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# Female Labor Force Participation and Economic Growth in Developing Countries

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*Abstract-* This paper examines the relationship between female labor force participation and its impact on economic growth. The paper further explores whether the impact of the female labor force participation on economic growth is different for developing countries as a whole compared with countries in sub-Saharan Africa (SSA). I hypothesize, that female labor force participation will have a positive effect on economic progress in developing countries including countries in SSA. I use a panel data from the World Development Indicators (WDI) from 1975-2015, and employ a neoclassical growth model to examine how the female labor force participation, affect economic growth. Using the 'system' GMM estimator, my findings reveal that the female labor participation has a positive impact on economic growth, in developing countries, and that of SSA countries only. This paper contributes to the literature analyzing the importance of female labor force participation on economic growth. By examining, the impact on 139 countries that make up the developing world analysis from this further strengthens the link between female labor force participation and economic growth.

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# Female Labor Force Participation and Economic Growth in Developing Countries

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## I. Introduction

The importance of the female labor force participation has been acknowledged for decades (Boserup, 1970, 2013; Durand, 1975; Pampel and Tanaka, 1986; King and Hill, 1997; Mamnen and Pazason, 2000; Juhn and Ureta, 2003 and Lincove, 2008; Lechman and Kauer, 2015). Drawing from empirical studies, economic empowerment has also been recognized as a prerequisite for Sustainable Development Goals (SDGs). As female labor force participation is an important aspect of economic empowerment, some have specifically addressed these two variables. This paper thus contributes to this major field by extending studies that examine how female labor force participation affect economic growth, in developing countries, in general. By utilizing analysis of countries in SSA, this paper aims at providing a comparative perspective on the association between female labor force participation and economic development.

Having noted the goals and objectives of the study, as well as some significant contributions, this paper provides the theoretical framework to discuss the impact of female labor force participation on per capita GDP growth. I employ the 'system' General Method of Moments (GMM) proposed by Blundell and Bond (1998) to estimate a linear dynamic data of 139 countries over the period 1975 to 2015. The importance of using the system GMM estimator is that it is a more efficient estimator. My findings indicate that female labor force participation has positive and statistically significant effects on the economic growth in all developing countries, and in SSA as a separate region, after controlling for other factors that affect economic growth. I find no difference between the marginal effects in SSA and developing countries as a whole. The rest of the paper is as follows: Section 2 provides a brief background, and Section 3 describes the data. In Section 4, I discuss the method used in analyzing the data, and Section 5 presents the results. Section 6 concludes.

## II. Background

The existing literature examines how changes in the economies in specific countries result in changes in the female labor force participation as well. As economies remain, primarily agricultural research reveals that female labor force participation remains high as found in many developing countries. Since 1970s female labor force participation in developing countries mostly, in SSA, Latin America (LAC), and the Middle East have been rising (World Bank data, 2017). Contrary, female labor force participation in the other regions is characterized by cyclical periods in which labor is either plenteous or scarce. Çağatay and Özler (1995); Gaddis and Klasen, (2014) note the decline of female labor force participation as an economy moves from mainly an agricultural sector to an industrial one. Cavalcanti and Tavares (2011) show how female labor force participation, then increases as economies move to a more service- centered one. It is, however, crucial to note that cultural factors, including religious values and ethnic attitudes also affect the female labor force. Duflo (2012) reveals that women's labor force presence on economic development can be bidirectional, in the sense that economic development can lead to an increase in female labor force participation. Research by Berniell and Sánchez-Páramo (2011) reveal how household labor can have a negative effect on the female labor force. As women spend more time and energy on household labor, they have little time to

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participate in the formal labor force. Developing countries, on the other hand, the informal labor force affords women the opportunity to combine both, but also limit the most productive use of their time. In this case, as economies develop, women tend to spend less time on household chores and are therefore free to participate in the labor force (Greenwood, Seshadri et. al., 2005; Dinkelman, 2010). At the same time, women's high presence in the labor force can be seen as a prerequisite for economic development. In some developing countries, where female labor force participation is low, society views girls' education as insignificant because of the potential lack of economic contributions to households. An expansion in the female labor force participation may also result in the empowerment of women decision-making processes in the family, regarding decisions about fertility, education for daughters, etc. as women are empowered economically (Thomas, 1993).

