715	0.2323	-0.1347	1.0000

corr reshat femlitcy femlbr f2minc
(obs=50)

	reshat	femlitcy	femlbr	f2minc
reshat	1.0000			
femlitcy	-0.0000	1.0000		
femlbr	0.0000	-0.1771	1.0000	
f2minc	-0.0000	0.2478	-0.1657	1.0000

Figure 1a: Scatter Diagram (GDP against female percentage of labour force)
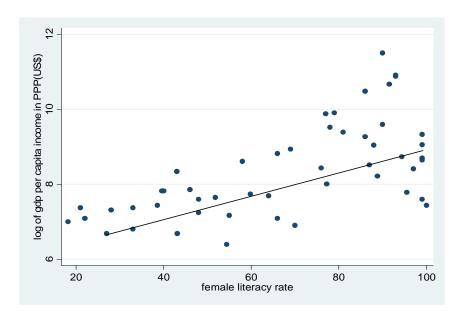
Figure 2a: Scatter Diagram (GDP against female literacy rate)

Description and Details of the Variables Used

1) 1GDPM= log of GDP per capita income in Muslim countries (CIA Fact Book)
2) ∝= constant
3) Femlitcy= female literacy rate (World Bank)
4) Femlbr= female percentage of labour force (World Bank and UNDP)
5) lf2inc= log of female-to-male income ratio (World Bank)
6) ε = usual error term