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Female labourforce participation decision and macro economic factors; International scenario

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I. INTRODUCTION

This paper addresses the debate: Does economic development effectively increase female labourforce participation? This debate is addressed with reference to international context. Broadly economic development refers to the rise in well-being of the people in terms of social and technological progress. It involves improvements in a variety of indicators such as literacy rates, life expectancy, and poverty rates. Development brings more education, more employment opportunity, and more industrialization to an area; which bring up female labourforce participation rate (Ramirez 1981; Semyonov 1980; Semyonov and Shenhav 1988; Weiss, Ramirez, and Tracy 1976). On the other hand, more active female population makes a country developed. Higher female labourforce participation rate can give a country more per capita income, higher standard of living, less population pressure etc. So we cannot deny that two-way positive association between female labourforce participation rate and development.

II. THEORETICAL PROPOSITIONS

The relationship between different indicators of economic development and female labourforce participation specially in the developing countries have been shown to be positive in the literature. Both domestic and paid workforce registered a rise in female workforce with development. Boserup's (1970) text evaluated how work was divided between men and women, the types of jobs that constituted productive work, and the type of education women needed to enhance development. Many liberal feminists took Boserup's (1970) analysis further to argue that the costs of modern economic development were shouldered by women. There are evidences which show a positive association between economic development and women's share of the labourforce (Ramirez 1981; Semyonov 1980; Semyonov and Shenhav 1988; Weiss, Ramirez, and Tracy 1976). Explanations for a positive association have suggested that the shift from agricultural and heavy manufacturing to service and light industry provides jobs considered appropriate for women and that women's entry into a few areas traditionally reserved for men (say, higher education) tends to open up other occupational areas. Several researchers hypothesized that female labourforce participation rate exhibits a U-shape during the process of economic development (Tansel 2002). Some other researchers explained a curvilinear relationship between female labourforce participation rate and development (Pampel, Tanaka 2004/2005). Their results affirmed the curvilinear effects of economic development as a determinant of female labourforce participation. Therefore, there is an association between female labourforce participation rate and economic development reflected through its indicators. Economic theory suggests that women's educational level and the family economic status determine women's labourforce participation (Nam (1991), Sebastian and Navaneetham, Lanot, Muller (1997). There are evidences which show that some of the development indicators are directly linked positively to female labourforce increase and some indirectly linked positively or negatively through some other variables.

The above discussion shows the use of different development indicators to examine the relationship between female labourforce participation and development. Out of these development indicators, per capita income and literacy rate has been taken as development indicators in this chapter to examine the relationship between female labourforce participation rate and development. These two development indicators are best represented in Human Development Index (HDI), because it is an average of literacy index, GDP index and health index. Therefore, here Human Development Indicator is used as proxy. Human Development Indicator (HDI) was developed by UNDP in 1990. The **Human Development Index** (**HDI**) is an index used to rank countries by level of "human development", which usually also implies whether a country is developed, developing, or underdeveloped.

OBJECTIVE - This paper tries to examine the relation between female labourforce participation decision with development and its different indicators.

PROPOSITIONS- The null hypothesis is the positive relationship between female labourforce participation rate (FLPR) and HDI (taken as proxy of development), as against the alternative hypothesis that these two are negatively associated.
The model: FLPR = a1 +a2*HDI.

The reasons behind the nature of association between female labourforce participation rate and HDI are whether influenced by 'health index'[1] or 'literacy index'[2] or 'GDP index'[3].
(a) FLPR = f (Health Index)
(b) FLPR = f (Literacy Index)
(c) FLPR = f (GDP index)

THE DATA-
The data has been collected from HDR (2005, 2006, 2007-08) from about 180 nations[4].
It is a cross-sectional analysis of various time points.
The Human Development Report (HDR) was first launched in 1990 with the single goal of putting people back at the center of the development process in terms of economic debate, policy and advocacy. The goal was both massive and simple, with far-ranging implications — going beyond income to assess the level of people's long-term well-being. The objective of HDR is bringing about development of the people, by the people, and for the people, and emphasizing that the goals of development are choices and freedoms.
Here, the data from HDR 2005, 2006 and 2007-2008 have been used for testing the above mentioned hypothesis.

