

Capital Formation and Three Major Sectorial Female Employments in Six South Asian Countries

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Abstract

Female employment is a crucial measure especially for developing countries. It increases women empowerment, brings financial solvency, declines poverty rate and gender gap, reduces unemployment rate, and improves living standard and more. The prime goals of the paper are to investigate the impacts of capital formation on three major sectorial (agriculture, industry and service) female employments in six South Asian countries. The panel data set for the six South Asian countries is collected from 1991 to 2018. Fixed effect, random effects model and Hausman test have been employed to conduct the study. To discuss the impacts of capital formation on the three female employment sectors the study is splinted in three models. The econometric outcomes of the first model represent that there is a highly significant strong negative impact of gross capital formation on the agricultural sector. The study identifies that mechanization, structural transformation, declining agricultural land areas through capital formation, and female literacy rate are the key factors for this expected result. On the other side, the empirical results of the second and third models make it clear that gross capital formation has strong and highly significant positive impacts in the industrial and service sectors. Findings of the study confirm that economic growth, improvement of educational level, growth of manufacturing, advertising, marketing, finance, entertainment, telecommunications, media, hospitality sectors, RMG sector, tourism sector, banks, insurance companies, NGOs, trade related services, living standard, and health sector through capital formation are the responsible factors for these desired results in the industrial and service sectors' female employment.

Keywords: *capital formation; agriculture sector; industry sector; service sector; fixed effects; random effects.*

JEL Classification: *C23; E22; E24; J21.*

Introduction

Female employment is an important indicator, particularly in developing countries. Nowadays, unemployment is a great challenge in many developing countries. Unemployment generates many negative private and social impacts (Alam et al., 2009, Alam, 2009). These include social inequality, loss of production, crime, family breakdown, poverty etc. Governments around the world are working together to solve this major problem (Alam, 2009). Involvement of more women in the labor market reduced the unemployment problem. In the past, the number of female workers in the labor market was very poor, especially in South Asian countries. But

nowadays it has been raised significantly due to some significant reasons where one of the most crucial factors is capital formation. Today, women are becoming an increasingly necessary part of the world's workforce. As the level of participation increased, their market labor and wages took on economic, political and social significance. Women's economic empowerment increases productivity, economic assortment and income equality, as well as other substantive development results (IMF, 2018). Companies benefit awfully from increased employment opportunities and leadership for women that have been shown to improve organizational performance and growth. It is calculated that companies with at least three women in leadership roles score higher in all aspects of organizational performance (Mckinesy & Company, 2018). If more women take part in the labor market, men will also benefit. The reason is that women's supplementary skills enhance productivity, thereby increasing everyone's wages (Dabla-Norris & Kochhar, 2009). More women in the workplace decline the gender gap. The strait of gender gaps promotes economic development and increases productivity. For many reasons, women's involvement in the labor market is covetable. Moreover, economic returns, women's employment also has positive developmental spillover effects: when women's income increases, families will expense more for their children's health and education, and women's paid work will give them more right to speak and participate more in society at home. For instance, female employment in the garment industry in Bangladesh has been linked to a decline in fertility, an increase in the age of marriage and higher educational attainment (Heath & Mobarak, 2015). For this study three female employment sectors were considered for the six South Asian countries, namely agriculture, industry and service sectors. The gross capital formation includes the production, transport and distribution of this part of the production of goods and services of the nation that is not consumed immediately, but is kept and added to the stock of the nation of wealth (kuznets, 1934). Capital formation is also considered as a key factor in the economic development of the economy and it is a crucial element of domestic investment. According to professor Nurkse (1953), the vicious cycle of poverty can be easily broken in underdeveloped countries through capital accumulation. It helps an economy to rise in the size of national employment, income and production, leading to acute inflation and balance of payments problems. Capital formation plays a special role in the development of the quality of human resources. The formation of human capital depends on education, health, economic and social security, training, freedom and welfare opportunities for which adequate capital is required. In the United States social security and saving were the crucial factors for capital accumulation (Blanchard et. al., 2003). Capital formation generates overhead capital and the essential environment for economic development of an economy. It helps to pursue technological progress, which prevents the use of more capital in the field of production, and with the increase in capital in production, the composition of capital changes (Suman). Capital formation generates employment in two ways: Firstly, when capital is produced, some workers create capital for factories, machinery, dams, irrigation work etc. Secondly, if you want to use capital, you need to hire more men and women, to produce additional goods (Guru, 2016). Improving human capital and production capital formation can create employment opportunities (Taraki & Arslan, 2019). The impacts of capital formation on the three female employment sectors (agriculture, industry and service) are discussed broadly in the later part of the study. The structure of my article is as follows. Section 2 represents a critical review of literature and further section 3 depicts the objectives of the study. Section 4 describes the methodology of the study and data sources. Section 5 provides results analysis and section 6 covers the discussion part. Finally section 7 summarizes the concluding remarks of the study.

