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Economic Determinants and Female Labour Force Participation: An Empirical Analysis of Pakistan

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Abstract
Females labour force plays a crucial role in economic development by enhancing the development potential of a country**.** This paper investigates the effects of economic determinants on female labour force participation of Pakistan by employing ARDL, ECM approach and Granger Causality over the period of 1980-2010.The outcome of the study shows that favourable economic policies encourage female labour supply to participate in the economic and productive activities. The results support this phenomenon for both long and short run periods. This study suggested that the government should devise policies that promote females contribution in the formal sector of the economy. Moreover, cottage industries need to be promoted and informal sector needs restructuring by encouraging females.
Key Words: Female labour Force Participation, Economic determinants, trade liberalization.

1. Introduction

Globally, women have made impressive inroads in various occupations and professions. In the developed countries, their contribution is dominant in the formal sector of the economy while in the developing countries their presence is mostly felt in the informal sector. Despite women's vital role in the global economy, their unemployment rate is extremely high. The measurement of the impact of economic determinants on the status of women and their labour supply is a challenging task in Pakistan due to the non-availability of the required data so that their impact can't be genuinely assessed. However, it is evident that there are a number of economic determinants which helps expand and contract the economy. Indeed, the economic determinants constitute the pull and push factors of the economy. Pakistan is undergoing a severe economic crisis that has produced a lot of social and economic problems within the country. As a result, the marginalized segment of the population comprising of women and children have become more actively associated in the marginalized activities. But the female participation is understated, due to the exclusion of women employed in the marginal activities. There also exists a strong and significant connection between female labour participation and openness to trade. Trade liberalization can change the relative prices of goods due to openness, which leads to the reallocation of factors of production among sectors. Further, due to openness, the incentives to the factors of production increases along with more earning opportunities. As the trade activities increases in the economy it encourages female economic activities.

In Pakistan, most of the women are involved in textile, wearing apparel and leather industries. Large segment of Women workers comprise of the unskilled labour force. In the era of 1980s, the process of liberalization started and was implemented with great force after 1988. The government pursued vigorous trade liberalization in the beginning of 1990s to convert the economy from a relatively inward looking to an open and outward looking economy. During the 1990s, multiple measures were taken by the then government that includes: privatization, liberalization of trade and foreign exchange and opening up its capital markets to foreign investors (Afzal (2006)). Several studies have focused the impact of increasing international economic integration on women employment in the developing countries. For example gender specific effects of multinational corporations, export-processing zones and the structural adjustment [(for instance See, Beneria and Feldman, (1992); Cagatay et al.(1995); Elson, (1990); Joekes and Weston, (1994)]. Female labour supply represents a crucial portion of the population that plays a pivotal role in economic activity. Investment activities in an economy are linked with a rising demand for labour, both skilled and unskilled, and for both even for men and women.This implies that investment activities encourage female labour force participation The objective of this study is to explore the nexus between the determinants of economic growth and FLFP. For this, the variables incorporated relate to the economic development of Pakistan such as the real GDP per capita, and consumer price index to measure the inflation in the society, private investment, openness to trade, foreign direct investment and external debt. When the size of the economy expands females have an easier and better access to jobs and are encouraged to become economically active which leads to an increased female participation in the productive activities. However, when the growth shrinks, the economy experiences the disappointing conditions in terms of economic and social factors which further contract the employment opportunities for females. The paper is organized in six sections. Section 2 explains the Review of Literature; section 3 provides details related to Analytical frame work, data sources and model. The methodology of the empirical investigation is given in

section 4. Empirical Results are elucidated in section 5 followed by conclusion and policy recommendations.

2.Theoretical and Empirical Review of Literature

The issue of globalization, trade and employment opportunities of women specially with respect to their work on structural adjustment and expansion of export-oriented industries since the mid-1980s have been stressed by few feminist economists and academics like Afshar and Dennis (1992), Cagatay, Elsoon and Grown, (1995), Commonwealth Secretariat (1989) and Moser (1989). . Literature supports the idea that debt overhangs and depresses growth due to the uncertainties attached with the government's actions and policies. Debt also discourages the structural and fiscal reforms of the government as there is an immense pressure on the government to repay the foreign creditors.Elson (1991) and Palmer (1991) study the implications of structural adjustment in the developing countries and found that the macro economic adjustment is not gender-neutral and that it tends to disadvantage women as compared to men, with an unpleasant social and economic impact on women.

There are two premises related to trade and its gender aspect. First, trade liberalization and expansion brings costs and benefits to both men and women. Second, the implications of liberalized trade are arbitrated by gender relations and gendered social, economic and political structures. All these structures are reflected in the form of gender gaps in education and health, discrimination in the labour market, disparities in the level of participation in the labour market, rights and resources and other socio-cultural factors. It is worth mentioning that the gender biases and barriers in the society may influence the trade policy outcomes (Cagatay et al., 1995).

Numerous studies like Catagay and Ozler, (1995), Joekes and Weston, (1994) and Standing, (1989) examined the impact of globalization and trade on women's employment. The study emphasizes that increased trade and export expansion activities are strongly linked with the feminization in the industrial labour force. A study for the developed and developing countries for the year 1980-1985 provide strong linkage between export expansion and feminization of labour in the manufacturing sector which was largest in Mauritius, Tunisia, Sri Lanka, Malaysia and the four East Asian 'Tigers'(Wood 1991).

