The Panel Data Analysis of Female Labor Participation and Economic Development Relationship in Developed and Developing Countries

Murat Belke
Department of Economics, FEAS
Mehmet Akif Ersoy University, Turkey
muratbelke@gmail.com

Suleyman Bolat (Corresponding Author)
Department of Public Finance, FEAS
Aksaray University, Turkey
bolatsuleyman80@gmail.com

Abstract
This study investigates the long term (structural change in the economy) determinant of female labor participation. We test the U-shape hypothesis which is developed by Boserup (1970) and Goldin (1995) for the long-term relationship between economic development and female labor participation. The dataset includes 148 countries between the different time periods from 1991 to 2014. We also divide countries into two group based on the IMF methodology: developed countries (36 advanced countries) and developing countries (112 emerging and other developing countries). This paper used both fixed effects model and system generalized method of moments (GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). Results indicate that the U-shape hypothesis is valid in developing countries independently from the estimation methodology.

Keywords: Female Labor Participation, Economic Development, Labor Market, Panel Data Analysis

JEL classifications: C23, F66, J16, J21, J22.

Introduction

The economic development and women's labor participation have discussed in the Labor markets. There is an important body of literature that includes the relationship between women Labor participation and economic development. Especially, this issue about female Labor participation has become one of the most important topics in the Labor markets. In the aftermath of EU crisis, Labor markets have been started to investigate both theoretical perspectives and empirical research. Some theories supposed a U-shaped link between the Female Labor Participation (FLP), women's social economic and political status and economic development in the Labor markets. Some scholars/economists highlight that some institutions restrain the female's capacity to achieve equal status in the working life. The relationship between gender equality and economic development is likely to be a U-shaped figure. This shows that the equality can decrease in the initial stages of development and then can increase beyond some economic threshold in the economy (Eastin and Prakash, 2013; Tam, 2011; Durand, 1975; Psacharopoulos and Tzannatos, 1989; Goldin, 1995; Gaddis and Klasen, 2014).

In this analysis, we investigate that the relationship between development and gender equality is even more complex a finding with policy implications. So, the findings we receive in these models can increase an important theoretical and policy issues enclosure to the consequences of economic development on gender gaps (Lechman and Kaur, 2015).

There is an important literature which investigates the relationship between economic development and female Labor participation in the Labor markets. Some researchers focus on the effect of the gender gaps in terms of education and employment on the economic growth (Seguino 2000a, 2000b; Blecker and Seguino, 2002; Esteve-Volart, 2004; Cavalcanti and Tavares, 2007; Klasen, 2002; Klasen and Lamanna, 2009). Other hand, there is another literature that studies on the economic growth on the female Labor participation (Boserup, 1970; Durand, 1975; Pampel and Tanaka, 1986; Psacharopoulos and Tzannatos, 1989; Goldin, 1990, 1995; Cagatay and Ozler, 1995; Mammen and Paxson, 2000; Lincove, 2008; Luci, 2009; Tam 2011).

Some scholars have employed in extended argue on the connection between women's economic, social and political status and economic development. In this area, some critics highlight that some institutions restrict female capability to obtain equal status in the work life (Jütting et al, 2006). The development only cannot enhance the female labor force participation. Some studies refer to some examples of female labor force non-participation so long as economic development expands male participation and male gains. Thus, this situation constrains the female Labor participation to get out from the formal labor markets and has tendency to chores. After women get into the labor force, they are limited to skivvy, secretaryship, clerical and flunkey status which show for the gender gap in the labor market (Forsythe, Korzeniewicz and Durrant, 2000; Wilensky, 1968; Blackburn and Jarman, 2006). Other hand, some critics proposes that the specific kind of economic development can deteriorate gender gap in the labor market. The recruitment of males to formal labor force induces to male out migration move towards urban areas. This situation rejects female labor force and opportunities in labor market and formal employment areas, as this coerces them to stay at their home and force to follow the petty affairs. Female labor force participation is possible female favoritism and restriction and female labor force leads to menial and secondary workplaces in the labor markets (Eastin and Prakash, 2013).

The feminization U hypothesis connecting economic development and female labor force participation is based on Goldin (1990, 1995). Following these studies, if incomes are low and most population earns from agricultural activity for their lives, and finally female labor take part in labor force. At that situation, fertility rates are still high and women's labor are used in the family farm areas or their work life continue in household business that permits to compound the economic activity with bringing up their children (Gaddis and Klasen, 2014).

After the decline in fertility, part-time jobs start to increase in the labor area, and the greater access to child-care facilities provides opportunity for women in work outside from the house with growing their children. In later stages for economic development, after the female education grow, fertility rates, and socio-cultural positions develop and finally, female labor force participation

increases in the labor market (Gaddis, 2013; Psacharopoulos and Tzannatos, 1989; Goldin, 1990, 1995; Mammen and Paxson, 2000).

The plan of this paper is organized as follows. Section II presents the data and model used in our study. Section III discusses our empirical findings and finally, section IV concludes the paper.