Table1. Human Development Index ranuks for high developed countries

COUNTRIES	**HDI RANKS**				**COUNTRIES**	**HDI RANKS**		
HIGH HUMAN DEVELOPMENT	**2005**	**2006**	**2007-08**		**HIGH HUMAN DEVELOPMENT**	**2005**	**2006**	**2007-08**
Norway	**1**	**1**	**1**		**Malta**	**32**	**31**	**38**
Iceland	**2**	**2**	**3**		**Brunei Darussalam**	**33**	**34**	**30**
Australia	**3**	**3**	**2**		**Argentina**	**34**	**36**	**49**
Luxembourg	**4**	**12**	**11**		**Hungary**	**35**	**35**	**43**
Canada	**5**	**6**	**4**		**Poland**	**36**	**37**	**41**
Sweden	**6**	**5**	**7**		**Chile**	**37**	**38**	**44**

1. Health index- In health index, calculations are based on infant mortality data from Demographic and Health Surveys. Infant mortality has proven a reliable proxy for overall mortality patterns and thus for life expectancy.

2 The literacy index - The education index is based on adult literacy and school enrolment data. Adult literacy data are available directly from the household income surveys for each income quintile. To calculate the quintile-specific gross enrolment index, the combined gross enrolment ratio for each quintile is calculated. Each individual ages 5–23 attending school or university, whether general or vocational, is considered enrolled. The quintile-specific gross enrolment index is then calculated using the same minimum and maximum values that are used in calculating the standard HDI.

3 GDP index- The GDP index is calculated using the income variable from the household income survey. For conceptual reasons and because of measurement errors, mean income per capita calculated from the household income surveys can be very different from GDP per capita from national accounts data, which are used to calculate the GDP index in the standard HDI.

4 Since the research tries to focus on the post-reform period of India, and, the analysis involves the two unit level data of the period 2004, 2005 and 2006; the relevant worldwide data have been taken from HDR 2005, 2006 and 2007-08.

Switzerland	**7**	**9**	**9**	**Estonia**	**38**	**40**	**40**
Ireland	**8**	**4**	**5**	**Lithuania**	**39**	**41**	**46**
Belgium	**9**	**13**	**17**	**Qatar**	**40**	**46**	**33**
United States	**10**	**8**	**13**	**United Arab Emirates**	**41**	**49**	**35**
Japan	**11**	**7**	**10**	**Slovakia**	**42**	**42**	**42**
Netherlands	**12**	**10**	**6**	**Bahrain**	**43**	**39**	**39**
Finland	**13**	**11**	**12**	**Kuwait**	**44**	**33**	**31**
Denmark	**14**	**15**	**16**	**Croatia**	**45**	**44**	**45**
United Kingdom	**15**	**18**	**21**	**Uruguay**	**46**	**43**	**50**
France	**16**	**16**	**8**	**Costa Rica**	**47**	**48**	**54**
Austria	**17**	**14**	**14**	**Latvia**	**48**	**45**	**48**
Italy	**18**	**17**	**18**	**Saint Kitts and Nevis**	**49**	**51**	**62**
New Zealand	**19**	**20**	**20**	**Bahamas**	**50**	**52**	**52**
Germany	**20**	**21**	**22**	**Seychelles**	**51**	**47**	**57**
Spain	**21**	**19**	**15**	**Cuba**	**52**	**50**	**51**
Hong Kong, China (SAR)	**22**	**22**	**24**	**Mexico**	**53**	**53**	**53**
Israel	**23**	**23**	**27**	**Tonga**	**54**	**55**	**99**
Greece	**24**	**24**	**25**	**Bulgaria**	**55**	**54**	**61**
Singapore	**25**	**25**	**23**	**Panama**	**56**	**58**	**60**
Slovenia	**26**	**27**	**29**	**Trinidad and Tobago**	**57**	**57**	**64**
Portugal	**27**	**28**	**34**				
Cyprus	**29**	**29**	**32**				
Barbados	**30**	**31**	**37**				
Czech Republic	**31**	**30**	**36**				

Sources- Human Development Report, 2005, 2006, 2007-2008

Table2.