Fontana et al. (1998) revealed that men and women received different levels of benefits from liberalization and expansion in the trade. Moreover, the benefits associated with women are even different within the different groups of women. According to Moghadam (1999), "feminization of labour" is the child of globalization. The recent globalization is a complex and challenging phenomenon for both the developed and the developing economies. Economic globalization demands more integration and interaction of countries in production, exports and imports. These open economies rely heavily on the work of women. As there is an expansion of trade, the prices of imported commodities become competent with the prices of the local goods which push local capitalists to reduce the cost of labour by hiring cheap labour in the form of females. It is important to note that the global economy multiply capital and mainly through the manipulation of the labour power of women. It is worth mentioning that the role of women is vital in the global economy but the rate of unemployment of women is also very high.

Streeten (1999) investigates that economic liberalization, technological changes, competition in both labour and product markets have contributed to economic failure, weakening of institutions and social support systems, and erosion of established identities and values. From the employment point of view, globalization has been bad for Africa and for many parts of the world. Afzal (2007) empirically investigates the impact and implication of globalization on the economic growth of Pakistan for the period 1960-2006. The author concluded that Pakistan can counter the negative influence of globalization fall if the developing countries unite and adopt policies that serve their genuine cause. In the era of globalization, Pakistan will certainly benefit if and only if the country pursues sound economic and labour policies. As the benefits of globalization are multifold, it will obviously affect the female participation rate in the export-oriented industries

Analytical Framework , Model and Data Sources

This study explores the link between the economic determinants and FLFP. Various studies have highlighted that domestic investment activities and FDI encourage labour mobility in the market. Investment is one of the key determinants of economic growth. Expansion in economic growth creates more job opportunities for both male and female. Gray Becker theory of discrimination emphasizes the point that openness of the economy and trade liberalization makes the "discrimination" activity much more expensive in effect. Trade liberalization and openness of the economy change the relative prices of goods, which leads to the reallocation of the factors of production among different sectors of the economy. It raises the earning opportunities and thus leads to higher employment opportunities for female. This creates higher household income and ultimately empowers women within her set up. That helps in reducing gender inequalities and discrimination. Ahmed and Bukhari (2007) focused on the three dimensions of gender inequalities for Pakistan. The hindsight was suggestive of the fact that trade liberalization has vital implications in reducing gender inequality. It is also evident that gender inequality is

more profound to export than to imports. However, the effects of MNCs on female and the gendered dimensions of MNC production in developing countries show positive results. Due to FDI, wage structure improves, employment opportunities rises, skill and training development occurs this increases the in formalization of women's work in the international production.

Therefore, the affiliation between FLFP and MNCs shows strong evidence that the share of female employees in the labour-intensive, export oriented assembly and multinational manufacturing sector is high (Joekes and Weston, 1994) specially the export- oriented sector that mostly employ females. Theoretical predictions reveal that external debt promotes economic growth if it is allocated for developmental projects to achieve economic goals. If external debt is used only for repayment of external debt, it not only contracts economic activity but also declines the demand for labour both male and female.

3.1 The Model

On the basis of theoretical literature and empirical studies, we employ GDP, CPI, Investment, trade openness and FDI.The functional form of model is portrayed as following:

$$[FP_t = f(Y_t, CPI_t, INV_t, TR_t, FDI_t, ED_t)][\ ] \quad (1)$$

Where, FP_t is female labour force per capita, Y_t is real GDP per capita, CPI_t is consumer price index proxy for inflation, INV_t is domestic investment per capita, TR_t is trade openness(exports + imports) per capita, FDI_t is foreign direct investment per capita, ED_t is external debt per capita and ε is residual term having normal distribution with constant variance and zero mean.

3.2 Data Sources Time series data is employed for the period 1980-2010.The data is collected from various issues of Economic Survey of Pakistan, ILO Webpage and World Development Indicators (CD-ROM2011).

4 Methodological Frame work

For empirical purpose, we have converted all series into logarithms. This specification of model provides efficient and consistent results without any biasness. The empirical equation is modeled as following:

$$\ln FP_t = \beta_1 + \beta_2 \ln Y_t + \beta_3 \ln CPI_t + \beta_4 \ln INV_t + \beta_5 \ln TR_t + \beta_6 \ln FDI_t + \beta_7 + \ln ED_t + \varepsilon_i \quad (2)$$

The Unrestricted Error Correction Model (UECM) is modeled as following:

$$\begin{aligned}\Delta \ln FP_t = {} & \vartheta_1 + \vartheta_T T + \vartheta_Y \ln Y_{t-1} + \vartheta_{INV} \ln INV_t + \vartheta_{CPI} \ln CPI_{t-1} + \vartheta_{ED} \ln ED_{t-1} + \vartheta_{TR} \ln TR_{t-1} \\ & + \vartheta_{FDI} \ln FDI_{t-1} + \sum_{j=1}^{q} \vartheta_j \Delta \ln FP_{t-j} + \sum_{k=0}^{r} \vartheta_k \Delta \ln Y_{t-k} + \sum_{l=0}^{s} \vartheta_l \Delta \ln INV_{t-i} + \sum_{m=0}^{t} \vartheta_m \Delta \ln CPI_{t-m} \\ & + \sum_{n=0}^{u} \vartheta_n \Delta \ln ED_{t-n} + \sum_{o=0}^{v} \vartheta_o \Delta \ln TR_{t-o} + \sum_{p=0}^{w} \vartheta_w \Delta \ln FDI_{t-w} + \varepsilon_i \end{aligned} \quad (3)$$

Where difference operator is indicated by Δ, T is trend variable and ε is residual term assumed to have normal distribution with finite variance and zero mean. The diagnostic tests have also been conducted to test the problem of normality, serial correlation, autoregressive conditional heteroskedasticity, white heteroskedasticity and specification of the ARDL bound testing model.