Data and Model

This study investigates the long term (structural change in the economy) determinant of female Labor participation. We test the U-shape hypothesis which is developed by Boserup (1970) and Goldin (1995) for the long-term relationship between economic development and female Labor participation. U-shape hypothesis build on Kuznets's thesis suggesting a curvilinear relationship between economic development and female Labor participation. For the curvilinear relationship between economic development and female Labor participation, we use level (LGDP) and square ($LGDP^2$) of natural logarithm of gross domestic product in the regression equation.

The dataset we used was collected from International Labor Organization economically Active Population, Estimates and Projections (ILO-EAPEP) database and World Bank's World Development Indicators database. Female labor force participation rate (FLPR) is defined as the number of the economically active female population between 15-64 ages divided by the total female population of the same age group (15-64). Economic development level is measured by the real gross domestic product (GDP) per capita (in constant 2005 US$).

We have taken the natural logarithm of all the variables (LFLPR and LGDP). The dataset includes 148 countries between the different time periods from 1991 to 2014. These countries are selected based on the availability of data for the period 1991-2014. The dataset is unbalanced with several observations missing over different years and countries due to the lack of data. We also divide countries into two group based on the IMF methodology: developed countries (36 advanced countries) and developing countries (112 emerging and other developing countries).

This study employed both fixed effects model and system generalized method of moments (GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). In addition to the fixed effects estimates we also provide system GMM estimation as a consistency check. GMM estimator takes into account the problems caused by unobserved country specific effects and joint endogeneity in lagged dependent variable models, and provides control for simultaneity and omitted variable biases.

Our main model follows Goldin (1995) approach to test the U-shape hypothesis;

$$LFLPR_{i,t} = \alpha_i + \beta_1 LGDP_{i,t} + \beta_2 (LGDP_{i,t})^2 + \varepsilon_{i,t}$$

GMM equation;

$$LFLPR_{i,t} = \rho LFLPR_{i,t-1} + \beta_1 LGDP_{i,t} + \beta_2 (LGDP_{i,t})^2 + \mu_i + \varepsilon_{i,t}$$

where LFLPR is the natural logarithm of the female Labor participation rate, LGDP represents the natural logarithm of gross domestic product (GDP) per capita at constant 2005 US$. μ_i is an unobserved country specific effect, ε is the error term, and i and t represent subscripts for countries and time respectively.

Empirical Results

In this analysis, the fixed effects and system-GMM regression results are shown in table 1 (FE; Fixed effects and S-GMM; system-GMM). Fixed effects regression results confirm the validity of U-shape hypothesis in all countries and in sub-samples both developed and developing countries. The coefficients LGDP $(\beta_1 < 0)$ and LGDP^2 $(\beta_2 > 0)$ variables are both statically and economically significant at conventional significance levels. But for GMM results show that U-shape hypothesis is not valid in developed countries in the research period. GMM results support the fixed effects models results in all countries and in developing countries. The U-shape hypothesis is valid in developing countries independently from the estimation methodology (Table 1).

Table 1: Panel Data Estimates for the U-shaped Relation between Female Labor Participation and Economic Development for 148 Countries, 1991-2014

	Dependent Variable: LFLPR					
	All Countries		Developed Countries		Developing Countries	
Independent Variables	FE	S-GMM	FE	S-GMM	FE	S-GMM
LFLPR (-1)		0.914		0.921		0.921
		(0.037)***		(0.033)***		(0.048)***
LGDP	-0.501	-0.070	-0.811	0.146	-0.509	-0.180
	(0.104)***	(0.043)*	(0.459)*	(0.097)*	(0.167)***	(0.058)***
LGDP^2	0.027	0.005	0.0428	-0.007	0.028	0.012
	(0.007)***	(0.003)*	(0.025)*	(0.004)	(0.012)**	(0.004)***
Hansen Test		0.256		0.250		0.705
AR(2)		0.477		0.841		0.506
Observation	2510	2154	746	688	1764	1466
Countries	148	148	36	36	112	112
R^2	0,27		0,58		0,18	

Notes: *All regressions (both fixed effects and system GMM) include time effects, which are not reported. Standard errors are in parentheses. The symbols *, **, *** indicate significance 10%, 5% and 1% levels, respectively. FE: country fixed effects with robust standard errors clustered by country. S-GMM (system GMM) estimation: Two step using Windmeijer standard errors with small sample correction and control variables treated as endogenous (instrumented using 2nd and 3rd lag).*

Conclusion

This paper examined at the relationship between female labor force participation and economic development in the developed countries (36 advanced countries) and developing countries (112 emerging and other developing countries). It has done so by using a fixed effects model and system-GMM regression results are shown in the analysis. The econometric results supported the evidence for the U-shape hypothesis.

Fixed effects regression results confirm the validity of U-shape hypothesis in all countries and in sub-samples both developed and developing countries. In the results, only GMM results present that U-shape hypothesis is not valid in developed countries in this period. Other hand, the GMM results promote the fixed effects models results in all samples and in developing countries. The U-shape hypothesis is valid in developing countries independently from the estimation methodology.

