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Impact of Sector-Specific FDI on Sector-Specific Employment in Pakistan

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Abstract: The study wants to find the impact of sector-specific foreign direct investment on sector-specific employment in Pakistan. Data on primary, secondary and tertiary sectors are used for this purpose. ADF, PP and Zivot-Andrews unit root tests are applied to find the level of integration. ARDL and its error correction model are used to find the long run and short run relationships. The study finds the long run relationships in case of all sectors. The short run relationships are found in case of secondary and tertiary sectors. Sector-specific FDI has a positive and significant impact on sector-specific employment in case of secondary and tertiary sectors.

Key words: Sector-specific FDI · Employment · Cointegration · Stationarity

INTRODUCTION

Demand for labor is derived demand. If there will be demand for goods and services, there will be demand for labor as well. FDI can have direct and indirect effect on employment. When foreign investors intend to invest in any country, they need the skilled and unskilled labor force in their production process which is also a source of employment generation in the host country. Secondly, FDI can have positive spillovers by creating demand for local industries' product or simply has positive effect on income level of their labor who generate the demand for local goods also, which generates source of demand for labor in these industries. FDI is also helping in employment generation through forward and backward linkage with domestic firms and multiplier effects in local economy. In forward linkage, foreign investors are suppliers of local firms and create more ideas and employment in local firms. In backward linkage effect, foreign investors are the buyers of local firms, which create demand for local firms' product and local firms create the demand for labor. Aaron [1] found that 26 million direct jobs and 41.6 million indirect jobs were created by FDI in developing countries in 1997. FDI is a source of capital accumulation in a country and enhances the new skills in labor force through training and development. So, labor can have greater potential in finding new jobs.

MacDougall [2] stated that FDI had positive effects on capital formation and employment generation in the host country. Aharoni [3] and Vernon [4] stated that FDI had positive effects on employment, management abilities, skill transfer and know-how of host country's labor. Streeten [5] stated the positive spillovers on direct and indirect employment creation. That was also a source of enhancing new skills in local labor through training, promoting managerial skills in local managers causing the higher domestic wages.

Caves [6] and Buckley and Casson [7] discussed the positive effects of FDI on skill transfers and training of manpower, which could help the labor force in finding jobs. Brander and Spencer [8] claimed that positive spillovers of FDI were generated through tax collection and increased employment through a rise in production level in the host country. Dunning [9] stated that FDI generated the direct and indirect employment and further stated that foreign firms could provide better jobs than the local firms depending on the host country's human resource development, favorable market structure, favorable culture and availability of the educational and technological infrastructure. Haaparanta [10] stated that in high wage countries, government could give subsidy to attract FDI and FDI could become a source of employment creation in those countries.

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Haaland and Wooton [11] gave the economic justification of giving subsidy to attract FDI. FDI increased the demand for domestic inputs and labor as well. In the long run, FDI could establish modern sector through agglomeration effects and helped in industrial development and in generating employment. Mudambi [12] claimed that region-specific FDI could play a role to increase employment in backward areas. Haaland and Wooton [13] mentioned that foreign investors could initially offer jobs to get the benefit of subsidy from host country's government and afterwards could redundant the labor from jobs. Welfare effects of subsidy depended on government policies. If government reduced the amount of subsidy and raised the payments for redundancy, the welfare effects could be maximized. Hanson *et al.* [14] stated that the welfare effects of FDI on employment depended on the nature of FDI. Production-oriented FDI had better impact on training and job creation than that of distribution-oriented FDI.

In a survey on the Hong Kong manufacturing firms, Chen [15] found that multinational firms spent more on training programs than the domestic firms did. The same result has been reported by Gerschenberg [16] in Kenya. Such training programs could be much beneficial for enhancement in the labor skills and employment. The Department of Trade and Industry [17] gave a report after conducting a survey on thirty foreign manufacturing firms in United Kingdom. The report revealed that these firms generated 21515 direct jobs and every 100 direct jobs further created 19.5 indirect jobs in UK. Lipsey [18] found that foreign firms employed greater number of employees in administrative jobs than the local firms.