4.1 Error Correction Model

Once long run relationship between economic development and FLFP is established then it is necessary to find short run consequences of economic development on female labour force participation in case of Pakistan. In doing so, we apply error correction method (ECM). The empirical equation of ECM is modeled as follows:

$$\begin{aligned}\Delta \ln FP_t = {} & \delta_{\circ 1} + \sum_{i=1}^{l} \delta_{FP} \Delta \ln FP_{t-i} + \sum_{j=0}^{m} \delta_Y \Delta \ln Y_{t-j} + \sum_{k=0}^{n} \delta_{INV} \Delta \ln INV_{t-k} + \sum_{l=0}^{o} \delta_{CPI} \Delta \ln CPI_{t-l} \\ & + \sum_{m=0}^{p} \delta_{ED} \Delta \ln ED_{t-m} + \sum_{n=0}^{q} \delta_{TR} \Delta \ln TR_{t-k} + \sum_{O=0}^{R} \delta_{FDI} \Delta \ln FDI_{t-O} + \vartheta ECM_{t-1} + \varepsilon_i \end{aligned} \quad (4)$$

Where ECM_{t-1} is lagged error term ϑ is estimate of lagged error term captures the speed of adjustment from short run towards long run equilibrium path. Here, we say that difference of FLFP is explained by differenced of linear (non-linear) term of real GDP per capita plus lagged error term and stochastic term. We have conducted diagnostic tests to test the CLRM assumptions such as normality of error term, serial correlation, autoregressive conditional heteroskedasticity, white heteroskedasticity and specification of short model. The reliability of short run estimates is investigated by applying the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) suggested by Pesaran and Shin, (1999).

4.2 Vector Error Correction Model Granger Causality Test

We should apply the vector error correction model (VECM) to investigate causal relationship between the variables once co-integration relationship exists between the series. It is argued by Granger, (1969) that the

VECM is an appropriate approach to examine causality between the variables when series are integrated at I (1). The empirical equation of the VECM Granger causality approach is modeled as following:

$$(1-L)\begin{bmatrix}\ln FP_t\\ \ln Y_t\\ \ln INV_t\\ \ln CPI_t\\ \ln ED_t\\ \ln TR_t\\ \ln FDI_t\end{bmatrix}=\begin{bmatrix}a_1\\a_2\\a_3\\a_4\\a_5\\a_6\\a_7\end{bmatrix}+\sum_{i=1}^{p}(1-L)\begin{bmatrix}b_{11\,i}&b_{12\,i}&b_{13\,i}&b_{14\,i}&b_{15\,i}&b_{16\,i}&b_{17\,i}\\ b_{21\,i}&b_{22\,i}&b_{23\,i}&b_{24\,i}&b_{25\,i}&b_{26\,i}&b_{27\,i}\\ b_{31\,i}&b_{32\,i}&b_{33\,i}&b_{34\,i}&b_{35\,i}&b_{36\,i}&b_{37\,i}\\ b_{41\,i}&b_{42\,i}&b_{43\,i}&b_{44\,i}&b_{45\,i}&b_{46\,i}&b_{47\,i}\\ b_{51\,i}&b_{52\,i}&b_{53\,i}&b_{54\,i}&b_{55\,i}&b_{56\,i}&b_{57\,i}\\ b_{61\,i}&b_{62\,i}&b_{63\,i}&b_{64\,i}&b_{65\,i}&b_{66\,i}&b_{67\,i}\\ b_{71\,i}&b_{72\,i}&b_{73\,i}&b_{74\,i}&b_{75\,i}&b_{76\,i}&b_{77\,i}\end{bmatrix}\times\begin{bmatrix}\ln FP_{t-1}\\ \ln Y_{t-1}\\ \ln INV_{t-1}\\ \ln CPI_{t-1}\\ \ln ED_{t-1}\\ \ln TR_{t-1}\\ \ln FDI_{t-1}\end{bmatrix}+\begin{bmatrix}\alpha\\ \beta\\ \delta\\ \phi\\ \varphi\\ \partial\\ \theta\end{bmatrix}ECT_{t-1}+\begin{bmatrix}\varepsilon_{1t}\\ \varepsilon_{2t}\\ \varepsilon_{3t}\\ \varepsilon_{4t}\\ \varepsilon_{5t}\\ \varepsilon_{6t}\\ \varepsilon_{7t}\end{bmatrix} \quad (5)$$

Where $(1-L)$ indicates difference operator and lagged residual term is indicated by ECT_{t-1} which is obtained from long run relationship while $\varepsilon_{1t},\varepsilon_{2t},\varepsilon_{3t},\varepsilon_{4t}$, and ε_{5t} are error terms. These terms are supposed to be homoscedastic i.e. constant variance. The statistical significance of coefficient of lagged error term i.e. ECT_{t-1} using t-statistic shows long run causal relationship between the variables. The short run causality is shown by statistical significance of F-statistic using Wald-test by incorporating differenced and lagged differenced of independent variables in the model. Moreover, joint significance of lagged error term with differenced and lagged differences of independent variables provides joint long-and-short runs causality. For example, $b_{12,i}\neq 0\forall_i$ implies that income per capita Granger-causes female labour supply and income per capita is Granger-caused by female labour supply shown by $b_{21,i}\neq 0\forall_i$.

5 Empirical Results

The descriptive statistics and correlation matrix are explained in Table-1 and 2. The results indicate that all the series have homoscedastic variance and normal distribution as indicated by Jarque-Bera statistics.