Review of Literature

Corley et al. (2002) studied research into technology, growth and employment in the EU and US. Data was collected from various sources. The study used the regression method and fixed effects model. Research findings show that investments in broad capital, physical capital,

research and development and human capital are necessary for more production in all industries. In the high-tech and low-tech sectors, Europe needs to increase its level of investment in tangible and intangible capital per unit of labor employed. However, especially in high-tech industries, where there is a high potential for productivity and employment, investment levels are likely to deliver positive returns, especially if they include adequate investment in research and development and human capital. Meyer & Sanusi (2019) inspected the causality between gross capital formation (domestic investment), employment and economic growth utilizing quarterly data from 1995 to 2016 in South Africa. The econometric methods of their study included the Johansen cointegration test and the vector error correction model (VECM). Empirical outcome shows that there is a long-run relationship between domestic investment, employment and economic growth, with causality from growth to investment and not the other way around. The econometric results also show that investment has long-run effects on employment. Furthermore, the study also showed that there is a bi-directional causality between employment and economic growth, and there is an instance of unidirectional causality between investment and employment. Investment turned out to be a positive factor in employment in the long-run. They concluded that low interest rates, a favorable economic environment (investment promoting policies) can contribute to increasing employment opportunities. Padhi (2014) stated that the formation of human capital is an integral aspect of the growth of firms that, in their quest to achieve greater market access (and higher profits) are liable for new and better employment opportunities, thereby creating external economies that allow for a higher state of development. Therefore, a lot depends on the development of firms that create such good job opportunities. Bastola (2020) conducted a study to identify the determinants of employment in the three major sectors (agriculture, industry and service sectors) of Nepal from 1991 to 2019. The study used the Augmented Dickey-Fuller (ADF) test, ordinary least squares (OLS), and various types' diagnostic tests. He observed that education, health, population growth and inflation are negatively related to agricultural employment. Similarly, employment in the industrial sector is positively influenced by health and political conflicts, while being inversely influenced by the country's education level and interest rates. Employment in the service sector has been positively influenced by education, health, population growth and inflation, while the political conflict has had a negative impact. Ghosh (2012) stated that the predominance of financial capital, the emergence of new trade links, and the prolongation of global production chains based on the division of the production processes in different places, has radically changed the production and market structure of work around the world. Both the financial and production sectors have become more concentrated resulting in a relative decrease in small business, which are usually labor-intensive. Trade openness has created some new opportunities for income generation and employment. Pasara & Garidzirai (2020) studied the causality between gross capital formation, unemployment and economic growth in South Africa. In their study, they used time series data for the period from 1980 to 2018. Augmented Dickey Fuller (ADF) test, granger causality test and variance decomposition methods were applied for the study. They created three econometric models for this research. The econometric outcome of the second model reveals that there is a positive and significant relationship between unemployment and gross capital formation whereas the third model argues that there is a negative relationship between unemployment and gross domestic product (GDP). At the end of the study, they suggested expansionary fiscal policy to stimulate employment and economic growth. Arestis & Biefang-Frisancho Mariscal (2000) asserted that capital formation is a crucial factor that determines unemployment rates and wages. Results of their model depicts that NAIRU is a decreasing function of capital stock. They found that capital accumulation has a significant effect on employment rates in Great Britain and Germany. Piva & Vivarelli (2018) investigated a study on technological change and employment in 11 European countries. For the study they used a database which covered the 1998-2011 periods with 3073 observations. They employed a generalized method of moments (GMM) in the Blundell & Bond (1998) version (GMM-SYS). They found two main results. One of the results is that capital formation is negatively related to employment. The result indicates that due to the technological changes included in the total

