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WOMEN INDICATORS OF ECONOMIC GROWTH: A PANEL DATA APPROACH

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Abstract

This study aims to find out which of the women indicators of education, employment, health and political factors, measured in many sub-indicators, are significantly effective in explaining economic growth. The study analyses cross-national data of 187 countries where data is available in between 1998-2008 (inclusive) with fixed effects panel data approach separately for high income countries and low, lower-upper middle income countries. The results obtained have revealed that different measurements, such as less fertility, more employment of women, and more participation of women in the parliament, have important effects on the economic growth of a country.

Keywords: Women Role, Economic Growth, Panel Data, Cross-national Data

JEL classification: C23, O40

1. Introduction

Advancing women's economic opportunities as well as improving women's health and education has been at the core of World Bank. After having launched the Gender Action Plan in 2007, the very lately published World Development 2012 Report focuses on gender equality and development. Dealing with gender equality in the context of development, the report has many dimensions such as women education, labour participation, health and fertility (Sattar, 2012).

Even though all institutions and individuals[1] are aware of the importance of reducing the inequality of women and increasing the life standards of women, the statistics still show us that there is a lot to be done. The World Bank 2012 Development Report mentions that there are nearly 4 million poor women going missing each year in developing countries, 58% of unpaid employment consists of

[1] A woman must be educated and work in order to prove herself in society and be a better mother" by a young woman in Rafah City, West Bank and Gaza (World Bank website: http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTWDRS/EXTWDR2012/0,,menuPK:7778074~pagePK:7778278~piPK:7778320~theSitePK:7778063~contentMDK:22851055,00.html)

women, and however girls outnumber boys in secondary schools in 45 developing countries. Another report by United Nations Capital Development Fund on "Gender Development" is a striking report showing 10 stark and often brutal statistics about women including health, violence against women, marriages and women giving birth, parliamentary seats of women all over the world (UNCDF, 2006).

These statistics show us that there is still a lot to be done to improve the life standards of females. It is believed that with an increase in female life standards, the economic growth of the countries will increase as well. As a result, it is crucial and important to analyse the issue of growth through the prism of gender and emphasize the importance of women indicators on economic growth once more. It is believed that female life standards in a country and therefore the economic growth improves once the female is less occupied with child rearing, more educated, more politically and economically involved and much healthier.

The main aim of this study is to investigate the impacts of female indicators such as female education, female labour participation, female political involvement, female health and life expectancy rates on economic growth as well as the widely known determinants of growth such as population growth, inflation rate, research and development and trade with an analysis of cross-national data on 187 countries from 1998 to 2008, inclusive (Er, 2011). Since the data includes both cross-sectional (countries) and the time (years) dimension, the analysis will be applied using panel data techniques that are widely used in analysing panel data of this kind.
The empirical results in this paper demonstrate that in high income countries, women being less fertile, being more educated, being less active in the agricultural sector, being more employed and getting more involved in politics, and similarly in low, lower-upper middle income countries, women being more employed, being healthier increase the economic growth. These results present some more challenges to world economic growth policies.

The paper is organised as follows: In Section 2 an overview of the literature is presented. The methodology used in this paper is explained in Section 3. The data and variable descriptions are given in Section 4. The results are summarised in Section 5 and finally in Section 6 the paper is summarised and future work is suggested.

2. Literature Review

Following the seminal work of Boserup's (1970) "Women's Role in Economic Development" in 1970 there has been a vast empirical research done on the determinants of economic growth. In this study only some of the research done on the female indicators of economic growth will be summarised since the main aim of this research is to analyse which of the female indicators are statistically significant in explaining economic growth. The other variables included in the analysis are inflation, fiscal policy, research and development, financial development and international trade (Barro, 1995, Bassanini, Scarpetta, 2001).