Methodology: To capture the impact of sector-specific FDI on sector-specific employment, the study uses sector-specific employment as dependent variable and sector-specific FDI and aggregate GDP as independent variable. The study uses GDP as proxy for aggregate demand. As mentioned before, the demand for labor is derived demand for commodities to produce labor. Secondly, rise in GDP comes with rise in economic activities, which will again be a source of employment. FDI is also attracted in those countries where demand condition is good. When foreign investors operate in a country, they also need labor. So, GDP level is helpful for both FDI and employment. The study uses the data of FDI and employment for primary, secondary and tertiary sectors for analysis. Model of labor productivity is as follows:

$$EMP_{jt} = f(FDI_{jt}, GDP_t) \quad (1)$$

where,

EMP_{jt} = Sector-specific Employment at sector j at time t.
FDI_{jt} = Sector-specific Foreign Direct Investment at sector j and time t.
GDP_t = Gross Domestic Product is proxy for aggregate demand at time t.

At first, study discusses the Augmented Dickey-Fuller (ADF) test, which was produced by Dickey and Fuller [19] to check the stationarity in the time series. This test proposed the following equation with intercept to detect the non-stationarity.

$$\Delta Y_t = \alpha + \delta Y_{t-1} + \gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta Y_{t-2} + \ldots\ldots + \gamma_m \Delta Y_{t-m} + u_t \quad (2)$$

where, Δ is a difference operator, t refers to the time period and u_t is a residual at time period t. Y_t denotes the variable, which is investigated for stationarity. $\gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta Y_{t-2} + \ldots\ldots + \gamma_m \Delta Y_{t-m}$ is used to correct the correlation problem among μ_t and regressors of equation (2). The equation (2) includes intercept α and can also be assumed with intercept and time-trend T as follows:

$$\Delta Y_t = \alpha + \lambda T + \delta Y_{t-1} + \gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta Y_{t-2} + \ldots\ldots + \gamma_m \Delta Y_{t-m} + u_t \quad (3)$$

where λ is the coefficient of time-trend (T). ADF test checks the null hypothesis (δ=0), if δ is statistically significant and it is not zero, then time series has no unit root problem. A time-series variable is stationary with two conditions. At first, δ should be statistically non-zero and it should be negative.

Phillips and Perron [20] developed the unit root test which is different from ADF tests in dealing with heteroscedasticity and serial correlation. They ignore the $\gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta Y_{t-2} + \ldots\ldots + \gamma_m \Delta Y_{t-m}$ from ADF equation (3) which is for any serial correlation amongst error terms. PP test removes the serial correlation by giving ranks to the residuals. Equation of PP test is as follows:

$$\Delta Y_t = \alpha + \lambda T + \delta Y_{t-1} + u_t \quad (4)$$

u_t may have heteroscedasticity, so for correction of serial correlation and heteroscedascity. PP test uses the modified statistic Z_t and Z_δ which are as follows:

$$Z_t = \left(\frac{\hat{\sigma}^2}{\hat{\pi}^2}\right)^{1/2} .t_{\delta=0} - \frac{1}{2}\left(\frac{\hat{\pi}^2 - \hat{\sigma}^2}{\hat{\pi}^2}\right).\left(\frac{T.SE(\hat{\delta})}{\hat{\sigma}^2}\right) \quad (5)$$

$$Z_\delta = T\hat{\delta} - \frac{1}{2}\frac{T^2.SE(\hat{\delta})}{\hat{\sigma}^2}\left(\hat{\pi}^2 - \hat{\sigma}^2\right) \quad (6)$$

where, $SE(\hat{\delta})$ is the standard error of $\hat{\delta}$. $t_{\delta=0}$ is the test statistic under the estimates of $\hat{\sigma}^2$ and $\hat{\pi}^2$, which are given below:

$$\hat{\sigma}^2 = \lim_{T\to\infty} T^{-1}\sum_{t=1}^{T} E\left[u_t^2\right] \quad (7)$$

$$\hat{\pi}^2 = \lim_{T\to\infty} \sum_{t=1}^{T} E\left[T^{-1}S_T^2\right] \quad (8)$$

where $S_T = \sum_{t=1}^{T} u_t$ and T is the time-trend. Z_t and Z_μ of PP test follows the same distribution as the t-statistic of ADF test under the null hypothesis (δ=0). PP test has an advantage over ADF test that it robust heteroscedasticity in the error term (u_t). Secondly, it does not need to specify the lag length for its estimation.

Zivot and Andrews [21] modified the PP and ADF unit root test, which also considers the one-unknown structural break. The ADF test may fail in identifying the true result in the presence of a structural break whether time series is stationary or not. ADF and PP tests do not allow for structural break in data. Zivot-Andrews test uses the sequential ADF test to find the break with the following equations.

$$Model\ \ A:\ \ \Delta Y_t = \mu_1^A + \gamma_1^A t + \mu_2^A DU_t(\lambda) + \alpha^A Y_{t-1} + \sum_{j=1}^{k} \beta_j \Delta Y_{t-j} + \varepsilon_t \quad (9)$$

$$Model\ \ B:\ \ \Delta Y_t = \mu_1^B + \gamma_1^B t + \gamma_2^A DT^*{}_t(\lambda) + \alpha^B Y_{t-1} + \sum_{j=1}^{k-1} \beta_j \Delta Y_{t-j} + \varepsilon_t \quad (10)$$

$$Model\ \ C:\ \ \Delta Y_t = \mu_1^C + \gamma_1^C t + \mu_2^C DU_t(\lambda) + \gamma_2^C DT_t^*(\lambda) + \alpha^C Y_{t-1} + \sum_{j=1}^{k-1} \beta_j \Delta Y_{t-j} + \varepsilon_t \quad (11)$$

where $DU_t(\lambda)$ is 1 and $DT^*_t(\lambda) = t - T\lambda$ if $t > T\lambda$, 0 otherwise. $\lambda = {}^{T_B}\!/_{T}$, T_B represents a possible break point. Equation is tested sequentially for T_B=2,3,....,T-1, where T is the number of observations after adjustment of differencing and lag length k. Model (A) allows for a change in the intercept of the series, Model (B) allows for a change in the trend of a series, while Model (C) allows changes in both intercept and trend.

After testing the unit root problem in the time-series variables, the cointegration test can be used to find the long-run relationship among the variables. Long-run relationship states the long-run equilibrium among variables, which may have the shock of disequilibrium in the short-run from long-run, but it will move again in long-run equilibrium, Harris and Sollis [22]. Auto-Regressive Distributive Lag (ARDL) bound testing technique has been developed by Pesaran *et al.* [23]. ARDL can be applied if variables have mixed order of integration i.e. I(0) and I(1). This approach takes the optimum lag length for each variable separately in the model which helps in the data generating process from a general to a specific model. The problems resulting from non-stationarity of data can also be avoided by using an ARDL approach, Laurenceson and Chai [24]. The study uses Schwarz Bayesian Criterion(SBC) to find the maximum relevant lag length for ARDL model. To find the cointegration amongst employment in each sector j, GDP of Pakistan and foreign direct investment in each sector j, ARDL model is as follows:

$$\Delta EMP_{jt} = \delta_{j0} + \delta_1 EMP_{jt-1} + \delta_2 FDI_{jt-1} + \delta_3 GDP_{t-1} + \sum_{i=1}^{p} \beta_{1i}\Delta EMP_{jt-i} + \sum_{i=0}^{q} \beta_{2i}\Delta FDI_{jt-i} + \sum_{i=0}^{r} \beta_{3i}\Delta GDP_{t-i} + \lambda D_{EMPj} + \varepsilon_{jt} \quad (12)$$