investment, there may be a labor-saving effect. Khan & Chaudhry (2019) investigated the relationship between human capital, employment opportunities and economic growth in developing countries in 1996-2018. They utilized fixed effects and random effects models to analyze a panel data set for 48 countries. For the study life expectancy and education expenditure are used as proxy variables to determine human capital. The empirical outcomes of the research show that human capital has a positive and significant impact on employment and economic growth. Capital formation is also included in the models as an independent variable. The econometric outcomes represent that capital formation also has a positive effect on economic growth and employment opportunities. Fang et al. (2013) guided research on female employment and fertility status in China. They collected data on 2,355 married women from the 2006 China Health and Nutrition Survey (CHNS). OLS, two-stage least squares estimation and Poisson estimation techniques are used for the research. The results of the study state that the employment of women declines the preferred number of children of a married woman by an average of 0.35 while her actual number of children decreases by 0.50.

As far as I know, such a comprehensive study to explore the impacts of gross capital formation on the three major sectorial (agriculture, industry, and service) female employment has not been commenced for the six South Asian developing countries. Thus, this research paper will fill the research gap in the exploratory literature.

Objectives of the Study

- (1) Analyze the impacts of gross capital formation on female employment in the agricultural sector.
- (2) Investigate the impacts of gross capital formation on female employment in the industrial sector.
- (3) Explore the impacts of gross capital formation on female employment in the service sector.

Data and Methodology

The panel data set for the six South Asian countries (India, Pakistan, Sri Lanka, Bangladesh, Nepal, and Bhutan) is balanced over the 1991 to 2018 range, giving 168 observations. The study here used extended data series which has many good aspects. It improves the degrees of freedom, diminishes the impacts of the business cycle, and eases collinearity. It gives us more efficient estimates than cross-section and time series data (Baltagi, 2005). Moreover, panel estimation can control heterogeneity problems and minimize specification error bias (Kimino et al. 2007). For this study, secondary data are collected from the World Development Indicators, World Bank database and United Nations-World Population Prospects for the six South Asian countries. Three independent variables (gross capital formation, GDP per capita, fertility rate) and the three dependent variables (female employment rate in the agriculture, industry and service sectors) were selected for the study. To justify the effect of the three independent variables on the three dependent variables, the following three econometric models have been developed.

$$FEA_{it} = \alpha_0 + \alpha_1 LGGCAF_{it} + \alpha_2 LGGDP_{it} + \alpha_3 FTR_{it} + \epsilon_{it} \quad (1)$$

$$FEI_{it} = \beta_0 + \beta_1 LGGCAF_{it} + \beta_2 LGGDP_{it} + \beta_3 FTR_{it} + \epsilon_{it} \quad (2)$$

$$FES_{it} = \gamma_0 + \gamma_1 LGGCAF_{it} + \gamma_2 LGGDP_{it} + \gamma_3 FTR_{it} + \epsilon_{it} \quad (3)$$

Where:

FEA = female employment rate in the agricultural sector;

FEI = female employment rate in the industrial sector;

FES = female employment rate in the service sector;
 LGGCAF = Log of gross capital formation (current us \$);
 LGGDP = Log of gross domestic product per capita (current us\$);
 FTR = fertility rate.;
 $\alpha_s, \beta_s, \gamma_s$ = parameters;
 ϵ = error term.

Here, 'i' represents the six South Asian countries and 't' demonstrates the time dimension. Pairwise correlation test was applied to check the correlation among the variables. The most usually estimated models for panel or cross section time series data are fixed-effect and random-effect models. For the study, the Hausman (1978) test was applied to select the appropriate model (between fixed effects and random effects). The Hausman (1978) test is generally known as a test for model misspecification. The null hypothesis of the test is "the preferred model is random effects" and the alternative hypothesis is "the preferred model is fixed effects". In this study, it is postulated that gross capital formation will negatively affect female employment in the agriculture sector. Furthermore, it is also hypothesized that gross capital formation will positively affect female employment in the industrial and service sectors respectively. Finally the robustness of the coefficients was checked to justify the consistency of the estimated results.