Education of females in a country is thought to have a positive impact on economic growth since the more educated the females are the higher the quality of human capital is. Though there are numerous studies finding a negative impact or sometimes a statistically insignificant impact of education on economic growth (Barro, 1996, Barro & Lee, 1994, Barro & Sala-i-Martin, 2003, Pritchett, 1997). These studies cover many different countries for different periods. For example, Barro (1995) has analysed data for around 100 countries from 1960 to 1990 in order to assess the effects of inflation on economic performance using a system of regression equations in which many other determinants of growth such as male and female schooling, overall life expectancy, fertility rate, government consumption ratio, public education spending ratio, investment ratio, democracy index are included (Barro, 1995). It is found that growth is estimated to fall with higher fertility rates and with higher levels of female schooling whereas increase with higher levels of male schooling (Barro, 1995).

For less-developed countries, Benavot (1992) found clear evidence that educational expansion among girls at the primary level has a stronger effect on long term economic prosperity than among boys and Hill and King (1993) find a positive association between female primary and secondary education on economic growth analysing data of 152 countries from 1960-1985. There are empirical studies finding positive (Klasen, 1999, Esteve-Volart, 2000, Benavot, 1992) or insignificant positive association between female education and economic growth (Lorgelly & Owen, 1999).
From the employment perspective, it is believed that an increase in the female labour force participation rate also increases the economic growth. The empirical research on this issue is much more consistent with positive (King and Hill, 1993, Benavot, 1992) or insignificant positive (Klasen, 1999) findings between female labour force participation and economic growth.

Another determinant of economic growth from the human capital perspective is fertility rate. A higher fertility rate means that increased resources will be devoted to child rearing rather than the production of goods, participation in the labour force and education. As a result it is expected that a higher fertility rate affects economic growth negatively. Barro (1995), Brander and Dowrick (1994) in their study found that fertility rates have a negative impact on economic growth. In this study it is also assumed that a negative association will be found for fertility rates.
Similarly, life expectancy is associated with high income per capita but on the other hand there is a debate on the causes of improvements of life expectancy levels on economic growth. Though it is believed that life expectancy ratio has a positive impact on economic growth since higher life expectancy at birth is an indicator of a healthier generation with better life standards and therefore better quality in human capital. Empirical research on the causal impact of life expectancy on economic growth reveals different conclusions with both positive (Lorentzen, McMillan and Wacziarg, 2005, Barro, 1995) and negative (Acemoglu & Johnson, 2007) impacts.

Finally, it is believed that female participation in the parliament is also an indicator of high income per capita but like other variables there is no exact direction of the effects of an increase in the levels of female political involvement. Therefore the effect of this variable on the economic growth along all the other variables considered will be investigated in this paper as well.

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3. Methodology

In this study panel data analysis is applied in order to determine the female indicators of economic growth since the data set has 2 dimensions: cross-sectional and time dimensions. Panel data analysis methods have many advantages over Ordinary Least Squares with a richer set of information, less collinearity among the explanatory variables and controlling for individual heterogeneity. The latter is the most important issue in panel data analysis since panel data suggest that cross-sectional units are heterogeneous and this heterogeneity should be taken into account in order to obtain unbiased estimates (Baltagi, 2001).

The general panel data model could be expressed as follows:

$$y_{it} = a + x_{it}\beta + timedummy_t\gamma + v_{it} \quad (1)$$

for $i = 1,\ldots,N$ denoting countries and $t = 1,\ldots,T$ denoting years, where y_{it} is the economic growth rate of the ith country for time t, x_{it} are the time and country variant explanatory variables, $timedummy_t$ are the time dummies for the years 1998-2008, v_{it} are the unobservable factors that affect the ith country economic growth rate in time t.
Most of the panel data applications assume that the composite error term v_{it} follows a one-way error structure,

$$v_{it} = \mu_{it} + u_{it} \quad (2)$$

that has two components, μ_i specific to countries that doesn't change over time and u_{it} that changes both over time and for countries.

In order to find if the country specific effects (μ_i) are significant and therefore the estimation of the model with the pooled Ordinary Least Squares (OLS) estimates would be biased and inconsistent, joint significance of the country specific factors with F-test should be applied. This test basically compares the sum square errors of the fixed effects and OLS methods, and if a significant F is obtained then the test reveals that the country specific effects are significant (Baltagi, 2011).