Human Development Index ranuks for medium developed countries

COUNTRIES	**HDI RANKS**			**COUNTRIES**	**HDI RANKS**		
MEDIUM HUMAN DEVELOPMENT	**2005**	**2006**	**2007-08**	**MEDIUM HUMAN DEVELOPMENT**	**2005**	**2006**	**2007-08**
Libyan Arab Jamahiriya	**58**	**64**	**55**	**Algeria**	**103**	**102**	**104**
Macedonia, TFYR	**59**	**66**	**72**	**El Salvador**	**104**	**101**	**106**
Antigua and Barbuda	**60**	**59**		**Cape Verde**	**105**	**106**	**121**
Malaysia	**61**	**61**	**66**	**Syrian Arab Republic**	**106**	**107**	**107**
Russian Federation	**62**	**65**	**71**	**Guyana**	**107**	**103**	**114**
Brazil	**63**	**69**	**75**	**Viet Nam**	**108**	**109**	**116**
Romania	**64**	**60**	**63**	**Kyrgyzstan**	**109**	**110**	**120**
Mauritius	**65**	**63**	**81**	**Indonesia**	**110**	**108**	**111**
Grenada	**66**	**85**	**74**	**Uzbekistan**	**111**	**113**	**119**
Belarus	**67**	**67**	**68**	**Nicaragua**	**112**	**112**	**124**
Bosnia and Herzegovina	**68**	**62**	**76**	**Bolivia**	**113**	**115**	**113**
Colombia	**69**	**70**	**77**	**Mongolia**	**114**	**116**	**115**
Dominica	**70**	**68**	**73**	**Moldova, Rep. of**	**115**	**114**	**117**
Oman	**71**	**56**	**56**	**Honduras**	**116**	**117**	**112**
Albania	**72**	**73**	**70**	**Guatemala**	**117**	**118**	**122**
Thailand	**73**	**74**	**87**	**Vanuatu**	**118**	**119**	**126**
Samoa (Western)	**74**	**75**	**94**	**Egypt**	**119**	**111**	**123**

Venezuela	**75**	**72**	**58**	**South Africa**	**120**	**121**	**129**
Saint Lucia	**76**	**71**	**69**	**Equatorial Guinea**	**121**	**120**	**118**
Saudi Arabia	**77**	**76**		**Tajikistan**	**122**	**122**	**127**
Ukraine	**78**	**77**	**85**	**Gabon**	**123**	**124**	**103**
Peru	**79**	**82**	**78**	**Morocco**	**124**	**123**	**130**
Kazakhstan	**80**	**79**	**82**	**Namibia**	**125**	**125**	**128**
Ecuador	**82**	**83**	**80**	**São Tomé and Principe**	**126**	**127**	**131**
Armenia	**83**	**80**	**84**	**India**	**127**	**126**	**134**
Philippines	**84**	**84**	**105**	**Solomon Islands**	**128**	**128**	**135**
China	**85**	**81**	**92**	**Myanmar**	**129**	**130**	**138**
Suriname	**86**	**89**	**97**	**Cambodia**	**130**	**129**	**137**
Saint Vincent and the Grenadines	**87**	**88**	**91**	**Botswana**	**131**	**131**	**125**
Paraguay	**88**	**91**	**101**	**Comoros**	**132**	**132**	**139**
Tunisia	**89**	**87**	**98**	**Lao People's Dem.Rep.**	**133**	**133**	**133**
Jordan	**90**	**86**	**96**	**Bhutan**	**134**	**135**	**132**
Belize	**91**	**95**	**93**	**Pakistan**	**135**	**134**	**141**
Fiji	**92**	**90**	**108**	**Nepal**	**136**	**138**	**144**
Sri Lanka	**93**	**93**	**102**	**Papua New Guinea**	**137**	**139**	**148**
Turkey	**94**	**92**	**79**	**Ghana**	**138**	**136**	**152**
Dominican Republic	**95**	**94**	**90**	**Bangladesh**	**139**	**137**	**146**
Maldives	**96**	**98**	**95**	**Timor-Leste**	**140**	**142**	**162**
Turkmenistan	**97**	**105**	**109**	**Sudan**	**141**	**141**	**150**
Jamaica	**98**	**104**	**100**	**Congo**	**142**	**140**	**136**
Iran, Islamic Rep. of	**99**	**96**	**88**	**Togo**	**143**	**147**	**159**
Georgia	**100**	**97**	**89**	**Uganda**	**144**	**145**	**157**
Azerbaijan	**101**	**99**	**86**				