Results Analysis

Table 1 summarizes the descriptive statistics for the six variables for selected six South Asian countries.

Table 1. Descriptive statistics

	FEA	FEI	FES	FTR	LGGDP	LGGCAF
Mean	68.00	12.91	19.09	3.2647	6.6375	22.9641
Median	71.75	11.66	17.78	2.9960	6.5728	23.1088
Max	90.66	31.50	43.87	6.0970	8.3198	27.4698
Min	29.23	1.44	1.60	1.934	5.1392	18.1661
Std. Dev.	14.92	7.09	8.71	1.0737	0.7648	2.1844
Observations	168	168	168	168	168	168

Source: Eviews software, based on panel data of six countries, World Bank, 2020; United Nations-World Population Prospects, 2019.

Table 2 illustrates the correlation matrix for the six variables. The results show correct signing and support the assumptions. As predicted, gross capital formation is negatively related to female employment in the agriculture sector. Moreover, gross capital formation is positively related with female employment in the industrial and service sectors. The pairwise correlations suggest that there is no multicollinearity problem in the models (Gujarati, 2003).

Table 2. Correlation matrix

	FEA	FEI	FES	LGGDP	LGGCAF	FTR
FEA	1.00					
FEI	-0.93	1.00				
FES	-0.95	0.78	1.00			
LGGDP	-0.67	0.50	0.75	1.00		
LGGCAF	-0.23	0.44	0.03	0.20	1.00	
FTR	0.48	-0.37	-0.52	-0.63	-0.23	1.00

Source: Eviews software, based on panel data of six countries, World Bank, 2020; United Nations-World Population Prospects, 2019.

FEA, FEI and FES are the response variables and the regression variables are GDP per capita, LGGCAF, FTR related to fixed and random effects model estimates. The Hausman test is applied to identify whether a fixed or random effects model is suitable for estimation. We can apply the Hausman test to select between the fixed effects and random effects models (Greene,

2008). The general rule is that if $p\text{-value} > 0.05$, we must use a random effects model, and if $p\text{-value} < 0.05$ we must use a fixed effects model (Klärner, 2010). Results of the Hausman test show that for model 1 and 3 the fixed effects model takes precedence over the random effects model. But for the model 2 the random effects model is an appropriate technique for the estimation. The estimated results of the three models are displayed in Tables 3, 4 and 5. Empirical results show that it is statistically significant that all coefficients are reported with expected sign. The results of model 1 are represented in Table 3. According to the fixed effects model it is evident from Table 3; LGGCAF and FTR have a strong negative significant impact on women's employment in the agriculture sector in the six selected South Asian countries. The econometric outcomes also depict that the effect of LGGDP on FEA is positive, but it is not statistically significant. In addition, the impact of LGGDP on FEA was negative and statistically significant at the 10 % level of significance based on the random effects model. Like the fixed effects model, LGGCAF and FTR have negative and significant impacts on FEA in the random effects model. The Hausman test suggests that the correct method in these estimations is the fixed effects model, because the $p\text{-value}$ of the Hausman test is 0.018; which recommends us to reject the null hypothesis "the preferred model is random effects". The values of R^2 are 0.92 and 0.54 for fixed effects and random effects models respectively.

Table 3. Dependent variable FEA (Model 1)

Regressors	Fixed-effects		Random-effects	
	Coefficients	P-value	Coefficients	P-value
Intercept	251.05	0.000	186.03	0.000
LGGDP	1.2755	0.664	-3.95	0.060
LGGCAF	-8.02	0.000	-3.76	0.017
FTR	-2.26	0.003	- 1.66	0.024
Hausman test				0.018
R^2	0.92		0.54 (Weighted statistics)	
F-Statistics		0.000		0.000

Source: Eviews software, based on panel data of six countries, World Bank, 2020; United Nations-World Population Prospects, 2019.