In equation (12), first difference of EMP is the dependent variable, the null hypothesis is (H_0: δ_1=δ_2= δ_3= 0) and alternate hypothesis is ($\delta_1 \neq \delta_2 \neq \delta_3 \neq$ 0) which shows the existence of long run relationships in the models, δ_{j0} is a constant and ε_{jt} is error term. D_{EMPj} is included in equation for possible structural break and to complete information in each model. This is also shown as $F_{EMPjt}(EMP_{jt}/FDI_{jt},GDP_{jt})$. If cointegration exists in the model, then long run and short run coefficients will be calculated. Error correction term can be used to find the short-run relationships in the models which is as follows:

$$\Delta EMP_{jt} = \gamma_j + \sum_{i=1}^{p} \beta_{1i} \Delta EMP_{jt-i} + \sum_{i=0}^{q} \beta_{2i} \Delta FDI_{jt-i} + \sum_{i=0}^{r} \beta_{3i} \Delta GDP_{jt-i} + \phi_j D_{EMPj} + \varphi_j ECT_{jt-1} + \zeta_{jt} \quad (13)$$

φ_j is showing the speed of adjustment from short run disequilibrium to long run equilibrium for each sector j. Afterwards, diagnostic tests will be used to check the normality, functional form, heteroscedasticity and serial correlation in the model. CUSUM and CUSUMsq statistics will be used to ensure the stability of parameters.

Data Sources: Data on sector-specific FDI is taken from State Bank of Pakistan [25]. Gross Domestic Product, total employment and employment share in primary, secondary and tertiary sectors are taken from World Bank [26]. Data is taken from 1972 to 2010.

Empirical Results: At first, the study checks for stationarity of variables. The study uses the ADF and PP unit root tests to check the stationarity in all variables in the model. Results are given in the table below.

Table (1) shows that EMP_t is non-stationary in all sectors with both ADF and PP tests. GDP_t is non-stationary at level with both ADF and PP tests. FDI_t in the primary is stationary at level at 5% level of significance with intercept and intercept & trend with ADF and PP unit root tests. FDI_t in secondary sector is non-stationary with ADF and PP tests with intercept and with intercept & trend except it is stationary at 1% level of significance with intercept & trend with PP test. FDI_t in tertiary sector is non-stationary with both ADF and PP tests.

Table (2) shows that GDP_t becomes stationary at 5% level of significance with significant structural break in trend for the year 2003. It is non-stationary with significant break for the 2003 in intercept and significant break for the year 2001 in both intercept & trend. EMP_t in primary sector is non-stationary with significant break for the year 2000 in intercept, significant break for the year 1998 in trend and significant break for the year 1991 in both intercept & trend. EMP_t in secondary sector is non-stationary with significant break for the year 2002 in intercept, significant break for the year 2001 in trend and significant break in 1998 in both intercept & trend. EMP_t in tertiary sector is non-stationary with significant break for the year 2003 in intercept, significant break for the year 1990 in trend and significant break for the year 1989 in both intercept & trend. FDI_t in primary sector is stationary at 5% level of significance with significant break for the year 1997 in intercept, significant break for the year 1990 in trend and significant break for the year 1987 in both intercept & trend. FDI_t in secondary sector is stationary at 5% level of significance with significant break for the year 1983 in intercept. It is stationary at 1% level of significance with significant break for the year 1991 in trend and significant break for the year 1992 in both intercept & trend. FDI_t in tertiary sector is non-stationary with significant break for the year 2003 in intercept. It is stationary at 1% level of significance with significant break for the year 2003 in trend and in the both intercept & trend.