## III. Data

I use a panel data from the World Development Indicators (WDI) data from the World Bank covering 139 developing countries, from 1975 to 2015. My dependent variable is per capita GDP growth (in 2010 US$), and my explanatory variables are female labor force participation, which is the variable of interest, capital, and female primary school enrollment. These variables have been proven to influence economic growth as found in studies by Shashid (2014), Lechman and Kauer (2015) among others. I use the gross primary school enrollment, rather than primary school educational attainment because of missing cells for most of the developing countries. Again, I use the primary school because not all developing countries, have reached universal secondary school education, but the majority of them has somewhat attained primary school education. I also include a dummy variable for sub-Saharan Africa in my regression. The table below is the summary of my datasets. Column 3 shows the mean and standard deviation for all developing nations. Columns 4 and 5 depict the mean and standard deviation for developing states, excluding SSA, and for only SSA countries respectively.

*Table 1:* Summary statistics of the data

| Variable | Label | All developing Countries | | Developing countries excluding SSA | | Only Sub-Saharan African countries | |
|---|---|---|---|---|---|---|---|
| | | Mean | Std. dev | Mean | Std. dev. | Mean | Std. dev. |
| Per capita GDP growth | gdppcr | 17988 | 15785.2 | 22069 | 15320.3 | 10547 | 13785.1 |
| Female labor force participation | Lft | 39.89.6 | | 37 | 9.8 | 44 | 7.1 |
| Capital | k | 23.010.4 | | 25 | 9.0 | 21 | 12.3 |
| Female primary school enrollment (gross) | ger1f | 97.0 22.6 | | 10215.0 | | 86 | 29.3 |

*Source, WDI, The World Bank databank: No. of countries, all developing countries: 139; No. of obs., 406 Developing countries excluding SSA: 91; No. of obs., 301; Only SSA countries: 48; No. of obs. 105 Time: 1975- 2015. Per capita GDP data are in constant 2010 U.S. dollars. Female labor force participation proportion of female population ages 15 and older that is economically active, who supply labor to produce goods and services during a given period (both formal & informal sectors). Capital is gross capital formation (% of GDP). School enrollment, primary, female (% gross).*

I present the summary statistics of the data are in Table 1. Column 3 shows the statistics for all developing countries. Column 4 depicts data for developing countries excluding SSA, and column 5 exhibits the data for only SSA countries. Though the mean for female labor force participation in SSA is higher than that of developing countries as a whole, their per capita GDP growth is lower than the rest of developing countries. The data buttress the existing literature that large stocks of physical capital and the accumulation of human capital positively correlate with per capita GDP growth. This can partly explain the low levels of investment in education in SSA; an element considered one of the key factors of human capital, which is a major, contributor to economic growth.

## IV. Estimation Procedure

I employ the neoclassical growth model to examine the impact of female labor force on per capita GDP growth. I use the 'system' General Method of Moments (GMM) estimator proposed by Blundell and Bond (1998) to analyze a panel data of 139 countries over the period 1975 to 2015. I find this approach, appropriate estimator for estimating growth equation in my study. Earlier researchers attested that the most crucial factor in determining economic growth is human capital (Barro, 1991; Romer, 1990). In developing countries, females constitute a majority of the labor force, particularly, in the agriculture sector and the informal sector. However, my study focuses on the impact of the female labor force (comprising formal & informal) on per capita GDP growth. The basic production function is the following:

$$Y = F(K, L) \quad (1)$$

where $Y$ represents per capita GDP, K is the capital stock, and L denotes labor. I expand the above production function model to include the variables shown below:

$$Y = f(k, lft, ger1f) \quad (2)$$

$Y$ and $k$ are as defined above, and lft = female labor force. I hypothesize that female labor force (lft) participation improves economic growth; thus, I expect a positive sign. I also hypothesize that human capital improves the productivity of capital stock, so I include education ger 1f (female gross primary school enrollment) as an argument in the growth of per capita GDP; thus, the expected sign is positive. Finally, I expect no difference between the impact of female labor force participation on economic growth in SSA and that of the developing countries as a whole. The explanatory variables are control variables that previous researchers have found to influence economic growth. I include $Y_{t-1}$ to test the convergence hypothesis. Also, I introduce female labor force participation in a quadratic form to test the hypothesis proposed by Schultz (1999) that the marginal impact of the growth of per capita GDP declines as the female labor force participation increases all other things equal. Next, I include a dummy variable sub-Saharan Africa (ssa) to determine if the impact of female labor force participation on per capita GDP growth in SSA countries differs from that of other developing countries. From the above discussion, I estimate the following equation to examine the effects of female labor force participation on per capita GDP growth:

$$LY_{it} = \alpha LY_{it-1} + \delta_1 lft_{it-1} + \delta_2 lft^2_{it-1} + \prod k_{it} + \beta ger1f_{it} + \lambda ssa + \varepsilon_{it} \quad (3)$$

$$\varepsilon_{it} = \mu_{it} + v_{it}$$

where i refers to countries and t indexes time. $Y_{it}$ is per capita GDP as a percent of GDP and $Y_{it-1}$ is the lag of per capita GDP, and $\varepsilon$ is the error term. I define the rest of the variables as shown above. I assume that female labor force ($lft_{it}$) is endogenous with per capita GDP ($Y_{it}$) in the model because improved female labor force participation causes per capita GDP growth to increase and vice versa. The explanatory variables may be correlated with the disturbance term ($\varepsilon_{it}$). To measure the impact of the independent variable of interest, on the dependent variable, I lagged the female labor force (lft) in the estimation model by one period.