Though at this point, another concern arises on how to treat these effects. Since it is found that there are unobserved country specific factors which causes the error to be autocorrelated, the estimation of (1) by the ordinary least squares becomes impossible (Wooldridge, 2002). Therefore there are methods developed for panel data. These methods analyse the v_{it} composite error term by assuming that the one-way error structure is either fixed or random (Frees, 2004, Wooldridge, 2002). The decision on which method to use is the most important thing in panel data analysis (Mátyás, Sevestre, 1996) and it depends on the existence of correlation between the explanatory variables and the unobservable cross sectional specific factors (Arellano, 2003, Wooldridge, 2002). There is no

restriction about zero correlation between the explanatory variables and the unobservable cross sectional specific factors (μ_i) in the fixed effects models. However, random effects estimates are based on zero correlation assumption. As a result, if the correlations between the explanatory variables and the unobservable cross sectional specific factors (μ_i) are found to be high then one should hesitate in estimating the panel data with random effects since the basic assumption would be violated. There is also a Hausman test that compares the less efficient fixed effects model with the more efficient random effects model under the null of no significant difference. The test tries to find if the more efficient random effects model also gives consistent results and if the null is not rejected then the more efficient random effects model is preferred. On the other hand, if the test finds that there is significant difference between the models, then it is more appropriate to use fixed effects models. Though it has to be kept in mind that Hausman test is not a test to make a choice between fixed or random. There is more to be kept in mind. If the data set includes all of the cross-sectional units rather than a randomly chosen sample from the large population, it is more appropriate to obtain the fixed effects model estimates.

Once it is decided to estimate a fixed effects model, it means that μ_i is assumed to be fixed parameters to be estimated and therefore least squares dummy variable estimation approach or within group transformations are applied, whereas if it is decided for a random effects model, then μ_i is assumed to be a random component and generalized least squares estimation approach is applied which is nothing more than applying OLS to the transformed variables with the inverse of the variance-covariance matrix of the composite error terms (Baltagi, 2001, Bhargava, Franzini & Narendranathan, 1982).

In this paper, the fixed effects panel data methods are suggested since the models include all of the countries rather than a randomly chosen sample which makes fixed effects methods more appropriate. However, both fixed and random effects are applied to the economic growth data that are explained in details in the following section, in order to compare their results. Both the tests of individual effects and the Hausman and Breusch Pagan Tests are applied. The results are provided in the 5th Section.

4. Data

The data set covers 187 countries in between 1998 and 2008, inclusive where data is available for this period. The data[2] is obtained from the World Bank database (World Bank). The distribution of the countries according to their income levels[3] is given in Figure 1.

[2] The data used in the paper can be downloaded from the author's website: http://www.isletme.istanbul.edu.tr/ogrelem/sebnemer/english/publications.html

[3] Economies are divided among income groups by World Bank according to 2010 gross national income (GNI) per capita, calculated using the World Bank Atlas method. The groups are: low income, $1,005 or less lower middle income, $1,006–3,975; upper middle income, $3,976–12,275; and high income, $12,276 or more.