This paper limited by the lack of historical data. Further researchers will use historical data to detect the relationship in countries that have different economic take-off stages.

References

Arellano, M. and O. Bover, 1995, "Another Look at the Instrumental Variable Estimation of Error-components Models," *Journal of Econometrics*, 68(1), 29–51.

Blackburn, R. M., and J. Jarman, 2006, "Gendered Occupations: Exploring the Relationship between Gender Segregation and Inequality," *International Sociology,* 21(2), 289–315.

Blecker, R.A., and S. Seguino, 2002, "Macroeconomic Effects of Reducing Gender Wage Inequality in an Export Oriented, Semi-industrialized Economy," *Review of Development Economics*, 6(1),103–119.

Blundell, R., and S. Bond, 1998, "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," *Journal of Econometrics*, 87(1), 115–143.

Boserup, E., 1970, "Woman's Role in Economic Development," St. Martin, New York.

Cagatay, N., and S.Ozler, 1995, "Feminization of the Labor Force: The Effects of Long-term Development and Structural Adjustment," *World Development*, 23(11), 1883–1894.

Cavalcanti, T., and J. Tavares, 2007, "The Output Cost of Gender Discrimination: A Model-Based Macroeconomic Estimate," Discussion Paper 6477. Centre for Economic Policy Research, London.

Durand, J. D., 1975, "The Labor Force in Economic Development: A Comparison of International Census Data 1946–1966," Princeton University Press, Princeton.

Eastin, J. and A. Prakash, 2013, "Economic Development and Gender Equality: Is There a Gender Kuznets Curve?," *World Politics*, 65(01), 156-186.

Esteve-Volart, B., 2004, "Gender Discrimination and Growth: Theory and Evidence from India." DEDPS Discussion Paper 42, London School of Economics and Political Science, London.

Gaddis, I. and S. Klasen, 2014, "Economic Development, Structural Change, and Women's Labor Force Participation: A Reexamination of the Feminization U Hypothesis," *Journal of Population Economics*, 27(3), 639–681.

Goldin, C., 1990, "Understanding the Gender Gap: An Economic History of American Women," Oxford University Press, New York.

Goldin, C., 1995, "The U-Shaped Female Labor Force Function in Economic Development and Economic History," in: Schultz TP (Ed) Investment in Women's Human Capital, University of Chicago Press, Chicago, 61–90.

Jütting, J.P., C. Morrisson, J. Dayton-Johnson, and D. Drechsler, 2006, "Measuring Gender (In)Equality: Introducing the Gender, Institutions and Development Data Base (GID)," *Journal of Human Development,* 9(1), 65–86.

Klasen, S., 2002, "Low Schooling for Girls, Slower Growth For All? Cross-Country Evidence on the Effect of Gender Inequality in Education on Economic Development," *World Bank Economic Review*, 16(3), 345–373.

Klasen, S. and F. Lamanna, 2009, "The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for A Panel of Countries," *Feminist Economics*, 15(3), 91–132.

Lechman, E. and H. Kaur, 2015, "Economic Growth and Female Labor Force Participation–Verifying the U-Feminization Hypothesis. New Evidence for 162 Countries over the Period 1990-2012," *Economics and Sociology*, 8(1), 246-257.

Lincove, J.A., 2008, "Growth, Girls' Education, and Female Labor: A Longitudinal Analysis," *Journal of Development Areas*, 41(2), 45–68.

Luci, A., 2009, "Female Labor Market Participation and Economic Growth," *International Journal of Innovation Sustainable Development*, 4(2/3), 97–108.

Mammen, K., and C. Paxson, 2000, "Women's Work and Economic Development," *Journal of Economic Perspectives*, 14(4), 141–164.

Pampel, F.C., and K. Tanaka, 1986, "Economic Development and Female Labor Force Participation: A Reconsideration," *Social Forces*, 64(3), 599–619.

Psacharopoulos, G., and Z. Tzannatos, 1989, "Female Labor Force Participation: An International Perspective," *World Bank Research Observer*, 4(2), 187–202.

Seguino, S., 2000a, "Accounting for Gender in Asian Economic Growth," *Feminist Economics*, 6(3), 27–58.

Seguino, S., 2000b, "Gender Inequality and Economic Growth: A Cross-Country Analysis," *World Development*, 28(7), 1211–1230.

Tam, H., 2011, "U-Shaped Female Labor Participation with Economic Development: Some Panel Data Evidence," *Economics Letters*, 110(2), 140–142.

Verme, P., 2015, "Economic Development and Female Labor Participation in the Middle East and North Africa: A Test of the U-Shape Hypothesis," *IZA Journal of Labor & Development*, 4(3), 1-21.

Wilensky, H.L., 1968, "Women's Work: Economic Growth, Ideology, and Social Structure," *Industrial Relations,* 7(3), 235–248.