Table (3) shows that EMP_t is stationary at 1% level of significance with both ADF and PP unit root tests in all sectors except EMP_t in tertiary sector is stationary at 5% level of significance with ADF test for intercept only. FDI_t in primary sector is stationary at 5% level of significance in both ADF and PP tests. GDP_t and FDI_t in

Table 1: Unit Root Tests at Level

		ADF		PP	
Sector	Variable	C	C&T	C	C&T
Primary	EMP_t	0.781 (1)	-1.911 (1)	0.141 (5)	-1.689 (3)
	FDI_t	-3.368*(1)	-3.315*(0)	-3.285*(1)	-3.239*(1)
Aggregate	GDP_t	0.529 (1)	-2.005 (5)	1.292 (3)	0.366 (3)
Secondary	EMP_t	1.933 (0)	-0.254 (1)	2.587 (7)	-0.057 (3)
	FDI_t	0.441 (3)	-1.303 (3)	-3.155 (2)	-5.641** (1)
Tertiary	EMP_t	1.983 (7)	0.007 (5)	1.038 (3)	-0.231 (4)
	FDI_t	1.983 (4)	1.007 (4)	1.038 (3)	0.231 (4)

Note: *, ** and *** show stationarity of variables at the 0.10, 0.05 and 0.01 level respectively

Brackets contain the optimum lag length.

Table 2: Unit Root Test: Zivot-Andrews

Sector	Variable	k	Year of Break	α	t_α	Type of Model
Primary	EMP_t	3	2000	-0.947	-3.406	A
		2	1998	-0.993	-4.080	B
		2	1991	-0.914	-4.174	C
	FDI_t	3	1997	-0.723*	-4.935	A
		2	1990	-0.812*	-4.560	B
		3	1987	-0.963*	-5.281	C
Aggregate	GDP_t	1	2003	-0.051	-1.065	A
		0	2003	-0.304*	-4.633	B
		0	2001	-0.275	-4.037	C
Secondary	EMP_t	2	2002	-0.377	-2.818	A
		1	2001	-1.032	-3.057	B
		2	1998	-0.845	-3.294	C
	FDI_t	2	1983	-1.374*	-5.095	A
		3	1991	-1.578**	-5.771	B
		3	1992	-1.579**	-5.671	C
Tertiary	EMP_t	1	2003	-0.323	-3.229	A
		0	1990	-0.776	-3.651	B
		0	1989	-0.774	-2.364	C
	FDI_t	1	2003	-0.182	-1.405	A
		0	2003	-1.405**	-5.551	B
		0	2003	-2.388**	-9.182	C

Note: * and ** show stationarity of variables at the 0.05 and 0.01 level respectively.

Table 3: Unit Root Tests at First Difference

		ADF		PP	
Sector	Variable	C	C&T	C	C&T
Primary	EMP_t	-7.342**(1)	-7.667**(1)	-7.800**(6)	-9.374**(9)
	FDI_t	-3.368*(1)	-3.315*(0)	-3.285*(1)	-3.239*(1)
Aggregate	GDP_t	-3.452*(2)	-4.105**(1)	-4.297**(5)	-4.769**(1)
Secondary	EMP_t	-5.471**(1)	-6.194**(1)	-5.469**(1)	-6.210**(3)
	FDI_t	-3.236*(3)	-3.745**(3)	-5.804**(5)	-5.414**(4)
Tertiary	EMP_t	-3.678*(5)	-5.503**(4)	-7.811**(4)	-8.463**(3)
	FDI_t	-4.678**(4)	-5.503**(4)	-7.811**(4)	-8.463**(3)

Note: * and ** show stationarity of variables at the 0.05 and 0.01 level respectively.

secondary sector are stationary at 1% level of significance in both ADF and PP tests except ADF test with intercept at 5% level of significance. FDI_t in tertiary sector is stationary at 1% level of significance in both ADF and PP tests. There is evidence for mix order of integration I(0) and I(1) in all models. So, ARDL model is suitable to apply here. The study finds the optimum lag length for ARDL model by using SBC and then includes dummy variable D_{EMP} in each model separately in the ARDL model to complete the information in the model. Optimum lag length is 2 for $dEMP_t$, 0 for $dFDI_t$ and 0 for $dGDP_t$ in primary sector employment model. The study selects the year 1991 for break period and puts 0 from 1972 to 1991 and 1 afterward in D_{EMP}. Optimum lag length is 1 for $dEMP_t$, 0 for $dFDI_t$ and 0 for $dGDP_t$ in secondary sector employment model. The study selects the year 1998 for break period and puts 0 from 1972 to 1998 and 1 afterwards in D_{EMP}. Optimum lag length is 2 for $dEMP_t$, 1 for $dFDI_t$ and 0 for $dGDP_t$ in primary sector employment model. The study selects year the 1989 for break period and puts 0 from 1972 to 1989 and 1 afterwards in D_{EMP}. The calculated F-statistic for selected ARDL model is given in Table (4).