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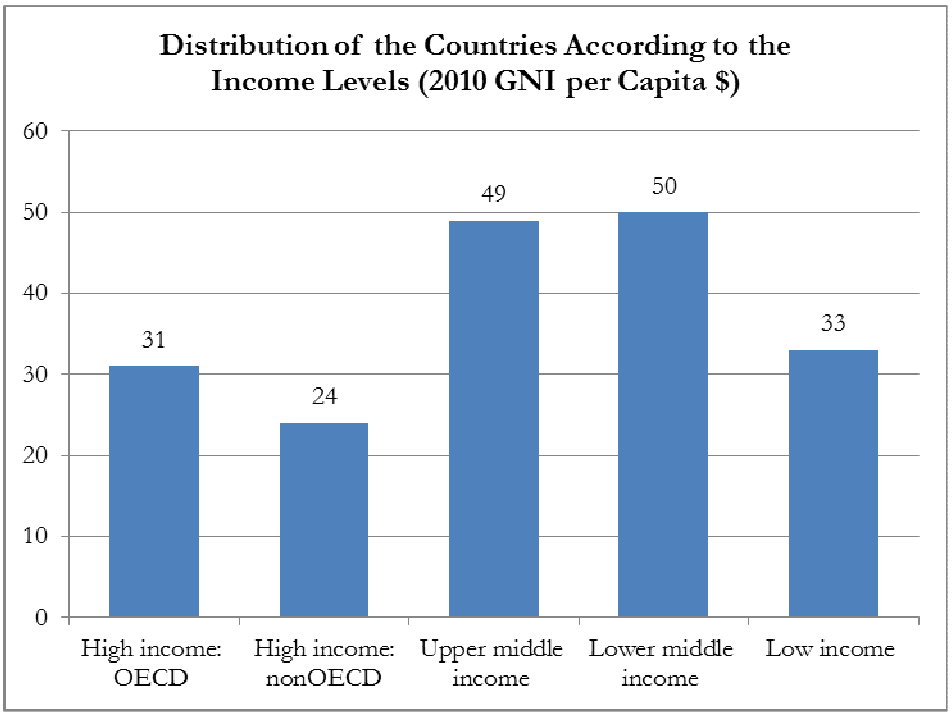

Figure 1 – Distribution of the Countries According to Their Income Levels between 1998-2008

In the analysis of the women indicators of economic growth, the dependent variable is GDP per capita growth rate and several explanatory variables are included in the model with a classification of 6 different dimensions such as fertility, employment, education, health, political and economic indicators. The summary statistics for the variables included in the model are given according to the income levels separately in the Appendix in Table 2 and Table 3, and the names of the variables with their expected signs in the parenthesis are as follows:

- Fertility indicators: (-)
  i. Adolescent fertility rate (var4)
  ii. Total fertility rate (var20)

Both are considered to have a negative impact on economic growth since higher fertility means increased resources will be devoted to child rearing rather than the production of goods, participation in the labour force and education.

- Employment indicators:
  i. Percentage of female employment in the agriculture sector (-) (var14)
  ii. Female (age +15) employment to population ratio (+) (var17)
  iii. Percentage of female labour force in total labour force (+) (var26)
  iv. Female unemployment rate as a percentage of female labour force (-) (var72)

It is believed that an increase in the female labour force participation rate also increases the economic growth. As a result, employment ratio of females is expected to have a positive impact whereas unemployment rate to have a negative impact.

- Education indicators: (+)

i. Primary completion rate of females as a percentage of relevant age group (var41)
ii. Percentage of female teachers in primary education (var43)
iii. Ratio of female to male tertiary enrolment (var48)
iv. Female gross school enrolment rate at the pre-primary level (var53)
v. Female gross school enrolment rate at the primary level (var54)
vi. Female net school enrolment rate at the primary level (var55)
vii. Female gross school enrolment rate at the secondary level (var56)
viii. Female net school enrolment rate at the secondary level (var57)
ix. Female gross school enrolment rate at the tertiary level (var58)
x. Percentage of female teachers in secondary education (var61)
xi. Female net primary total enrolment rate (var67)

Education of females in a country is thought to have a positive impact on economic development since the more educated the females are the higher the quality of human capital is.

- Health indicators:
  i. Female life expectancy at birth in years (+) (var28)
  ii. Female adult mortality rate per 1000 female adults (-) (var33)
  iii. Female survival to age 65 as a percentage of cohort (+) (var65)

It is believed that life expectancy ratio and survival to age 65 have a positive impact on economic growth since both are the indicators of a healthier generation with better life standards and therefore better quality in human capital. On the other hand, high female adult mortality rates show that life standards are not good in quality and as a result it is expected to have a negative impact.

- Political indicators:
  i. Proportion of seats held by women in national parliaments (+) (var45)

Female participation in the parliament is believed to have a positive impact on income per capita since high participation rates of females in the parliament show the level of democracy and the importance given to females.

