NEXUS BETWEEN FEMALE LABOR FORCE PARTICIPATION AND FERTILITY RATE IN ORGANIZATION OF ISLAMCI COOPERATION (OIC) MEMBER MUSLIM COUNTRIES OF ASIA

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Abstract

The underlying study uniquely measured the relationship between female fertility rate (FR) and their participation in labor force for Organization of Islamic Cooperation (OIC) member Muslim countries of Asia. 24 Muslim countries of OIC were selected in the study to measure this relationship. Population Density (PD), Income level (IL) measured through Gross Domestic Product per capita (GDPC) along with Female Labor Force Participation (FLP) have also been used to predict the FR of selected OIC Muslim countries. Data for all variables of FR, FLP, PD and IL have been accessed from world bank development indicators. Panel and time series annual data have been accessed for 24 years ranging from the year of 1995-2018 with total of 552 observations. FR have been regressed with FLP, PD and IL using EViews software. Before applying regression, normality of the data has been checked through Jarque Bera test. Fixed effect model was selected for analysis based on the criteria of Hausman test. Descriptive statistics showed that the data is slightly positive skewed but overall, the distribution is found to be normally distributed. Correlation analysis showed that FLP has strong but negative relationship with FR while PD and IL have negative but moderate and weak relationships with FR. Regression Analysis showed that the proposed model for OIC Muslim member countries explained the 83 percent variation in the FR. FLP and PD found to be the good predictors of FR while IL found to have insignificant relationship with FR. Based on the results, it has been concluded that FLP and PD acted as natural barriers for FR. It is concluded that whenever, females from OIC muslim countries participated more in the labor force or engaged in full time or part time jobs there is probability that these females had less birth rate. Similarly, females of urban or densely populated areas have less birth or fertility rate as compared to rural or less densely populated areas. This is because of the cost associated for the growth and development of the young ones. Income level, measured through GDPC found to be insignificant. From this, it is concluded that for OIC Muslim countries of Asia, child bearing cost has nothing to do with richness and poverty. On the basis of empirical analysis based on 552 observations of 24 countries for 24 years data of OIC Muslim member countries, the study proved that FLP and PD are the strong predictor for FR with reverse relationship in between them. So, the Asian Muslim countries who intended to control its birth rates should ensure the participation of females in jobs or in self-employment activities. Urbanization found to be another factor in reducing the FR of these countries. The study highlighted and identified the very important dynamics of FR as most of the Asian Muslim countries are overpopulated which impeded their development and economic growth. By promoting FLP and focusing on PD, these Muslim countries of OIC in Asia can minimize the FR in their respective regions.

Keywords: Female Fertility Rate, Female Labor Force Participation, Population Density, GDP, Organization of Islamic Cooperation (OIC), Muslim Countries

Introduction

The nexus between female labor force participation and their fertility rate has gained much attention in previous studies (Hartani, Bakar, & Haseeb, 2015; Mishra & Smyth, 2010). Most of these studies focused on European, Mediterranean or western countries to measure this

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relationship where the fertility rate or birth rate was a matter of serious concern (Bettio & Villa, 1998; Kohler, Billari, & Ortega, 2006). The measurement of female fertility rate with labor force participation in Muslim Countries are ignored or overlooked in general. This relationship should be measured specifically for muslim countries because the employment rate and fertility rate of Muslim countries are different from other parts of the world. This is also important because the socio-economic dynamics of the Muslim countries are different from rest of the world (Yurtseven, 2015). Keeping in view of above, this study has aim to answer the question that "what is the strength of relationship of Female Fertility rate (FR) with female labor force participation (FLP) in Organization of Islamic Cooperation (OIC) member countries"? Apart from FLP, study also considered the population density (PD) and Income level (IL) in relationship with FR to fulfill the following objectives