Table-1: Descriptive Statistics

Variables	$\ln FP_t$	$\ln Y_t$	$\ln INV_t$	$\ln CPI_t$	$\ln ED_t$	$\ln TR_t$	$\ln FDI_t$
Mean	1.4293	10.1256	8.4658	3.9268	8.7855	9.0219	5.1798
Median	1.3353	10.1501	8.4471	4.0043	8.9588	8.9619	5.1502
Maximum	1.9675	10.4512	8.7429	5.1972	9.9588	9.4084	7.1705
Minimum	1.1656	9.7734	8.2204	2.8018	7.1316	8.7028	2.9944
Std. Dev.	0.2309	0.1872	0.1318	0.7006	0.8749	0.1941	1.0118
Skewness	1.1060	-0.0125	0.2013	0.0242	-0.4398	0.4987	0.0404
Kurtosis	3.1213	2.2586	2.5026	1.7932	1.8211	2.2312	2.6993
Jarque-Bera	6.3398	0.7107	0.5290	1.8840	2.7945	2.0484	0.1251
Probability	0.0420	0.7009	0.7675	0.3898	0.2472	0.3590	0.9393
Observation	31	31	31	31	31	31	31

The results show that a positive correlation is found economic growth and female labour force, private investment and female labour force, female labour force and consumer inflation, trade openness (foreign direct investment) and female labour force. Domestic investment and economic growth are positively correlated and same inference can be drawn for consumer inflation and economic growth, trade openness (foreign direct investment) and economic growth. Consumer inflation, external debt, trade openness (foreign direct investment) and domestic investment are related positively. There is positive correlation between external debt, trade openness (foreign direct investment) and consumer inflation. Finally, same inference is drawn for trade openness and foreign direct investment.

Table-2: Correlation Matrix

Variable	$\ln FP_t$	$\ln Y_t$	$\ln INV_t$	$\ln CPI_t$	$\ln ED_t$	$\ln TR_t$	$\ln FDI_t$
$\ln FP_t$	1.0000						
$\ln Y_t$	0.8689	1.0000					
$\ln INV_t$	0.4945	0.6427	1.0000				
$\ln CPI_t$	0.8631	0.9736	0.5156	1.0000			
$\ln ED_t$	0.7518	0.9424	0.4762	0.9747	1.0000		
$\ln TR_t$	0.7866	0.8850	0.7168	0.8244	0.7527	1.0000	
$\ln FDI_t$	0.7368	0.9101	0.6605	0.8616	0.8267	0.8839	1.0000

The main assumption of the ARDL bounds testing approach co-integration is that the variables seem to be stationary at level or 1st difference. It is necessary to make sure that no variable is integrated at 2nd difference. If any variable is found to be stationary at 2nd difference then the ARDL F-test does not seem to work properly and might provide misleading results regarding co-integration between the variables. This rational leads us to apply appropriate unit root test to test the stationarity properties of the variables. In such environment, we prefer to apply ADF, PP and Ng-Perron unit root tests. The results are reported in Table-3 and 4. These tests reveal that the variables are found to be non-stationary at level with intercept and trend. At 1st difference, all the series do have not unit root problem. It is concluded that the variables are integrated at I (1) confirmed by ADF, PP and Ng-Perron unit root tests.

Table-3: ADF & PP Unit Root Tests

Variables	ADF Unit Root Test		PP Unit Root Test	
	T-Statistic	Prob. Value	T-Statistic	Prob. Value
$\ln FP_t$	-1.3747 (1)	0.8463	-0.8427 (3)	0.9459
$\ln Y_t$	-1.9645 (1)	0.5946	-1.8076 (3)	0.6749
$\ln INV_t$	-2.8305 (1)	0.1985	-2.1688 (3)	0.4888
$\ln CPI_t$	-2.4923 (1)	0.3291	-1.6800 (3)	0.7351
$\ln ED_t$	-1.3820 (1)	0.8449	-1.1575 (3)	0.9013
$\ln TR_t$	-2.4762 (1)	0.3364	-2.8107 (3)	0.1885
$\ln FDI_t$	-2.5174 (2)	0.3179	-2.5830 (3)	0.2899
$\Delta \ln FP_t$	-4.8335 (1)*	0.0032	-5.7271 (3)*	0.0004
$\Delta \ln Y_t$	-3.5666 (0)***	0.0514	-3.5324 (3)***	0.0551
$\Delta \ln INV_t$	-3.6710 (0)**	0.0409	-3.5928 (3)**	0.0481
$\Delta \ln CPI_t$	-3.3821 (9)***	0.0822	-3.6529 (3)**	0.0435
$\Delta \ln ED_t$	-3.7202 (5)**	0.0404	-5.4251 (3)*	0.0007
$\Delta \ln TR_t$	-4.0410 (1)**	0.0176	-5.1531 (3)*	0.0013
$\Delta \ln FDI_t$	-4.3455 (1)*	0.0095	-4.6752 (3)*	0.0042

Note:*,** and *** indicate significantat 1%,5%and 10%.

The problem with these unit root tests is that they do not deal with the presence of structural break stemming in the series and produce misleading empirical evidence regarding integrating order of the variables to be included in the model. To overcome this issue, we apply the Zivot-Andrews (1992) unit root test to find stationarityproperties of the variables in the presence of structural breaks and robustness of ADF, PP and Ng-Perron unit root tests.