Sources- Human Development Report, 2005, 2006, 2007-2008

Table3. Human Development Index ranks for low developed countries

COUNTRIES	**HDI RANKS**		
LOW HUMAN DEVELOPMENT	**2005**	**2006**	**2007-08**
Madagascar	**146**	**143**	**145**
Swaziland	**147**	**146**	**142**
Cameroon	**148**	**144**	**153**
Lesotho	**149**	**149**	**156**
Djibouti	**150**	**148**	**155**
Yemen	**151**	**150**	**140**
Mauritania	**152**	**153**	**153**
Haiti	**153**	**154**	**149**
Kenya	**154**	**152**	**147**
Gambia	**155**	**155**	**168**
Guinea	**156**	**160**	**170**
Senegal	**157**	**156**	**166**
Nigeria	**158**	**159**	**158**
Rwanda	**159**	**158**	**167**
Angola	**160**	**161**	**143**
Eritrea	**161**	**157**	**165**
Benin	**162**	**163**	**161**
Côte d'Ivoire	**163**	**164**	**163**

Tanzania, U. Rep. of	**164**	**162**	**151**
Malawi	**165**	**166**	**160**
Zambia	**166**	**165**	**164**
Congo, Dem. Rep. of	**167**	**167**	**176**
Mozambique	**168**	**168**	**172**
Burundi	**169**	**169**	**174**
Ethiopia	**170**	**170**	**171**
Central African Republic	**171**	**172**	**179**
Guinea-Bissau	**172**	**173**	**173**
Chad	**173**	**171**	**175**
Mali	**174**	**175**	**175**
Burkina Faso	**175**	**174**	**177**
Sierra Leone	**176**	**176**	**180**
Niger	**177**	**177**	**182**

Sources- Human Development Reports, 2005, 2006, 2007-2008

DATA DESCRIPTION-

In these three human development reports the data were collected from 177, 177 and 182 countries respectively. The reports are reflections of various kinds of information about all these countries. If we concentrate only on female labourforce participation rate, urbanization rate, literacy index and GDP index, we find huge variations.