The estimated results of model 2 are illustrated in Table 4. According to the fixed effects model the results have confirmed that LGGCAF and FTR have positive impacts on female employment in the industrial sector during the survey period. Here, although the impact of LGGCAF on FEI is highly significant, the effect of FTR is not statistically significant. Furthermore, the impact of LGGDP on FEI is negative and insignificant. Get the same results for LGGCAF, LGGDP, and FTR of the fixed effects model in the random effects model. The Hausman test ensures that the random effects model is appropriate for model 2 ($p\text{-value}=0.088$). The values of R^2 are 0.94 and 0.38 for fixed effects and random effects model successively.

Table 4. Dependent variable FEI (Model 2)

Regressors	Fixed-effects		Random-effects	
	Coefficients	P-value	Coefficients	P-value
Intercept	-56.70	0.000	-38.45	0.002
LGGDP	-2.55	0.047	-1.07	0.290
LGGCAF	3.70	0.000	2.52	0.001
FTR	0.34	0.305	0.18	0.567
Hausman test				0.088
R^2	0.94		0.38 (Weighted statistics)	
F-Statistics		0.000		0.000

Source: Eviews software, based on panel data of six countries, World Bank, 2020; United Nations-World Population Prospects, 2019.

Table 5 represents that the coefficients of LGGCAF, LGGDP and FTR are positive based on the fixed effects model. Here, the effects of LGGCAF and FTR on FES are statistically significant, but the impact of LGGDP is not statistically significant. The outcomes of the random effects model also depict that the three independent variables have positive coefficients. The impacts of LGGDP and FTR on FES are statistically significant while the effect of LGGCAF is not statistically significant. The Hausman test indicates that the correct technique for model 3 is the fixed effects model (p-value=0.010). The values of R² are 0.89 and 0.53 for fixed effects and random effects models sequentially.

Table 5. Dependent variable FES (Model 3)

Regressors	Fixed-effects		Random-effects	
	Coefficients	P-value	Coefficients	P-value
Intercept	-94.8	0.000	-35.97	0.012
LGGDP	1.28	0.547	5.90	0.000
LGGCAF	4.29	0.010	0.50	0.542
FTR	1.92	0.000	1.33	0.010
Hausman test				0.010
R ²	0.89		0.53 (Weighted statistics)	
F-Statistics		0.000		0.000

Source: Eviews software, based on panel data of six countries, World Bank, 2020; United Nations-World Population Prospects, 2019.

To test the robustness of the coefficients, FEA, FEI and FES were regressed only on the variables LGGDP, LGGCAF and FTR; excluding countries one by one (results are available upon request). The results of the robustness test depict consistent results for the three models.

Discussion

The econometric results make it clear that in the six South Asian countries there is a significant strong negative relationship between gross capital formation and the employment of women in the agricultural sector. Mechanization has greatly diminished the demand for labor for multiple tasks such as food processing, spinning, watering, thrashing and rural transportation (Rawski, 1979). In the past, many women participated in these activities, especially in rural areas, but now only a few women participate in these activities. Agriculture has attracted most of the new entrants to the labor market, leading to a decrease in labor productivity in agriculture (Rawski, 1979). Another important factor is structural transformation. Some economists (Fisher (1939), Clark (1940), Kuznets (1966) and Chenery and Syrquin (1975)) assume that when a country's economy grows, production will shift from the primary industry to the secondary industry, and then to the tertiary industry. It is also worth noting Rostow (1960), who claimed that the economy had undergone various phases of development, from traditional to leap to mass consumption. Female enrollment rate is also a crucial measure for discussion. Over the last two decades, in the mentioned six South Asian countries the female enrollment rate in primary, secondary and tertiary levels have increased noticeably. Due to some social issues in some South Asian countries, educated women do not like to participate in agricultural work in rural and urban areas. Therefore, many female workers have shifted to the industrial and service sectors in the agricultural sector. As the population grows, the demand for housing rises, land is fragmented, building infrastructure and industry increase, and land loss occurs due to river erosion. Agricultural land is declining continuously, and the importance of agriculture is now less impressive and some investors believe that investing in the agricultural sector is less profitable. Therefore, job availability in the agriculture sector declined significantly and many female workers have moved to the industrial and service sectors in the agricultural sector. Transplanting, planting and preparing land for seedlings on the mainland has been a labor-intensive task in the past. But now it has been superseded by farm equipment and machinery in