- Economic indicators:
  i. Inflation rate in consumer prices (-) (var78)
  ii. Research and development expenditure as a percentage of GDP (+) (var80)
  iii. Number of researchers in R&D per million people (+) (var81)
  iv. Trade as a percentage of GDP (+) (var82)
  v. Annual population growth (-) (var93)

The discovery of new ideas and methods of production improves the ways of production resulting with economic growth. Therefore research and development expenditures are assumed to have a positive impact on economic growth. On the other hand, if the population is growing, economy's investment is used to provide capital for new workers rather than to raise capital per worker. As a result we are expecting a negative impact of population growth on economic growth (Barro, 1996).

The sub-indicators of fertility, employment, education and health are measured similarly therefore only one sub-indicator at a time will be used in the analysis to represent one dimension. The analysis

is applied to high income (OECD and nonOECD) countries separately and to low, lower-middle and upper-middle income countries separately for the period of 1998 and 2008, inclusive.

5. Results

In order to find the female determinants of economic development, only fixed effects panel data analysis results with the yearly dummies for high income and other income countries, separately are provided in the paper in Table 1. The analysis is applied in STATA 9. For finding if the country specific effects (μ_i) are significant which causes the estimation of the model with the pooled Ordinary Least Squares to be impossible, joint significance of the country specific F-test should be applied. Table 4 gives the joint significance F test result of the fixed effects models and it is found that the country specific effects are significant. Therefore in the course of fixed effects estimations, the significance of both individual effects and the coefficients of explanatory variables are examined and those variables with insignificant coefficient estimates (i.e. p-values>0.10) are excluded from the models and the results for the most significant models are given in Table 1.

According to the fixed effects results displayed in Table 1, it is observed that at least 46% of the variance is due to differences across countries (rho). Moreover, the correlations between the explanatory variables and the unobservable cross sectional specific factors (μ_i) given in Table 5 indicates that the correlations are high and therefore random effects would be inconsistent. Similarly from Table 5 that shows the Hausman test results, it is seen that random effects estimates are not consistent given the p-values that are less than even 0.01. The results that are found to be statistically significant (according to the p-values of the coefficients given in parentheses and according to the F values of the overall models) for the low, lower middle, upper middle income countries are displayed in the first 3 columns of

Table **1** and the rest of the columns (columns 4-8) represent the statistically significant results for high income countries. Among the economic indicators, it can be seen that inflation rate (var78), percentage of trade in GDP (var82) and population growth rate (var93) are highly statistically significant in explaining economic growth for both high income and low, upper middle, lower middle income countries. Inflation rate and population growth rate have a negative impact whereas trade share in GDP has a positive impact. The signs of these variables are as expected. For all of the models time dummies are jointly significant.
Apart from the economic indicators, for low, upper middle, lower middle countries, the 1st column of

Table **1** shows that employment of female to population ratio (var17) and female survival to age 65 as a percentage of cohort (var65) have a positive impact; unemployment rate (var72) has a negative impact on economic growth. Furthermore, none of the educational, political indicators and fertility rates is significant for the low, upper middle, lower middle income level countries. These results are

very surprising that none of the educational, political indicators and fertility rates is found to be statistically significant.

The fixed effect results for high income countries are given on the 4-8th columns of Table 1 and it can be seen that fertility rate (var4), agricultural female employment rate (var14), female unemployment rate (var72) are highly statistically significant and have a negative impact on economic growth, whereas educational indicator of female to male tertiary enrolment rate (var48) and the proportion of seats held by women in the national parliaments (var45) have positive statistically significant impacts on economic growth.

As a result, it can be concluded that for the 1998-2008 period, women being less fertile, less active in the agricultural sector, being more employed, being more educated and getting more involved in politics increases the economic growth in high income countries whereas the more women are employed or in other words the less they are unemployed and the more healthier the women are, the higher the economic growth rate is for low, lower-mid and upper-mid income countries. For all income levels the increase in inflation rate and population growth decreases economic growth while an increase in trade as a percentage of GDP increases economic growth.