Now, with a panel data, there might be a problem of fixed impacts contained in the error term in equation 3. To deal with this problem, I apply Arellano – Bond (1991) two-step difference GMM estimator, which uses the first-step residuals to estimate the covariance matrix of moment conditions, making the endogenous variables pre-determined; therefore, not correlated with the error in equation (3). Again, the presence of the lagged dependent variable, $Y_{it-1}$ step up auto-correlation. To correct this problem, Arellano – Bond applied first differencing to transform the regressors in Equation (3) as shown below:

$$\Delta Lgdppc_{it} = \alpha \Delta Lgdppc_{i\,t-1} + \delta_1 \Delta lft_{it} + \delta_2 \Delta lft^2_{it-1} + \prod \Delta k_{it} + \beta \Delta ger_{it} + \lambda \Delta ssa + \Delta \varepsilon_{it} \quad (4)$$

$$\Delta \varepsilon_{it} = \Delta \mu_{it} + \Delta v_i$$

According to Arellano – Bover (1995), Arellano – Bond difference GMM estimator makes the variables to be predetermined; thereby, making the lagged levels of the explanatory variables, weak instruments for the first-difference. Blundell – Bond (1998) proposed the 'system' GMM estimator as a better alternative. This approach presumes to alleviate the weak instruments problem by using additional moment conditions and free it from serial correlation, thus considered more efficient. The disadvantage of the 'system' GMM estimator approach, is that it uses 'too many' instruments Hayakawa (2007). The 'system' GMM estimator, however, is suitable for dynamic panel-data, hence provides useful background for my study. Therefore, I use the two-step 'system' GMM estimator to estimate a linear panel data to first calculate the effect of the female labor force participation on per capita GDP growth in developing countries in Equation (4) without the dummy variable (ssa). Next, I estimate Equation (4) with the dummy variable (ssa) to test if the marginal effect of female labor force participation in SSA on per capita GDP growth is significantly different from the marginal effect of female labor force participation in developing countries as a whole.

## V. Empirical Results

I use the 'system' GMM estimator over the difference GMM estimator to estimate the impact to female labor force on economic growth because it provides relatively better results. I analyze the parameters $\delta_1$, $\delta_2$ in a linear form followed by the marginal impact of female labor force participation on per capita GDP growth based on the following questions:

*a) Does female labor force participation affect developing countries economic growth?*

I estimate equation 4 without the dummy variable. The coefficients $\alpha$, $\delta_1$, $\delta_2$, $\beta$, $\prod$ and $\lambda$ are shown in Table 5. The test statistics lead me to reject the null hypothesis, $h_0$ that variation in the dependent variable cannot explain the variation in all the explanatory

variables. The test also shows no serial correlation. I estimate the marginal impact of the coefficients $\delta_1$, and $\delta_2$ as shown below.

By partially differentiating equation (4), $\frac{\partial \text{Lgdppc}}{\partial \text{lft}}$ in the linear form for all emerging countries, the parameter $\delta_1$ is positive and statistically significant at $\rho = 0.01$, suggesting that an increase in the female labor force participation influences per capita GDP positively. However, the coefficient of $\delta_2$ is negative and significantly different from zero at $\rho = 0.01$. Now, I calculate the marginal impact of an increase in female labor force participation on per capita GDP as shown below. The estimated value is positive, but at a diminishing rate. Therefore, I cannot use this result to predict what will happen to per capita GDP as female labor force participation continues to grow.

$$\frac{\partial gdppcr}{\partial lft} \; 10.81 + 2(-0.086)x \; 39.76$$

$$= 10.81 - 6.85$$

$$= 3.96 > 0$$

My results suggest that increased higher female labor force participation may encourage economic growth in developing countries, while the low rate of female labor force participation may lower economic growth. My findings are consistent with those found in similar studies (Tsani et al., 2013; Mujahid and Zafar, 2012). Other studies found a U-shaped relationship between female labor force participation and economic growth. However, for low-income countries, their U-shaped hypothesis of positive impact was not proven (Lechman and Kauer, 2015).