the six South Asian countries. Econometric results reflect a strong significant positive relationship between gross capital formation and female employment in the industrial sector, service sector respectively. Economic growth is contributing to increased employment in the service sector through increased women's labor participation, as families with working wives tend to allocate a greater portion of their income on goods and services. For example, the household where the wife works spends a significant portion of money on restaurant meals or housekeepers, and the wife buys a car to go to work (Fuchs, 1980). Because of economic growth, some changes have taken place to induce women labor force participation. The improvement of their education level has led to more and better employment opportunities, the decline in fertility rates has reduced the burden of raising children for women, and the socially admissible service sector jobs are available to women whose wages have increased, and the substitution effect has dominated the income effect (Lahoti & Swaminathan, 2013). Increased capital formation has created many jobs for women in manufacturing, construction, entertainment, telecommunications, computers, media, hospitality, energy, fashion, advertising, marketing, finance and more. In some SAARC countries, industries are women labor intensive. The participation of female human resources is prominent in these countries, as much industry is spent on capital formation. In these countries, the involvement of women labor force is high in the manufacturing industry. For example, in a Bangladeshi garment company, 70 percent of its employees are female (Rahman, 1993). The development of computer networks and other types of communication has put enormous amounts of female labor at stake in these fields. In some countries, these sectors are a crucial source of new, relatively high-income, exalted jobs for female labor force (Pearson & Mitter, 1993; Dunn, 1995), requiring some degree of qualification. Also now many women are engaged in tourism related jobs. Capital formation also promotes the establishment of various types of service sectors such as banks, insurance companies, NGOs, trade-related services, healthcare, and education and so on, which create vast opportunities for women's employment in the six South Asian economies. The service sector is rapidly becoming the heart of South Asian countries. As incomes increase, people's needs are less important. They are starting to demand more services such as health education, amusement and many other fields (Ayon, 2018). Over the past two decades, per capita incomes in the South Asian countries have increased significantly, poverty rates have fallen sharply, and standard of living have improved dramatically. As such, people in these countries today are demanding more services than ever before, which is another crucial factor in the formation of capital in the sector, increasing the employment rate of women. More human capital participation is required in the service sector compared to the agriculture and industrial sectors. A country wealthy in human capital can lay the way for its employment and growth. As a result, the opportunities for women to be employed in this field are enormous. The service sector provides intangible products, such as education, modern communications, health, information and business service etc. (Chakraborty et.al, 2015). The amplification of modern services including information technology, telecommunication, financial intermediation, and neoteric services including hotel trade, has contributed remarkably to the increase of women's employment in India. These sub-sectors are about maintaining the health and education in which girls are employed, as well as possibly fostering employment growth for women (Mehrotra & Parida, 2017). The expansion of women intensive employment in some service businesses parallels the recent prolongation of export of fruits, flowers and vegetables in some developing countries, which is also based primarily on the utilization of a female workforce. In developing economies, the raised absorption of female labour in manufacturing was clearly driven by changes in trade performances in two ways: Firstly, women are the active preferred workforce for export industries; secondly, a shift in the center of trade has been accompanied by a relative decline in the employment of privileged men in self-sufficient industries. Currently, females make up about a third of all industrial workers in developing economies (Joekes, 1995).

Conclusion

The main goals of the research were to investigate the effects of capital formation on the three major sectorial (agriculture, industry, and service sectors) female employment in the selected six South Asian countries. A panel data set (1991–2018) for the six South Asian countries was taken from secondary sources. Applying fixed effects, random effects, and the Hausman test, it is found that gross capital formation has a strong and significant negative impact on the agricultural sector's female employment. According to the study, the key factors for this expected result are mechanization, structural transformation, declining agricultural land areas due to capital formation, and the female literacy rate. On the other hand, the study also suggests that capital formation has strong and significant positive impacts on the industry and service sectors' female employment in the six selected South Asian developing countries. The study's findings confirm that economic growth, educational level improvement, growth of manufacturing, advertising, marketing, finance, entertainment, telecommunications, media, hospitality sectors, RMG sectors, tourism sectors, banks, insurance companies, NGOs, trade-related services, living standards, and health sector through capital formation are the factors responsible for these desired results in female employment in the industrial and service sectors.

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