Table-4: Ng-Perron Unit Root Test

Variables	MZa	MZt	MSB	MPT
$\ln FP_t$	-4.2816 (1)	-1.2598	0.2942	19.4041
$\ln Y_t$	-8.3933 (1)	-2.0322	0.2421	10.9069
$\ln INV_t$	-13.4989(1)	-2.5979	0.1924	6.7507
$\ln CPI_t$	-3.8650(1)	-1.2188	0.3153	21.3687
$\ln ED_t$	-4.3494 (2)	-1.3761	0.3163	20.0571
$\ln TR_t$	-11.1091 (1)	-2.3484	0.2114	8.2442
$\ln FDI_t$	-9.5323(0)	-2.1138	0.2217	9.8389
$\Delta \ln FP_t$	-34.7297 (2)*	-4.1629	0.1198	2.6465
$\Delta \ln Y_t$	-84.1507 (5)*	-6.4863	0.0770	1.0838
$\Delta \ln INV_t$	-18.5458 (1)**	-3.0374	0.1637	4.9594
$\Delta \ln CPI_t$	-75.6509 (1)*	-6.1287	0.0810	1.2940
$\Delta \ln ED_t$	-16.0840 (9)***	-2.8355	0.1763	5.6671
$\Delta \ln TR_t$	-86.1074 (3)*	-6.5600	0.0761	1.0640
$\Delta \ln FDI_t$	-20.5490 (1)**	-3.2001	0.1557	4.4659

Note:*,** and *** indicate significantat 1%,5%and 10%.

Table-5: Zivot-Andrews Unit Root Test

Variable	At Level		At 1st Difference	
	T-Statistic	Time Break	T-Statistic	Time Break
$\ln FP_t$	-3.963 (0)	1996	-5.678 (0)*	1997
$\ln Y_t$	-3.629(1)	1997	-5.632(0)*	2004
$\ln INV_t$	-4.157 (1)	1997	-5.347 (1)**	2005
$\ln CPI_t$	-3.325(2)	1994	-5.202 (0)**	1998
$\ln ED_t$	-3.311 (0)	1997	-8.315 (0)*	2003
$\ln TR_t$	-4.033 (0)	1997	-5.533 (0)**	2003
$\ln FDI_t$	-4.638 (1)	2000	-5.602 (0)*	2004

Note:*,** and *** indicate significantat 1%,5%and 10%. The results of Zivot-Andrews unit root test are reported in Table-5. The results indicate that all the series have unit root problem in the presence of structural break in intercept and trend. Stationarity is found at 1st difference in the presence of structural break. This implies that all the series have unique order of integration leading to apply the ARDL bounds testing approach for investigating long run relationship between the series.

Table-6: Lag Length Selection

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	139.5201	NA	2.53e-13	-9.1393	-8.8092	-9.0359
1	351.1573	306.5090	3.78e-18	-20.3556	-17.7153*	-19.5287
2	424.7841	71.0880*	1.35e-18*	-22.0540*	-17.1035	-20.5036*

The long run results are detailed in Table-8. Our results indicate that economic growth is positively related to female labour supply. All else is same, a 1.4239 per cent of labour supply is linked with 1 per cent increase in economic growth. This relationship is statistically significant at 5 per cent level of significance. This shows that economic growth enhances female labour supply due to economic activities in the country. It is evident that during high economic crisis in 2008-09, Pakistan experienced very low GDP growth at 2%, so all the economic activities were at the tough point. This led to an adverse impact on female employment and participation rates. In the same year i.e. 2008-09, the manufacturing sector had the negative growth rate of -3.3% while textiles export declined and export of readymade garments declined to 18%.

Table-7: The ARDL Co-integration Analysis

Estimated Model	$FP_t = f(Y_t, \ln INV_t, \ln CPI_t, \ln ED_t, \ln TR_t, \ln FDI_t)$	
Optimal lag structure	**(1, 0, 1, 1, 1, 1, 0)**	
F-statistics	**9.272***	
Significant level	**Critical values (T = 31)#**	
	Lower bounds, I(0)	**Upper bounds, I(1)**
1 per cent	**7.763**	**8.922**
5 per cent	**5.264**	**6.198**
10 per cent	**4.214**	**5.039**
R^2	**0.9494**	
$Adj - R^2$	**0.8051**	
F-statistics	**6.5785***	
Durbin Watson Test	**2.8731**	
Diagnostic tests	**F-statistics (Prob. value)**	
$\chi^2 NORMAL$	**0.4301 (0.8064)**	
$\chi^2 SERIAL$	**0.9702 (0.4405)**	
$\chi^2 ARCH$	**0.1811 (0.6740)**	
$\chi^2 RAMSEY$	**0.1859 (0.6813)**	

These sectors are said to be the women-intensive sectors which had adversely affected the female participation which transformed the economic crisis into social crisis which resulted in social distortions (SPDC, 2007-08). There is negative link between female labour supply and domestic investment. This relationship is statistically significant at 5 per cent level. Keeping other things constant, a 1 per cent increase in private investment is linked with 0.1952 per cent labour supply. It may be noted that private investment enhances the demand for skilled labour and less opportunities are for unskilled labour. The relationship between foreign direct investment and female labour supply is negative and it is statistically significant at 10 per cent level. This shows that a 1 per cent increase foreign direct investment is linked with decline in female labour supply by 0.0596 per cent. It again indicates the demand for skilled personals. The positive affect of consumer inflation on female supply is found at 1 per cent level of significance. All else is same, a 0. 6719 per cent increase in consumer inflation raises female labour supply by 1 per cent. It is statistically significant at 1 per cent level of significant. A study about women's work in Lima (Peru) revealed that women's initial response to low returns and higher prices during (SAPs) is to enter the labour force to adjust and sustain the consumption levels (Francke, 1992). In the development-studies literature, Structural Adjustment has been a debatable topic as some economists find its positive effects while others have its negative impact on the economy. The fall outs of Structural Adjustment Programmes are on the poor women. Women become the victim of the austerities of adjustment and stabilization policies which includes high prices due to the withdrawal and reduction of government subsidies of food and services.