Table 1 - Results of Fixed Effects for Low, UpperMiddle, Lower Middle and for High Income Countries between 1998-2008, inclusive.

For Low, Lower-Mid, Upper-Mid Incomes				For High Incomes (OECD and nonOECD)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
var4						-0.1596**		
						(0.020)		
var14				-0.3020**			-0.2897*	
				(0.028)			(0.053)	
var17	0.0852*							
	(0.083)							
var72		-0.1416***			-0.2293***	-0.2549***		-0.2243***
		(0.010)			(0.000)	(0.000)		(0.001)
var48							0.0546***	0.0508***
							(0.002)	(0.004)
var65			0.0944*					
			(0.093)					
var45				0.0844**	0.0878**	0.0981**	0.0997**	0.0962**
				(0.035)	(0.025)	(0.013)	(0.037)	(0.038)
var78	-0.0267***	-0.0554***	-0.0258***	-0.4009***	-0.4287***	-0.4130***	-0.3477***	-0.3701***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
var82	0.0430***	0.0582***	0.0472***	0.0639***	0.0653***	0.0691***	0.0627***	0.0634***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
var93	-0.5496**	-1.1896*	-0.5734**	-0.8356***	-1.0890***	-1.0724***	-1.0549**	-1.3513***

	(0.046)	(0.080)	(0.035)	(0.002)	(0.000)	(0.000)	(0.015)	(0.002)
ydum1	dropped	-1.6591*	-1.2784**	5.1677***	4.5538***	5.4319***	5.0418***	dropped
		(0.068)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	

Table 1 – Continues: Results of Fixed Effects for Low, UpperMiddle, Lower Middle and for High Income Countries between 1998-2008, inclusive.

ydum2	0.2597	-2.2410**	-1.1941**	4.7855***	4.2037***	5.0108***	5.2938***	0.4743
	(0.592)	(0.014)	(0.020)	(0.000)	(0.000)	(0.000)	(0.000)	(0.389)
ydum3	0.8425*	-0.3015	-0.4579	5.5152***	4.9082***	5.5523***	5.9086***	1.0940**
	(0.081)	(0.727)	(0.360)	(0.000)	(0.000)	(0.000)	(0.000)	(0.048)
ydum4	0.6090	-1.0468	-0.9234*	2.7611***	2.1741***	2.7456***	3.3429***	-1.4389**
	(0.207)	(0.231)	(0.063)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)
ydum5	0.1459	-1.0912	-1.2774***	3.0044***	2.4382***	2.9612***	3.2915***	-1.4603**
	(0.763)	(0.211)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)
ydum6	1.7251***	0.7319	0.2637	2.7764***	2.2975***	2.7594***	3.1527***	-1.5199**
	(0.000)	(0.396)	(0.588)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)
ydum7	2.7676***	1.5681*	1.1685**	3.6735***	3.2732***	3.6561***	3.9643***	-0.6259
	(0.000)	(0.062)	(0.015)	(0.000)	(0.000)	(0.000)	(0.000)	(0.286)
ydum8	2.4615***	0.6154	0.9258*	3.1787***	2.7496***	3.0447***	3.3257***	-1.3009**
	(0.000)	(0.468)	(0.052)	(0.000)	(0.000)	(0.000)	(0.000)	(0.036)
ydum9	3.0825***	1.4932*	1.4914***	3.4469***	3.1290***	3.3166***	3.4218***	-1.1977*
	(0.000)	(0.076)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.064)
ydum10	2.9041***	1.6578*	1.3188***	3.2938***	2.6370***	2.7369***	3.3349***	-1.4235**
	(0.000)	(0.053)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.033)
ydum11	1.5889***	dropped	dropped	dropped	dropped	dropped	dropped	-4.2003***
	(0.003)							(0.000)
Constant	-4.6013*	2.2498	-5.9672	-5.9637***	-4.8786***	-3.2416*	-12.8455***	-6.8963***
	(0.061)	(0.271)	(0.138)	(0.000)	(0.002)	(0.057)	(0.000)	(0.007)
Obs	1,109	504	1,193	385	400	400	322	331
R	0.4563	0.5393	0.4444	0.6508	0.6662	0.6727	0.6410	0.6551
# country	110	91	118	40	39	39	36	35
corr(u_i,X)	-0.375	-0.501	-0.552	-0.906	-0.886	-0.921	-0.885	-0.853
rho	0.465	0.586	0.499	0.909	0.878	0.916	0.860	0.824
ll	-2862	-1241	-3088	-726.5	-757.9	-754.8	-600.6	-615.6
F	18.50	11.68	18.65	16.16	18.41	17.82	11.77	13.15
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F (u_i)	5.50	3.18	5.46	7.58	8.12	8.25	5.81	6.47
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