*b) Is the impact of an increase in female labor force participation on economic growth in developing countries different for SSA countries?*

I repeat equation (4), with the dummy variable (ssa) to examine the impact of female labor force participation in SSA countries on economic growth. I also investigate if the impact on per capita GDP growth in SSA countries is different from that of developing countries as a whole. The estimated coefficients are as reported in the last column of Table 2. Again, as addressed above, I use the parameters $\delta_1$ and $\delta_2$ to examine the impact of an increase in female labor force participation on per capita GDP growth. The parameter $\delta_1$ is positive and significant, suggesting that $h_0$ be rejected on the grounds that the dependent variable cannot be explained by the variation in the explanatory variables at $\rho = 0.01$. Also, there was no indication of autocorrelation. Here too, the parameter $\delta_2$ is negative and significant. The estimated marginal impact is positive, but at a decreasing rate, suggesting a diminishing return to economic growth as female labor force participation continues to expand.

$$\frac{\partial gdppcr}{\partial lft} \; 10.57 + 2(-0.083)x \; 39.76$$

$$= 10.57 - 6.61$$

$$= 3.96 > 0$$

Concerning the marginal impacts of female labor force participation on economic growth, my results show no significant differences between developing countries and SSA countries.

The estimated coefficient of the dummy variable (ssa) is negative and significant at $\rho = 0.01$, suggesting that SSA undermines the positive impact of female labor force participation on economic growth. Data not shown here indicates that female labor force participation in SSA countries continues to grow, particularly, in the agricultural sector. It could plausibly be the significant proportion of female labor force participation in the informal sector, where most of the labor force is semi-literate or illiterate (data are not shown).

I now turn my attention to the other variables; capital and female primary school enrollment. As expected, an increase in capital stock along with an improvement in female labor force participation affects per capita GDP growth positively. As hypothesized, an improvement in female primary school enrollment has a positive impact on economic growth; therefore, I reject h0. This suggests that educated labor force is more productive on the job as found in Petrakis and Stamatakis (2002), Keller (2006), and Appiah and McMahon (2002) among others, whose findings attribute the elevated level of per capita GDP growth in developed and developing countries to all levels of education. Educated labor force can afford to purchase health services, thus improve their human capital, suggests that government policies aimed towards the expansion of education for females have the potential to improve total labor force needed to improve human capital, hence, affect economic growth positively. Therefore, if developing countries want to increase their countries' economic growth, governments must embark on policies intended to improve the female labor force participation, by increasing female educational attainment necessary to boost their human capital that can help to enhance their economic growth.

## VI. Conclusion

This paper examines the effect of female labor force participation on economic growth in emerging countries. Furthermore, I investigated if the impact on per capita GDP growth in developing countries is different for SSA. By using a panel data of 139 countries that make up the developing world, and by employing the two-step 'system' GMM estimator, the study finds a positive marginal impact of an increase in female labor force participation on per capita GDP growth. The

estimated marginal impact is positive, but at a decreasing rate. Therefore, I cannot use my results to predict what will happen to per capita GDP growth as female labor force participation continues to expand. I did not find any difference in the impact of female labor force participation on economic growth in SSA and developing countries, as a whole. The findings in this study further strengthen the link between female labor force participation and economic growth in developing countries. Considering that this study lumped countries with different social, cultural and institutional contexts together, the strength of the findings may be called into question.

*Table 2:* 'System' GMM estimates of female labor force participation and economic growth

| | (1) | (2) |
|---|---|---|
| Variables | System GMM | System GMM |
| L.gdpper | 0.9869*** | 0.9869*** |
| | (0.000) | (0.000) |
| Lft | -1,093.9539*** | -1,068.6758*** |
| | (0.000) | (0.000) |
| L.lft | 1,081.0443*** | 1,057.1240*** |
| | (0.000) | (0.000) |
| lft2 | 8.7293*** | 8.4375*** |
| | (0.000) | (0.000) |
| L.lft2 | -8.5685*** | -8.2788*** |
| | (0.000) | (0.000) |
| K | 41.4281*** | 41.3770*** |
| | (0.000) | (0.000) |
| ger1f | 4.9198*** | 4.3217*** |
| | (0.000) | (0.000) |
| Ssa | | -731.6118*** |
| | | (0.001) |
| Observations | 2,211 | 2,211 |
| Number of id | 120 | 120 |

*Note: p-values in parenthesis. ∗ Significance at β=0.10. ∗∗ Significance at β=0.05. ∗∗∗ Significance at β =0.01.*

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