- To measure the impact of female labor force participation (FLP) on Female Fertility Rate (FR)
- To measure the impact of Population Density (PD) on Female Fertility Rate (FR)
- To measure the impact of Income Level (IL) on Female Fertility Rate (FR)

Literature Review

In Muslims and Muslim countries Female fertility rate (FR) are supposed to be high as compared to non-muslim countries (Westoff & Frejka, 2007). A number of studies confirmed this relationship in their analysis (Abbasi-Shavazi & Torabi, 2012; Yurtseven, 2015). However, deep analysis of literature further revealed that it's not true for all muslim countries. For example, Vahidnia (2007) observed a sharp decline of 64 percent in Iran for the period 1986-2000. Although this decline was the result of effective national family program which reduced the child birth rate up to 2 births per women in the year of 2000. The effectivity of this program was a combined effort from health workers, volunteers, technical support along with religious scholars' collaboration. As per this study findings, control over FR will help Muslim countries to better facilitate its masses for providing good health services and to improve the human development.

Yurtseven (2015) worked on the determinants of FR for Muslim countries. He took a sample of 33 Muslim countries in his study and concluded that socio economic elements are the basic reason in high fertility rate of Muslim countries. In addition, he determined that high fertility rates in Muslim countries slowed down their economy as there was reverse relationship between FR and economic development. He emphasized to control the FR, if these Muslim countries desired to improve the economic growth. Apar from this, cultural components were also found to be related with FR. Usually people followed the rituals and taboos and preferred these social norms over laws. But it takes a long time to change the cultural values. These cultural values acted as a hinderance if they were not congruent with the FR policies of that country. According to Yurtseven (2015), these cultural factors slowed down the change process for FR in selected data set of Muslim countries. Although FR was considered to be very high in Muslim countries but this notion was wrong. As per study of Johnson- Hanks (2006) in west Africa, muslim women have less birth rate as compared to their non-muslim counterparts. The study also discussed the relationship between women autonomy and their desire for children with findings that education and urbanization also affect the FR in Muslim countries.

By comparing the Muslim and non-Muslim communities in four Asian countries (Morgan, Stash, Smith, and Mason (2002) did not find any differences in the fertility rate among women. The analysis was based on three assumptions 1) Women having more children 2) Women with desire for more children and 3) Women having no desire for children. Study also measured the autonomy and fertility rate and did not find any significant differences for Muslim and non-Muslim communities. Westoff and Frejka (2007) studied the fertility rate with religiosity for

European Muslims. In the study, it was found that Muslim women tend to be found more religious as compared to non-Muslim women. It was further concluded that religiosity was directly associated with fertility. However, the frequency of having children varies varied from community to community based on the immigrants' origin. It was further revealed that for Muslim women religiosity, Islamic values and family commitment was important which ultimately affect the fertility rate. Contrary, Heaton (2011) examined the fertility rate among Muslim and Christian in 30 developing countries and found substantial higher fertility rate in Muslims. However, Eberstadt and Shah (2012) reported a dramatically decline and falling fertility rate for the period of 1975 to 2005 in Muslims.

Female Labor Force Participation (FLP)

Participation of females in labor or their engagement in rendering services have been frequently associated with their fertility rate. In literature, this association has reverse relationship (Myrskylä, Kohler, & Billari, 2009; Waite & Stolzenberg, 1976). It is known fact that female contribute less in labor during pregnancy or when they have very young children (Mishra & Smyth, 2010). There are multiple reasons which describes that why the females participate less in labor force having many children. With participation in the labor force, females have to pay certain costs if they are married as well as have children. For child care, they might have to skip the permanent and full-time job and to have opt the part time job. Even securing the full-time job, their career path may affect for senior positions as they have to seek leave for maternity and other related issues (Lyness, Thompson, Francesco, & Judiesch, 1999). Apart from loss of monetary benefits for actively participating in labor force, women with children have to pay the social networking cost as well. Because they have to spend lot of their time at home as mothers for caring their children (Connelly, 1992).