pval in parentheses*** p<0.01, ** p<0.05, * p<0.1

6. Conclusion

Improving female life standards through advancing women's economic opportunities as well as improving women's health and education has been at the core of World Bank and many other institutions since it is believed that it is essential to reduce the gender inequalities that exist for economic development. As a result, in this study, it is aimed to analyse the economic growth of countries through the prism of gender, finding which of the female indicators are important to improve economic growth. With this aim, data of 187 countries for the period of 1998-2008 (inclusive) are analysed using fixed effects panel data models for high income and other income countries separately. From these points of view, this paper extends the existing literature by attempting to analyse the data from all of the countries in the world for a recent time period and with a distinction of the countries according to their income levels.

According to the analysis, it can be concluded that for the 1998-2008 period, for all income levels the increase in inflation rate and population growth decreases economic growth while an increase in trade as a percentage of GDP increases economic growth. In high income countries, women being less fertile resulting in increased resources devoted to the production of goods, participation in the labour force and education rather than child rearing and women being less active in the agricultural sector, women being more employed and more educated and women getting more involved in politics, increase the economic growth.
Similarly for low, lower-upper middle income countries, the more women are employed or in other words the less they are unemployed and the healthier the women are, the higher the economic growth rate is. On the other hand, the models for low, lower-upper-middle income countries are less explanatory with fewer determinants of economic growth compared to high income countries. For example, none of the educational, political indicators and fertility rates is significant. Though, this result does not show that these indicators are not at all important for low, lower-upper middle income countries but not statistically significant. In order to reach to the high income level countries' standards all dimensions should be continuously improved.

As a result, in order to sustain a level of economic growth or improve it, countries should always consider decreasing the female inequality and improving the female indicators such as education, employment, fertility and political involvement. These findings are based on only female indicators and the research could be enhanced with the analysis of female to male ratios of all of the indicators included in the analysis. Moreover, the direction of causality between the variables could be questioned with panel causality tests, and with the structural equation modelling for panel data a more detailed analysis could be done. Since the period used in this research is between 1998 and 2008, the validity of the findings for other periods could be investigated as well.

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Appendix

Table 2 - Summary statistics of the variables used in the analysis for High Income OECD and nonOECD countries between 1998 and 2008, inclusive.

	Variable	Obs	Mean	Std.Dev.	Min	Max
GDP per capita growth	gdpPerCapG	803	2.74	5.36	-16.36	65.77
Fertility rate	var4	583	22.13	21.96	2.27	133.39
	var20	858	2.26	1.26	0.86	7.04
Employment	var14	541	4.09	4.96	0.00	35.00
	var17	647	42.82	10.60	13.50	67.30
	var26	818	38.09	10.27	10.88	49.80
	var72	545	8.53	5.42	1.10	29.00
Education	var41	414	94.55	13.58	27.49	123.52
	var43	478	77.11	12.81	23.65	97.58
	var48	502	73.51	29.32	1.59	138.82
	var53	574	100.88	9.29	56.06	140.72
	var54	467	92.78	9.00	42.06	100.00
	var55	551	97.06	21.43	14.67	175.37
	var56	362	86.61	10.63	26.96	100.00
	var57	501	50.25	27.13	0.25	104.83
	var58	428	57.56	10.37	4.36	81.89
	var61	501	138.11	73.41	14.17	626.49
	var67	426	94.19	8.57	46.23	100.00
Health and life	var28	853	77.60	6.38	46.27	86.05
	var33	557	77.93	49.71	33.14	399.77
	var65	583	87.99	7.40	44.87	94.49
Political involvement	var45	510	17.89	11.14	0.00	47.30
Economic	var78	743	9.22	81.12	-17.64	1500.00
	var80	359	1.59	1.07	0.02	4.77
	var81	319	2865.82	1726.65	141.08	8004.75
	var82	736	113.33	67.68	18.97	438.09
	var93	918	1.34	2.16	-44.41	12.83