According to the Annual Review of SPDC (2007-2008), during the recent economic crisis of Pakistan, the rate of inflation was 12% in 2007-08 and 21% during 2008-09 combined with GDP growth rate of 2%, which pulls the females out of their houses and push them to move in the labour market. Food inflation rises rapidly due to global recession. This has an adverse impact on employment opportunities in women- intensive sectors and in exports. The females were compelled to move in the low paid and informal jobs. It is also emphasized that due to inflation the consumption pattern of the house hold changes. It is worth mentioning that the tragic dimension of the current economic crisis is that it has not only elevated the crime rates and killings but also transformed the working females into sex workers. The relationship between external debt and female labour supply is negative and it is statistically significant at 1 per cent level of significance. A 0.50 per cent rise in external debt is related with 1 per cent decline in female labour supply by keeping other things constant. This may concluded that high external debt and debt servicing in Pakistan eats up major chunk of resources and less is for developmental projects which declines economic growth. The unproductive use of external debt not only declines economic activities but also declines demand for female labour supply due to less employment opportunities.

Table-8: Long Run Results

Dependent Variable = $\ln FP_t$				
Variable	**Coefficient**	**Std. Error**	**T-Statistic**	**Prob. Value**
Constant	**-7.3199*** **	**3.7734**	**-1.9398**	**0.0648**
$\ln Y_t$	**1.4239****	**0.5450**	**2.6123**	**0.0156**
$\ln INV_t$	**-0.1952****	**0.0893**	**-2.1840**	**0.0394**
$\ln FDI_t$	**-0.0596*** **	**0.0334**	**-1.7815**	**0.0880**
$\ln CPI_t$	**0.6719***	**0.0729**	**9.2179**	**0.0000**
$\ln ED_t$	**-0.5029***	**0.0580**	**-8.6577**	**0.0000**
$\ln TR_t$	**-0.2138**	**0.1292**	**-1.6553**	**0.1114**
R-Squared	**0.9368**			
Adj. R-squared	**0.9203**			
Durbin-Watson	**1.5188**			
F-Statistic	**56.8736***			
Diagnostic Tests				
F-Statistic	**Prob. Value**			
$\chi^2 SERIAL$	**1.9495**	**0.1434**		
$\chi^2 ARCH$	**0.1102**	**0.7423**		
$\chi^2 WHITE$	**0.3505**	**0.9648**		
$\chi^2 RAMSEY$	**0.5166**	**0.4798**		

Trade openness is inversely linked with female labour supply and it is statistically significant at 15 per cent. The impact of trade openness on female labour supply is negative may be due to high demand for skilled labour which is captured by skilled male labour force. There are contradictions in the results of various studies that link trade expansion with the female labour supply. Trade liberalization due to globalization has mixed impact in South Asian countries. In countries like Bangladesh and Sri Lanka, increases female participation in trade related activities.

However, for India the impact of trade liberalization was limited during 1990s. Studies based on Indian data provide a mixed picture of the feminization of labour. For example, Banerjee (1999) established the argument that the Indian manufacturing sector exports contributes only 10% share of the GDP and women workers also account for small share in that sector. Therefore, the expansion of trade and export industries is not likely to bring feminization of labour in India. The contradictions exist in the literature as some micro studies report the increased association of females in trade related activities in India (Unni and Rani, 1999). For some countries like most of Sub-Saharan Africa, trade liberalization has not led to the expansion of female-intensive export industries. While places where feminization has occurred, it is due to reversed with the introduction of new technologies and new organizations of production [Beneria and Lind, (1995); Ozler, (1999)]. In all over the world, women's supply is almost between 30 to 40% of the total industrial labour. But the contribution of female labour supply specially in the export oriented industries like textiles, electronics components and garments is higher and about 90% in some cases (Pearson, 1992). The gist of one of the study on the developing countries is that the industrialization in the post-war period led to feminization of labour as export led (Jokes, 1987).

Results of diagnostic tests are reported in lower part of Table-8. These results reveal that there is no evidence found of non-normality of residual term, serial correlation, and autoregressive conditional heteroskedasticity. White heteroskedasticity does not seem to exist and model us appropriate and articulated as well. This shows that long run model meets the assumptions of classical linear regression model (CLRM). The next is to report the results of short run dynamics after discussing the long run impact of independent variables on dependent variable. The Table-9 is enriched with short run analysis and results indicate that economic growth is positively and significantly linked with female labour supply at 10 per cent level. This shows that economic growth encourages female labour supply. The relationship between domestic investment and female labour supply is positive and statistically significant at 10 per cent level of significance. Foreign direct investment

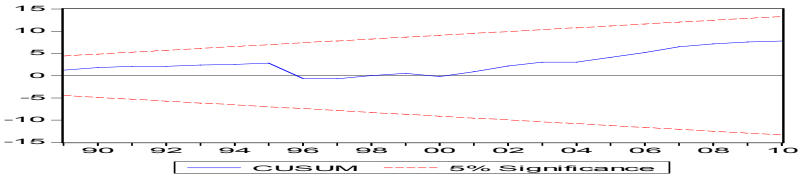
affects female labour supply negatively and it is significant at 5 per cent level. The link between external debt and female labour supply is negative. This implies that rise in external debt declines female labour supply by reducing funds for developmental projects. The impact of consumer inflation on female labour supply is positive but statistically insignificant. Trade openness and female labour force are negatively related. This shows that trade openness does not beneficial for female labour supply.