FLP may affect FR in two ways. First, having more children enforced mothers to increase their income level for family. This necessity enforced females to participate in income generating activities. Income can be generated by going outside the home and contribute in the total income of the household or generate the income while remaining at home (Edwards & Field-Hendrey, 2002). Generating income while remaining at home limits the opportunities for females. On the other side going out of the home with more kids might also risky as this income acted as trade off on the expense of her kid's growth and development. Therefore, for females earning and taking care of her children at the same time proved to be a very cumbersome job. In practical, employment for females seemed nearly impossible with higher number of children. So, necessity-based jobs for females with more children leads towards miserably of the family rather than prosperity (Braun, Scott, & Alwin, 1994).

The other aspect assumed that FLP inversely affect the FR. This is because, young kids at home required a lot their mothers time for their care. It affected the mothers by reducing their time to involve in income generating activities either from home or to seek the job outside. Apart from time management, mothers have emotional attachment with their kids, so they are reluctant to do any extra job or income generating activity which may brought adverse consequences on her children (Mishra & Smyth, 2010). Last but not the least, mothers have to spend extra time for her kids as a child care with the addition in the number of total children. So, it can be concluded that overall, FLP has negative effect on FR. Further, FLP was also to be affected by cultural values. As per Reimers (1985), cultural values may affect the females for their participation in the labour force. As the culture of muslim countries found to be different with respect to female participation in labour force (Korotayev, Issaev, & Shishkina, 2015), so it is hypothesized that

H1: Female Labor Force Participation (FLP) negatively and significantly affect the Female Fertility Rate (FR) in Organization of Islamic Cooperation (OIC) Muslim member countries of Asia

Population Density (PD)

Population Density (PD) is measured through number of people living in a certain area. The unit of area is quantified in miles or in kilometers while the humans are simply counted living in each unit of area. PD and FR have been associated with each other and studies like (De la Croix & Gobbi, 2017; Johnson- Hanks, 2006) showed a strong relationship in between PD and FR. It was believed that in urban areas FR would be low as compared to rural areas. Wilson (2011) compared the FR and mortality rates in different regions of the world and concluded that global convergence was moving speedily and explicitly for fertility. Lutz, Testa, and Penn (2006) studied the relationship of PD with fertility by observing the data of 145 countries. They observed that PD was generally ignored in fertility studies and must be taken under consideration for determination of fertility rate. They found consistent, significant and reverse relationship in between human fertility rate and PD. It was also found that individual preferences for having children also affect the fertility rate and these preferences may differ in high and low dense population areas.

Strulik and Vollmer (2015) worked on fertility rate for different regions of the world for the period of 1950-2005. In their study, the data of the countries had been divided into two peaks of high fertility regimes and low fertility regimes. With the passage of time and in long run, it has been observed that there exist an equilibrium in between low and high fertility regimes. From their study, it has been confirmed that PD and fertility rates are correlated with each other. Lutz and Qiang (2002) discussed the connection between PD and fertility rate. They highlighted overall decline in fertility rate worldwide but indicated in the rise of population for developing countries. The overall declining rate in fertility was set off with higher life expectancy rate worldwide. They also focused on socio economic determinants of fertility rate and concluded that PD was the strong predictor of human birth rate. The above discussion confirmed the strong association between PD and fertility rate so this study hypothesized the following

H2: Population Density (PD) negatively and significantly affect the Female Fertility Rate (FR) in Organization of Islamic Cooperation (OIC) Muslim member countries of Asia

Income Level (IL)

Fertility rate can decrease or increase based on the income level (IL) and its distribution among the population (Docquier, 2004). This study further revealed that inequalities in income not only affect the fertility rate in quantity i-e in the number of children but also affect the quality. Because higher level of income was associated with better education and access to better health facilities and hence improved the overall quality of life of the family including the children. The study confirmed the relation between income and fertility rate but also reported that this relation was ambiguous and yielded varying results at micro and macro level. Kaur (2000) examined that level of income has no effect on fertility rate but its education which was effective in controlling the family size.