Table 3 - Summary statistics of the variables used in the analysis for Low, Lower Middle and Upper Middle Income countries between 1998 and 2008, inclusive.

	Variable	Obs	Mean	Std.	Min	Max
GDP per capita growth	gdpPerCapG	2644	2.00	6.22	-44.15	90.47
Fertility rate	var4	1441	72.35	46.09	3.11	240.89
	var20	2672	3.78	1.60	1.09	8.61
Employment	var14	829	23.66	23.19	0.00	89.30
	var17	1947	44.00	16.80	8.10	85.50
	var26	2614	38.44	9.34	10.80	53.34
	var72	949	12.74	8.33	0.40	47.10
Education	var41	1246	77.67	26.04	2.92	150.93
	var43	1314	61.41	23.64	0.00	99.68
	var48	1394	37.41	28.80	0.28	120.36
	var53	1738	97.25	21.46	0.00	158.60
	var54	1078	81.20	18.11	20.62	100.00
	var55	1506	59.22	29.21	0.00	116.99
	var56	751	52.01	26.69	2.22	97.25
	var57	1072	20.77	22.01	0.00	153.74
	var58	1058	48.65	20.35	4.16	95.53
	var61	1068	96.52	47.41	0.00	530.70
	var67	985	81.61	18.78	20.78	100.00
Health and life	var28	2681	66.56	9.29	40.32	81.75
	var33	1602	199.48	124.56	51.96	688.56
	var65	1441	67.92	16.36	25.15	90.15
Political involvement	var45	1541	12.10	8.62	0.00	56.30
Economic	var78	2259	59.95	639.83	-100.00	24411.03
	var80	497	0.42	0.29	0.01	1.49
	var81	294	665.98	818.71	6.19	3790.50
	var82	2554	80.90	39.55	0.31	280.36
	var93	2827	1.66	1.30	-6.68	11.18

Table 4 - F Test Results for the Joint Significance of Country Specific Effects in Fixed Effects Models for Low, UpperMiddle, Lower Middle and for High Income Countries between 1998-2008, inclusive.

For Low, Lower-Mid, Upper-Mid Incomes				For High Incomes (OECD and nonOECD)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
F (u_i)	5.50	3.18	5.46	7.58	8.12	8.25	5.81	6.47
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5 - Hausman Test Results for Deciding between Fixed or Random Effects Models for Low, UpperMiddle, Lower Middle and for High Income Countries between 1998-2008, inclusive.

For Low, Lower-Mid, Upper-Mid Incomes				For High Incomes (OECD and nonOECD)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
corr(u_i,X)	-0.375	-0.501	-0.552	-0.906	-0.886	-0.921	-0.885	-0.853
Chi-Sq	-	33.59	338.07	516.55	-	-	-	-
p-value	-	0.0024	0.0000	0.0000	-	-	-	-

- Hausman test not applicable.

Table 6 - Breusch-Pagan Lagrange Multiplier Test for Evidence of Significant Differences Across Countries for Low, UpperMiddle, Lower Middle and for High Income Countries between 1998-2008, inclusive.

For Low, Lower-Mid, Upper-Mid Incomes				For High Incomes (OECD and nonOECD)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Chi-Sq	420.65	37.17	442.50	42.04	62.70	61.17	54.20	51.77
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000