The statistical significance of estimate of error correction term i.e. ECM_{t-1} indicates the speed of adjustment and further confirms our established long run relationship between the series (Banerjee et al. 1993). The speed of adjustment shows that how short run changes converge towards long run stable equilibrium path. Our results indicate that sign of estimate of ECM_{t-1} is -0.5608 is highly significant at 1 per cent level. This corroborates our long run relationship between female labour supply and its determinants and validates the view by Bannerjee et al. (1998). Our empirical evidence reveals that 56.08 per cent deviations are corrected from short run towards long span of time. The coefficient of ECM_{t-1} is -0.5608 shows high speed of adjustment towards long run stable equilibrium path. **Table-9: Error Correction Model**

Dependent Variable = $\Delta \ln FP_t$				
Variable	**Coefficient**	**Std. Error**	**T-Statistic**	**Prob. Value**
Constant	**0.0317**	**0.0319**	**0.9954**	**0.3303**
$\Delta \ln Y_t$	**0.8667*****	**0.4712**	**1.8394**	**0.0794**
$\Delta \ln INV_t$	**0.2830*****	**0.1521**	**1.8597**	**0.0763**
$\Delta \ln FDI_t$	**-0.0662****	**0.0273**	**-2.4192**	**0.0243**
$\Delta \ln ED_t$	**-0.3163***	**0.1019**	**-3.1035**	**0.0052**
$\Delta \ln CPI_t$	**0.1559**	**0.2410**	**0.6467**	**0.5245**
$\Delta \ln TR_t$	**-0.3767***	**0.1291**	**-2.9169**	**0.0080**
ECM_{t-1}	**-0.5608***	**0.1440**	**-3.8933**	**0.0008**
R-squared	**0.4285**			
Adj. R-squared	**0.2466**			
Durbin-Watson	**1.8214**			
F-Statistic	**2.3565****			
Diagnostic Tests				
Test	**F-Statistic**	**Prob. Value**		
$\chi^2 SERIAL$	**0.3466**	**0.7112**		
$\chi^2 ARCH$	**0.3228**	**0.5745**		
$\chi^2 WHITE$	**0.2554**	**0.9926**		
$\chi^2 RAMSEY$	**0.7657**	**0.3914**		

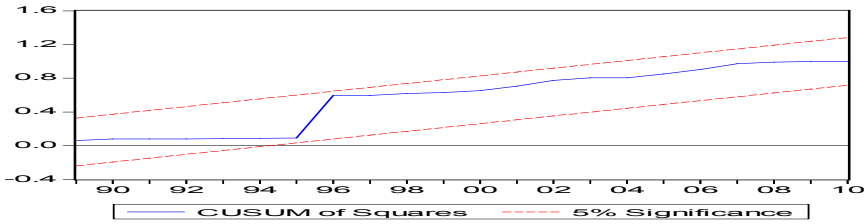
The short run model also passes diagnostic tests following CLRM assumptions. The results show that the variables are not serially correlated with residual term. There is no existence of autoregressive conditional heteroskedasticity. White heteroskedasticity is not found in the short run model. The short run model is well specified. The stability of long run and short run estimates has been tested by applying the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) are applied. It is suggested by Pesaran and Shin, (1999) to apply these tests. The null hypothesis of both CUSUM and CUSUMsq may be accepted that if plots of both tests are moving between critical limits. The null hypothesis is "regressions equation is correctly specified" (Bahmani-Oskooee and Nasir, 2004).

Figure-1.1: Plot of Cumulative Sum of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

Figure-1.2: Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

The CUSUM and CUSUMsq tests show that graphs of both tests do not cross lower and upper critical limits. So, we can conclude that long and short runs estimates
are reliable and efficient.

5 The VECM Granger Causality Analysis

It is pointed by Granger, (1969) that the VECM Granger causality should be applied to investigate the causal relationship between the variables if variables are co-integrated for long run relationship and order of integration of series is I(1). The exact detection of causal relationship between the variables would help us in knowing about which factor is causing female labour supply. Our analysis validated the co-integration between economic growth, investment, consumer prices (inflation), external debt, trade openness, foreign direct investment and female labour supply which further leads us to apply the VECM Granger causality to test the existence of causal relationship between said variables. The results of the VECM Granger causality are reported in Table-7.10. The convergence is high in domestic investment (-0.6584) VECM equation compared to consumer prices, (-0.3654); female labour supply, (-0.1121) and foreign direct investment, (-0.1378) VECMs. Long run Granger causality results reveal bi-directional causal relationship between female labour supply and domestic investment, female labour supply and inflation (consumer prices), female labour supply and foreign direct investment, domestic investment and consumer prices (inflation), domestic investment and foreign direct investment and, consumer prices and foreign direct investment. Unidirectional causal relation is found running from economic growth, external debt and trade openness to female labour supply. Economic growth Granger causes investment, consumer prices (inflation) and foreign direct investment. External debt and trade openness Granger causes female labour supply, domestic investment, consumer prices (inflation) and foreign direct investment.