Table (4) shows that all calculated values are greater than upper bound values at 1% level of significance. So long run relationships exist in all sector's models of employment.

Table (5) shows the results of long run estimates with selected ARDL model. The coefficient of FDI_t in primary sector is positive and insignificant. FDI_t has not significant impact on EMP_t in primary sector. The coefficient of GDP_t is positive and significant at 10% level of significance. So, GDP_t has a positive and significant impact on EMP_t in primary sector. Intercept is positive and significant at 5% level of significance. Coefficient of D_{EMP} is negative and significant at 5% level of significance. So, intercept has changed after the year

Table 4: ARDL Bound Test

Sector	VARIABLES (when taken as a dependent)	F-Statistic (Calculated)	At 0.05		At 0.01	
			I(0)	I(1)	I(0)	I(1)
Primary	$d(EMP_t)$	7.373**	3.615	4.913	5.018	6.610
Secondary	$d(EMP_t)$	9.287**	3.615	4.913	5.018	6.610
Tertiary	$d(EMP_t)$	10.283**	3.615	4.913	5.018	6.610

** Means at 1%, 5% significant levels reject the null hypotheses of no cointegration

* Means at 5% significant level reject the null hypotheses of no cointegration

Table 5: Estimated Long Run Results: Dependent Variable is EMP_{jt}

Sector	Regressor	Parameter	S. E.	t-Statistic	P-value
Primary	FDI_t	$8.56E^{-3}$	$5.41E^{-3}$	1.583	0.141
	GDP_t	$4.69E^{-5}$*	$2.49E^{-5}$	1.878	0.051
	C	$9.99E^{6}$***	$3.21E^{6}$	3.111	0.000
	D_{EMP}	$-1.19E^{6}$**	$4.86E^{5}$	-2.464	0.019
Secondary	FDI_t	$2.74E^{-4}$***	$1.24E^{-4}$	2.213	0.020
	GDP_t	$1.87E^{-5}$***	$2.11E^{-6}$	8.891	0.000
	C	$3.48E^{6}$***	$3.06E^{5}$	11.362	0.000
	D_{EMP}	$8.92E^{5}$**	$3.89E^{5}$	2.294	0.028
Tertiary	FDI_t	$1.71E^{-4}$***	$4.98E^{-5}$	3.412	0.000
	GDP_t	$5.23E^{-5}$***	$4.07E^{-6}$	12.777	0.000
	C	$2.26E^{6}$***	$4.82E^{-5}$	4.684	0.000
	D_{EMP}	$1.05E^{5}$	$6.09E^{5}$	0.173	0.864

Note: *, ** and *** show stationarity of variables at the 0.10, 0.05 and 0.01 level respectively.