Tabata (2003) observed an inverted U shape relation in between the IL and fertility rate. He concluded that fertility rate was indirectly proportional to the level of income. The higher the level of income, the lesser the number of children and vice versa. Like (Docquier, 2004) and (Kaur, 2000), Tabata also associated education with fertility rate and emphasized that expenditure on education not only created awareness in family for having number of children but also improves the quality of life. Earlier (Repetto, 1978) found a linear relationship

between IL and fertility rate and narrated that the level of income substantially affect the fertility rate. Jones (2006) observed the decline in fertility rate and associated IL with mortality and fertility rate in Muslim countries. From above, it is evident that IL and fertility rate are related with each other so it is hypothesized that

H3: Income Level (IL) positively and significantly affect the Female Fertility Rate (FR) in Organization of Islamic Cooperation (OIC) Muslim member countries of Asia

Model of the Study

$$FR_i = \beta_0 + \beta_1 FLP_i + \beta_2 PD_i + \beta_3 IL_i + \mu_i$$

Where
Female Fertility Rate = FR
Female Labor Force Participation = FLP
Population Density = PD
Income Level = IL
and
μ_i = Error Term

Research Methodology

24 Muslim members countries have been selected from Organization of Islamic Cooperation (OIC). There are total 57 member countries of OIC. Out of which 27 member countries belonged from Asia. This study specifically targeted the Asian Muslim countries to measure the fertility rate. Annual data has been accessed for 24 years ranging from 1995 to 2018. All indicators of the variables have been retrieved from world bank development indicators. FR has been measured through total births per women. FLP has been measured through the percentage of female participation in labor aged between 15 to 64 years. Population density is measured through the number of people living in per square kilometer of land area while income level was measured through GDP per capita in international dollars with taking 2011 year as a constant.

Results

Fertility rate was regressed with labor force participation, population density and with IL for OIC member countries of Asia. OIC was founded in 1969 to raise the voice of Muslim Ummah, for unity of Muslim countries and for the social and economic cooperation among Muslim countries. At present, OIC has 57 member countries with 27 African countries, 27 Asian countries, 01 from Europe and 02 from South America.

Table 1: Selected OIC Member Countries of Asia

Sr.	Country Name	Sr.	Country Name	Sr.	Country Name
1.	Azerbaijan	**9.**	Kazakhstan	**17.**	Saudi Arabia
2.	Bahrain	**10.**	Kuwait	**18.**	Tajikistan
3.	Bangladesh	**11.**	Kyrgyz Republic	**19.**	Turkey
4.	Brunei	**12.**	Lebanon	**20.**	Turkmenistan
5.	Indonesia	**13.**	Malaysia	**21.**	United Arab Emirates
6.	Iran, Islamic Rep.	**14.**	Maldives	**22.**	Uzbekistan
7.	Iraq	**15.**	Oman	**23.**	West Bank and Gaza
8.	Jordan	**16.**	Pakistan	**24.**	Yemen, Rep.

Source: Compilation from Panel Data

This study specifically targeted the OIC Asian muslim member countries. The reason for selection of these countries is that these muslim countries have either ignored or least studied in the literature in relation with FR. In Asia, there are 27 countries where 24 countries have been included in the final study for analysis as shown above in table 1. Three countries named Afghanistan, Qatar and Syria were excluded due to non-availability of data for the full range of period starting from 1995-2018.