Figure 1- Relation between FLPR and urbanization rate

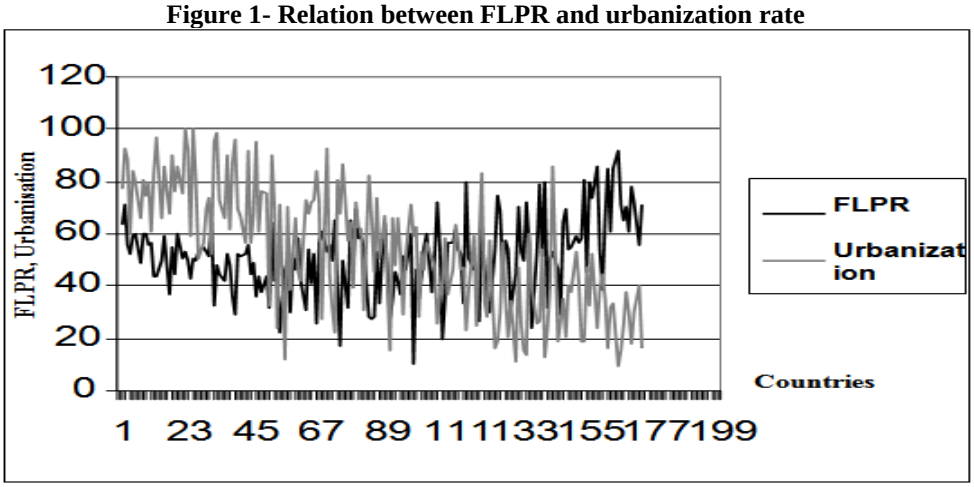


Figure 2- Relation between FLPR and literacy index-

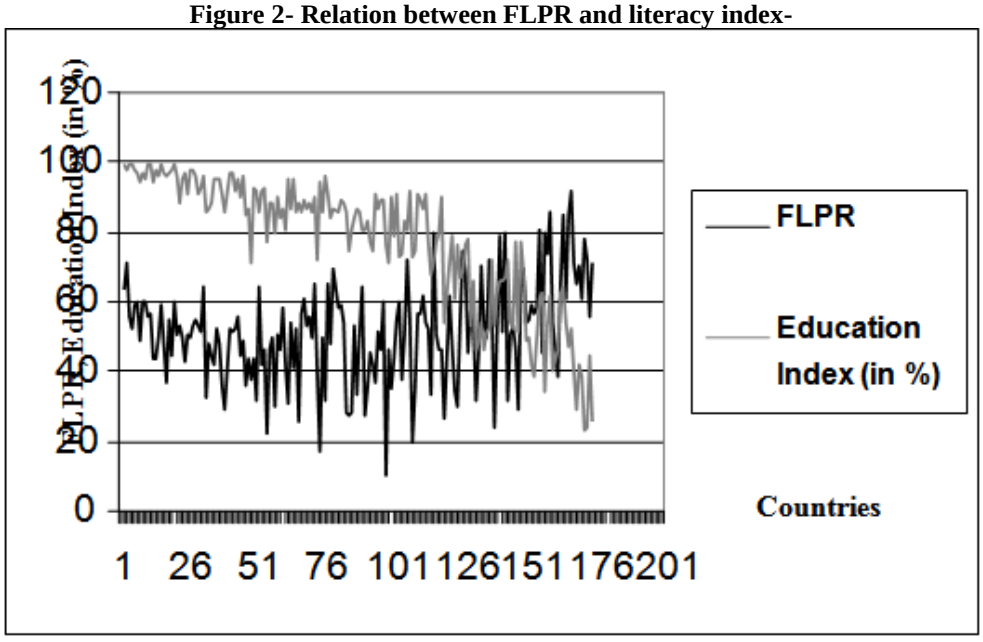
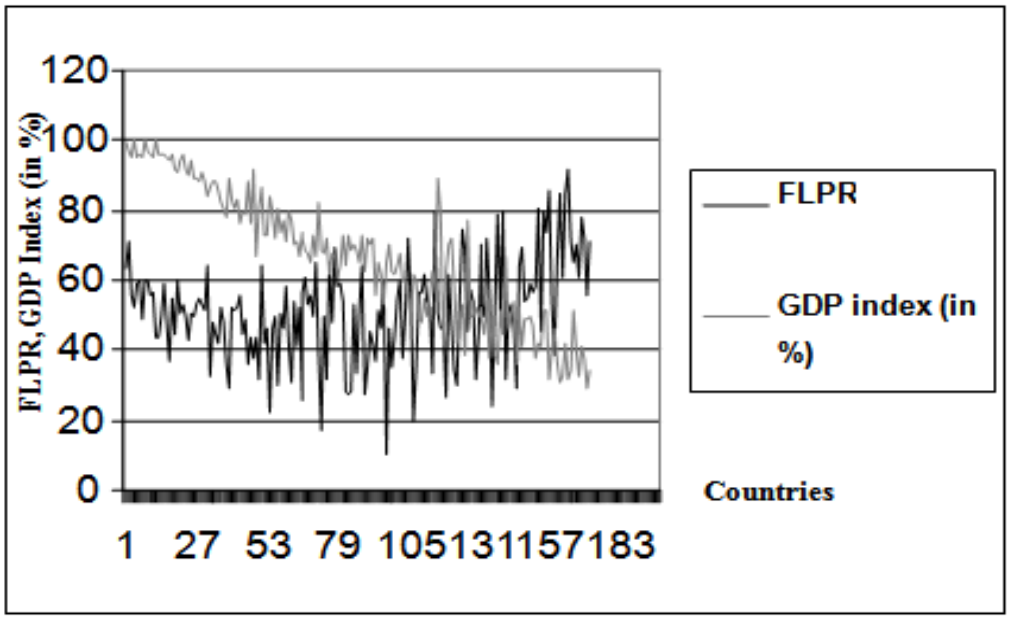


Figure3- Relation between FLPR and GDP index-



Source- Human Development Reports, 2006

Figure 1, 2, 3 shows the variations in the relationships between female labourforce participation rate with the three independent variables among the countries. The figures show that there is a strong negative association between female labourforce participation rate and urbanization rate, literacy index and GDP index. Further analysis of these three variables can give some inference towards the relationship of them with women's participation in labourforce. As one move from highly developed countries to low developed countries, each of the three independent variables diminish but the female labourforce participation rate increases.