In short run, the feedback effect exists between female labour supply and foreign direct investment and findings is found between trade openness and domestic investment. Inflation (consumer prices) is Granger cause of female labour supply. The bidirectional causality is found between external debt and consumer prices. Trade openness Granger causes external debt. The Table-11 confirms long-and-short runs (joint causality) causality results.

Table-10: The VECM Granger Causality Analysis

Dependent Variable	Direction of Causality							
	Short Run							Long Run
	$\Delta \ln FP_{t-1}$	$\Delta \ln Y_{t-1}$	$\Delta \ln INV_{t-1}$	$\Delta \ln CPI_{t-1}$	$\Delta \ln ED_{t-1}$	$\Delta \ln TR_{t-1}$	$\Delta \ln FDI_{t-1}$	ECT_{t-1}
$\Delta \ln FP_{t-1}$	....	2.6883 [0.1083]	2.3566 [0.1213]	0.7978 [0.4698]	1.4568 [0.2662]	0.0250 [0.9754]	5.3190** [0.0191]	-0.1121* [-4.0975]
$\Delta \ln Y_{t-1}$	0.1604 [0.8532]	....	2.9336 [0.1253]	0.4239 [0.6620]	1.7860 [0.2015]	0.2632 [0.7226]	2.5476 [0.1116]	....
$\Delta \ln INV_{t-1}$	0.3276 [0.7260]	1.1860 [0.3343]	....	0.2679 [0.7688]	1.6427 [0.2786]	11.8254* [0.0000]	0.0500 [0.9513]	-0.6584* [-3.0873]
$\Delta \ln CPI_{t-1}$	5.8879** [0.0139]	1.2468 [0.3175]	0.2734 [0.7648]	....	4.4545** [0.0318]	2.0482 [0.1694]	2.4263 [0.1245]	-0.3654* [-4.2111]
$\Delta \ln ED_{t-1}$	1.0673 [0.3687]	1.1325 [0.3483]	1.3055 [0.3001]	6-1128** [0.0113]	....	3.9636** [0.0415]	0.2246 [0.8015]	....
$\Delta \ln TR_{t-1}$	10923 [0.3607]	0.3980 [0.6785]	5.0022** [0.0217]	0.1856 [0.8324]	1.7836 [0.2019]	....	0.0595 [0.9424]	....
$\Delta \ln FDI_{t-1}$	3.4127*** [0.0620]	2.4096 [0.1261]	0.8054 [0.4665]	1.0059 [0.3096]	0.3829 [0.6887]	0.8202 [0.4604]	....	-0.1378 [-5.0604]

Note: *, ** and *** show significance at 1, 5 and 10 per cent levels respectively.

Source: Author's estimation

Table-11: The VECM Granger Causality Analysis

Dependent Variable	Joint Long-Short Runs Causality						
	$\Delta \ln FP_{t-1}, E$	$\Delta \ln Y_{t-1}, E$	$\Delta \ln INV_{t-1}, I$	$\Delta \ln CPI_{t-1}, I$	$\Delta \ln ED_{t-1}, E$	$\Delta \ln TR_{t-1}, E$	$\Delta \ln FDI_{t-1}, I$
$\Delta \ln FP_t$	....	11.0431* [0.0006]	7.3550* [0.0034]	8.7028* [0.0017]	11.7000* [0.0004]	7.2802* [0.0035]	5.7425* [0.0089]
$\Delta \ln INV$	7.4680 [0.0032]	11.1982* [0.0005]	....	3.6027** [0.0407]	7.0310* [0.0041]	16.8112* [0.0001]	3.0500*** [0.0819]
$\Delta \ln CPI$	3.1521*** [0.0585]	3.7111** [0.0371]	3.6918** [0.0379]	....	5.4483** [0.0108]	3.0201*** [0.0812]	3.7132** [0.0373]
$\Delta \ln FD$	9.8386* [0.0009]	9.8332* [0.0010]	8.7998* [0.0014]	10.6965* [0.0006]	9.5806* [0.0011]	10.0525* [0.0009]	....

Note: *, ** and *** show significance at 1, 5 and 10 per cent levels respectively.

6.Conclusion and Recommendations

The aim of this study is to investigate the relationship between economic determinants and female labor supply of Pakistan by applying ARDL approach for the period of 1980-2010. Our empirical evidence validates the presence of long run relationship between the economic determinants and female labor force participation. The results indicates that economic growth and inflation encourage female labor force participation while domestic and foreign direct investment, external debt and trade openness impact negatively on female labour supply in Pakistan. Moreover, the causality analysis exposed the bidirectional causal relationship of female labor force participation with domestic investment, inflation (consumer prices) and foreign direct investment. Unidirectional causal relation is found running from economic growth, external debt and trade openness to female labour supply. Our study also confirmed that Economic growth Granger causes investment, consumer prices (inflation) and foreign direct investment. External debt and trade openness Granger causes female labour supply, domestic investment, consumer prices (inflation) and foreign direct investment.

The study concluded that the women's contribution and achievement is dynamic and complexed. There is a dire need to integrate women in the development process as 52% are females in Pakistan. As the majority of the female workers belong to the informal sector, it needs to be formalized so that the conditions and position of women in this sector may improve. Moreover, the informal sector needs restructuring by promoting female entrepreneurship in female related professions. This will help all the unskilled and less educated females such as in the case field of embroidery, stitching, etc. In the food-chain activities such as processing, preservation and preparation women's role is extremely important and vital. In order to encourage them and improve the value

added production of fruits and vegetables the government should build medium-size processing plants that will create area employment in the rural settings and motivate women to enter such industries. Therefore, cottage industries are the need of the hour.

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