Table 2: Descriptive Statistics

	FR	FLP	PD	IL
Mean	3.009999	35.03161	245.3153	10647.34
Median	2.677500	31.82500	75.44235	5333.359
Maximum	7.525000	65.66200	1920.404	64864.72
Minimum	1.448000	6.083000	5.503699	366.9354
Std. Dev.	1.072456	17.08055	390.7647	13657.49
Skewness	1.261224	0.089035	2.152093	1.882706
Kurtosis	4.338837	1.630283	6.835722	6.055569
Jarque-Bera	187.5702	43.88016	764.4920	540.8410
Probability	0.000000	0.000000	0.000000	0.000000
Sum	1661.520	19337.45	135414.1	5877329.
Sum Sq. Dev.	633.7386	160751.7	84136059	1.03E+11
Observations	552	552	552	552

Source: Compilation from Panel Data

Table 2 above showed the descriptive statistics of 552 observations of 24 countries obtained from panel data ranging from years of 1995 to 2018. The table summarized the scaled variables of FR, FLP, PD and IL. When we observed the measure of tendency, it was observed that mean values of all measured variables of FR, FLP, PD and IL are greater than median values so it is concluded that distribution is positively skewed. The high values of kurtosis of FR, PD and IL showed that the distribution for these variables are leptokurtic while the low value of LPC showed that its distribution is mesokurtic. Similarly, LPC showed the normal skewness while the FR, PD and IL showed the positive skewness. Jarque Bera is the test statistic which measure the difference between skewness and kurtosis to check the normality of data. Here in table 2, the value of Jarque Bera is great than 1 and from which we failed to reject the null hypotheses for FR, FLP, PD and IL and concluded that the distribution is normally distributed. The same is supported with the p values of 0.0000.

Table 3: Covariance Analysis

	FR	FLP	PD	IL
FR	1.000000			

FLP	-0.609067	1.000000		
	-18.00977	-----		
	0.0000	-----		
PD	-0.135667	-0.052222	1.000000	
	-3.211364	-1.226389	-----	
	0.0014	0.2206	-----	
IL	-0.305854	0.220314	-0.040262	1.000000
	-7.533958	5.296975	-0.945004	-----
	0.0000	0.0000	0.3451	-----

Source: Compilation from Panel Data

Covariance analysis described the strength and direction of observed variables. Here in table 3 (above), FR showed the negative relationship with all three predictors or independent variables of FLP, PD and IL. FLP has very strong and negative relationship with FR. From this, it may be concluded that participation in labor force significantly reduced the fertility rate. So, the women who actively participated in rendering services have a smaller number of children in OIC Muslim member countries of Asia. The reason for reduced fertility rate is that working women have less time to take care of their young ones because their main focus is either to earn the livelihood or to improve the economic conditions of their family. Based on this, it can be said that participation in labor force by women act as a natural barrier to reduce their fertility rate. Similarly, PD and IL also have negative relationship with FR. Although PD has less influence on FR but still the relationship is reverse in nature. From the values of PD and IL in table 3, it may be concluded that urbanization and wealthiness have inverse relationship with number of children in OIC Muslim member countries of Asia. The possible reason for these relationships is that cost of living in urban areas and life style due to increase in income are the forcing agents to control the birth rates and consequently having a smaller number of children with reduced fertility rate in OIC Muslim member countries of Asia.

Table 4: Correlated Random Effects – Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.536537	3	0.0882

Source: Compilation from Panel Data

Hausman test is the test of endogeneity for regressors and helped in making decision either the fixed effects model or random effects model should be preferred. This decision is taken based on the probability value calculated in Hausman test. Here in table 4, the calculated value p is greater than 0.05 so we failed to reject the null hypothesis and concluded that the fixed effects model is more appropriate for this panel data of FR.

Table 5: Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F-Statistic	P Value
	.9171	.8411	.8331	.438005	106.8591	0.0000

a. Dependent Variable: FR
b. Predictors: (Constant), FLP, PD, IL

Source: Compilation from Panel Data

Valid regression results revealed positive and significant relationship among the observed variables. From table 5, it is clear that overall model is significant with very strong explanation of the model which is 0.8331 and depicted with the value of adjusted R square. The value of R square explains the goodness of fit and is the outcome of linear regression model. Here the high value of coefficient of determination explained that there is very few distance between the actual and estimated line drawn through linear regression model. Standard error of estimate (SE) is the rough estimate of the calculated regression with population mean values. Here the low value of SE indicated that proposed model is good fit for FR. It can be said that all estimated values lie on the regression line with very little variation. Significance of the model is reflected with p value. Here the p value is 0.000 which proved the significance of the model and it can be said that overall, the proposed model for FR has good fit with the predictors of FLP, PD and IL.