III. METHODOLOGY

Bi-variate analysis is done to explain the model because the association of the female labourforce participation rate has to be judged thoroughly and separately with each and every independent variable. Bi-variate analysis is done for female labourforce participation rate initially with HDI values; then with health index, literacy index and GDP index.

THE RESULTS- ***Table 4***

variables	HDI value	Literacy index	GDP index	Health index
Coefficients	**-2.504**	**6.112**	**-59.421**	**1.096**
R-square	**0.39**	**0.47**	**0.74**	**0.107**

THE FINDINGS-

(1) The result shows the truth of the alternative hypothesis because it revealed a negative association between HDI and female labourforce participation rate. That is, more developed nation has less economically active female population.

(2) The result of the proposition **FLPR = f (Health Index),** which is R^2 = 0.107, shows that negative relationship between female labourforce participation rate and HDI is definitely not due to Health Index.

(3) The result of the proposition that **FLPR = f (Literacy Index)** shows the association is positive. So we got a positive relationship between female labourforce participation rate and literacy rate. It is definitely a result which one can expect. Therefore, that negative association between female labourforce participation rate and HDI was obviously due to the third component i.e., GDP index.

(4) The result of the proposition **FLPR = f (GDP index)** reveals a very high association between these two variables which is negative. The value of this negative association overweighs the value of positive association with literacy index and as a result we have negative overall relationship between female labourforce participation rate and HDI. This result revealed, as gross domestic product of a country falls, female labourforce participation increases.

INTERPRETATION-
HDI has three components: GDP index, literary index and health index. To find the reason behind that result, these three components are taken separately.
To examine the effects of development on female labourforce participation rate, some indicators are taken like literacy index, GDP index and urbanization. Literacy index and GDP index have come from HDI, the health index, which is also used to calculate HDI was dropped, because it does not have any association with female labourforce participation rate. Urbanization is another important indicator of development. It may also have a good influence on female labourforce participation rate. Urbanization may bring more industries and it may influence female labourforce participation rate. Out of the three independent variables, literacy index and urbanization rate have been taken out of the debate through different literature. The third one, GDP index has been used as a proxy to some variables in the debate.

PROPOSITION –
The hypothesis is that whether the female labourforce participation rate depends on urbanization, literacy index and GDP index or not, and, if dependent then whether the relationship is positive or negative.

FLPR = f [urbanization, literacy index, GDP index].
Econometric equation is,
FLPR = [a1+a2* urbanization+a3* literacy index+a4* GDP index]

DATA-
It is a cross-section analysis of various time points.
Data are collected on these variables for all high HDI, medium HDI & low HDI countries from HDR 2005, 2006 and 2007-08.
High human development- (HDI 0.800 and above)
Medium human development- (HDI 0.500–0.799)
Low human development- (HDI below 0.500)

RESULTS-Table 5- Results with HDR 2005

variables	urbanization	Literacy rate	GDP	intercept	R-Square
REGRESSION RESULT FOR ALL COUNTRIES					
Coefficients	**-0.208**	**12.878**	**-66.021**	**89.349**	**0.39**
(t-values)	**(-3.392)**	**(1.74)**	**(-5.47)**	**(18.129)**	
REGRESSION RESULT FOR COUNTRIES WITH HIGH HDI					
Coefficients	**-0.042**	**71.142**	**-88.542**	**48.787**	**0.31**
(t-values)	**(-0.481)**	**(2.39)**	**(-2.71)**	**(1.363)**	
REGRESSION RESULT FOR COUNTRIES WITH MEDIUM HDI					
Coefficients	**-0.178**	**9.028**	**-153.84**	**124.018**	**0.552**
(t-values)	**(-2.22)**	**(1.018)**	**(-7.18)**	**(13.67)**	
REGRESSION RESULT FOR COUNTRIES WITH LOW HDI					
Coefficients	**-0.234**	**25.05**	**-325.13**	**106.7**	**0.821**
(t-values)	**(-1.283)**	**(2.203)**	**(-2.06)**	**(3.146)**	

Table 6- Results with HDR 2006variables	urbanization	Literacy rate	GDP	intercept	R-Square
REGRESSION RESULT FOR ALL COUNTRIES					
Coefficients	**-.006**	**-5.23**	**-14.23**	**68.27**	**0.111**
(t-values)	**(-1.05)**	**(-.604)**	**(-1.47)**	**(15.125)**	
REGRESSION RESULT FOR COUNTRIES WITH HIGH HDI					
Coefficients	**.0024**	**86.74**	**7.09**	**39.31**	**0.39**
(t-values)	**(.399)**	**(4.95)**	**(.495)**	**(-2.241)**	
REGRESSION RESULT FOR COUNTRIES WITH MEDIUM HDI					
Coefficients	**-0.122**	**17.64**	**-39.114**	**56.63**	**0.423**
(t-values)	**(1.29)**	**(1.35)**	**(-2.23)**	**(5.74)**	
REGRESSION RESULT FOR COUNTRIES WITH LOW HDI					
Coefficients	**-0.36**	**-9.28**	**-17.2**	**87.96**	**0.368**
(t-values)	**(-1.88)**	**(-.51)**	**(-2.44)**	**(5.34)**	

Table 7- Results with HDR 2007-08

variables	urbanization	Literacy rate	GDP	intercept	R-Square
REGRESSION RESULT FOR ALL COUNTRIES					
Coefficients (t-values)	**-0.005 (-.769)**	**-12.59 (1.4)**	**-7.45 (-.734)**	**69.95 (15.31)**	**0.099**
REGRESSION RESULT FOR COUNTRIES WITH HIGH HDI					
Coefficients (t-values)	**.019 (-.256)**	**47.78 (2.57)**	**24.71 (-1.89)**	**-18.19 (.199)**	**0.2**
REGRESSION RESULT FOR COUNTRIES WITH MEDIUM HDI					
Coefficients (t-values)	**-0.0079 (-.886)**	**11.88 (.876)**	**-27.34 (-1.47)**	**61.29 (5.96)**	**0.215**
REGRESSION RESULT FOR COUNTRIES WITH LOW HDI					
Coefficients (t-values)	**-0.872 (-3.342)**	**19.92 (.961)**	**-55.98 (2.07)**	**63.29 (2.8)**	**0.41**

FINDINGS

1) The association between female labourforce participation rate and the three variables are not very prominent when all nations are taken together. But with the categorization of countries according to their development level, the result improves. The result is most significant in case of low developed nations.

2) Among the three variables, GDP index has the strongest association with female labourforce participation rate. In almost all cases it has a negative influence on female labourforce participation decision. For high developed countries this association is insignificant, but then becomes negative as well as stronger towards the medium developed and low developed nations.

3) Urbanization is also having negative influence on female labourforce participation decision. In almost all cases the t values are significant. But its impact is less negative than GDP index on female labourforce participation rate.

4) Literacy rate, the other development indicator, has a weak positive association with female labourforce participation rate. In case of high developed countries the association is very strong.

IV. ANALYSIS AND INTERPRETATIONS-

The association between female labourforce participation rate and the three macro economic indicators are different for different countries. When the countries were classified into three groups according to their HDI ranks, the different nature of association can also be classified among these three groups. This means each of the three development indicators have different impacts on female labourforce participation rate for highly developed, medium developed and less developed nations.

One of the three development indicators, GDP index has negative association with female labourforce participation rate for medium and less developed countries in all years; but the negative association becomes stronger as we move from medium to less developed countries. If all nations are taken together, then also the relationship becomes negative. That means poverty, which is proxied by GDP index forces women to join labourforce. As GDP index falls, that is, poverty increases, women in more number go out for work. In less developed countries where the problem of poverty is intense this fact becomes clearer.

The second development indicator is urbanization. The impact of urbanization is negative to female labourforce participation rate in almost all cases. For medium and less developed countries, the negative impact of urbanization is clearer. But for high developed countries the association is not significant. If we take all countries together the association between these two is significantly negative.

The third development indicator which has been taken is literacy index. It's association with female labourforce participation rate for all nations taken together is positive, for medium and highly developed countries it is positive. The positive impact of literacy index becomes stronger as we move towards high developed countries. For low developed countries the influence of literacy index on female labourforce participation decision is insignificant.

V. CONCLUSION

The three macro economic indicators of development can reveal some forces behind female labourforce participation decision throughout the nations. It shows the positive association of literacy rate, negative association of GDP index as well as urbanization rate. It is also important that for all of the three HDR the results are almost same. But since the R-squares are low, there are more factors behind female labourforce participation decision.

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