Table 6: Coefficients

Variable	Coefficient	Std. Error	t-Statistic	P Value
C	5.061470	0.275765	18.35427	0.0000
FLP	-0.050000	0.007645	-6.540091	0.0000
PD	-0.001232	0.000227	-5.421124	0.0000
IL	2.09E-07	7.12E-06	0.029424	0.9765

Source: Compilation from Panel Data

In above table 6, the beta coefficients showed the mathematical relationship between the predictors of FLP, PD, IL and FR. The negative signs of the coefficients of FLP and PD indicated the reverse relationship with FR while coefficient of IL with positive sign showed its positive association with FR. Standard error (SE) is the indication of the reliability of the central tendency and mean of the observed values. The low values of SE confirmed the normality of data with absence of outliers. Low values of stochastic errors for FLP, PD and IL also confirmed that FR can be predicted through the predictors with little variation in it. The high t-statistic values of FLP and PD confirmed their significant relationship with FR while the low t-statistic value of IL confirmed the insignificant relationship with FR. These relationships had been further confirmed through p values where the FLP and PD have 0.0000 P values while the IL had the value of 0.9765. From both P and t values, we decide to accept or reject the proposed null hypotheses. So, from the calculated values of p and t in table 6, we failed to reject the null hypotheses H1 and H2 while the H3 is rejected. H1 and H2 assumed that FLP and PD had negative but significant relationship with FR. Based on the empirical evidence, it is concluded that for OIC member countries of Asia, female fertility is controlled or reduced if females are more involved in rendering services or participated in the labor force. Similarly, where there is dense population per square kilometer in OIC member countries of Asia, there is less fertility rate. In other words, the urban or populated areas have less birth rates as compared to rural areas. Contrary, IL have insignificant relationship with fertility rate for OIC member countries of Asia and it can be said income level does not affect the fertility rate so the H3 is rejected which states that IL has positive and significant relationship with FR for OIC member countries of Asia.

Conclusion

This study was initiated to measure the causal relationship between FR and FLP, PD and IL for OIC member countries of Asia. To measure this connection, 3 hypotheses were developed and the relationship was checked through linear regression model using EViews software. From results it was observed that the FLP and PD have strong but reverse relationship with FR but IL have insignificant relationship with FR. Alternative hypotheses of 1 and 2 of the study were accepted while the 3rd alternative hypothesis was rejected. Hypotheses 1 & 2 were stated as "FLP and PD negatively and significantly affect the FR in OIC Muslim member countries of Asia". Based on the empirical evidence and calculated values, H1 found to be significant with negative association in between FLP and FR. It has been concluded that the more active participation by females in the employment reduced the FR. The results are consistent with the previous studies like (Hartani et al., 2015; Mishra & Smyth, 2010). Similarly, H2 also found to be significant with reverse relationship in between PD and FR which showed that enhanced cost of living or urbanization significantly reduces the fertility rate. The results are consistent with the studies like (Loftin & Ward, 1983; Lutz et al., 2006). Third hypothesis "IL negatively and significantly affect the FR in OIC Muslim member Countries of Asia" found to be insignificant with negative association in between IL and FR. It showed that for Asian Muslim countries of OIC members, income level played insignificant role. Through valid and empirical

analysis, study also confirmed the strength of relationship between FLP, PD, IL and FR and it has been concluded that FLP and PD are the strong predictors of FR and explained the 83 percent variation in FR for selected OIC Muslim member countries.

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