Table 6: Error Correction Model: Dependent Variable is ΔEMP_{it}

Sector	Regressor	Parameter	S. E.	t-Statistic	P-value
Primary	$dEMP_{t-1}$	-0.330	0.168	-1.969	0.058
	$dFDI_t$	$-4.66E^{-3}$	$3.34E^{-3}$	-1.394	0.173
	$dGDP_t$	$2.76E^{-6}$	$2.46E^{-6}$	1.117	0.273
	dC	$1.33E^{5}$	$2.61E^{5}$	0.511	0.613
	dD_{EMP}	$-1.61E^{3}$	$9.65E^{4}$	-0.017	0.999
	ECT_{t-1}	$6.01E^{-3}$	$3.07E^{-2}$	0.196	0.846
Secondary	$dFDI_t$	$4.29E^{-4}$	$3.44E^{-4}$	1.249	0.221
	$dGDP_t$	$1.04E^{-6}$	$2.01E^{-6}$	0.518	0.608
	dC	$4.90E^{4}$	$1.34E^{5}$	0.366	0.716
	dD_{EMP}	$6.81E^{4}$	$4.28E^{4}$	1.591	0.176
	ECT_{t-1}	-0.191	0.110	-1.731	0.083
Tertiary	$dEMP_{t-1}$	-0.367	0.162	-2.264	0.013
	$dFDI_t$	$6.08E^{-5}$	$1.62E^{-4}$	0.376	0.710
	$dGDP_t$	$1.01E^{-5}$	$5.23E^{-6}$	1.934	0.062
	dC	$3.46E^{5}$	$2.02E^{5}$	1.713	0.096
	dD_{EMP}	$2.17E^{4}$	$1.98E^{4}$	1.398	0.315
	ECT_{t-1}	-0.189	0.086	-2.208	0.011

Note: *, ** and *** show statistically significance of parameters at the 0.10, 0.05 and 0.01 respectively

Brackets contain number of lags

Table 7: Diagnostic Tests

Sector	Serial Correlation (χ^2)	Functional Form (χ^2)	Normality (χ^2)	Heteroscedasticity (χ^2)
Primary	1.414 (0.234)	1.263 (0.270)	0.953(0.493)	1.146 (0.312)
Secondary	0.391 (0.532)	0.351 (0.558)	0.256(0.593)	0.835 (0.361)
Tertiary	1.026 (0.311)	0.061 (0.805)	2.431(0.297)	2.685 (0.101)

Note: Brackets contain Probability values.

1991. The results of secondary sector show that the coefficient of FDI_t in secondary sector is positive and significant at 5% level of significance. FDI_t has a positive and significant impact on EMP_t in secondary sector. The coefficient of GDP_t is positive and significant at 1% level of significant. GDP_t has a positive and significant impact on EMP_t in secondary sector. Intercept (C) is positive and significant at 1% level of significance. The coefficient of D_{EMP} is positive and significant at 5% level of significance. So, intercept has changed after the year 1998. The results of tertiary sector show that the coefficient of FDI_t in tertiary sector is positive and significant at 1% level of significance. FDI_t has a positive and significant impact on EMP_t in tertiary sector. The coefficient of GDP_t is positive and significant at 1% level of significant. GDP_t has a positive and significant impact on EMP_t in secondary sector. Intercept (C) is positive and significant. The coefficient of D_{EMP} is positive and insignificant. Table (6) shows the estimates of short run. Results of primary sector show that all coefficients are insignificant except $dEMP_{t-1}$. The coefficient of ECT_{t-1} is positive and insignificant. So, there is no short run relationship amongst the models of primary sector. Results of secondary sector show that the coefficients of all variables are insignificant. Coefficient of ECT_{t-1} is negative and significant at 10% level of significance. The short run relationship exists in secondary sector and speed of adjustment is 19.1% in a year. The results of tertiary sector show that $dEMP_{t-1}$ is negative and significance. The coefficient of $dFDI_t$ is positive and insignificant. The coefficient of $dGDP_t$ is positive and significant. So, rising GDP_t has positive impact on employment in short run. The coefficient of ECT_{t-1} is negative and significant at 5% level of significance. The short run relationship exists in tertiary sector employment model and speed of adjustment is 18.9% in a year.

Results of table (7) show that p-values of serial correlation, functional form, normality and heteroscedasticity are greater than 0.10 in case of all models. So, there is no problem of serial correlation, functional form, normality and heteroscedasticity in the models.

Figures (1), (2) and (3) are showing that CUSUM and CUSUMsq tests for primary, secondary and tertiary sectors. Figures show that CUSUM and CUSUMsq testsare within critical boundaries. So, the calculated long run estimates are reliable for all sectors.

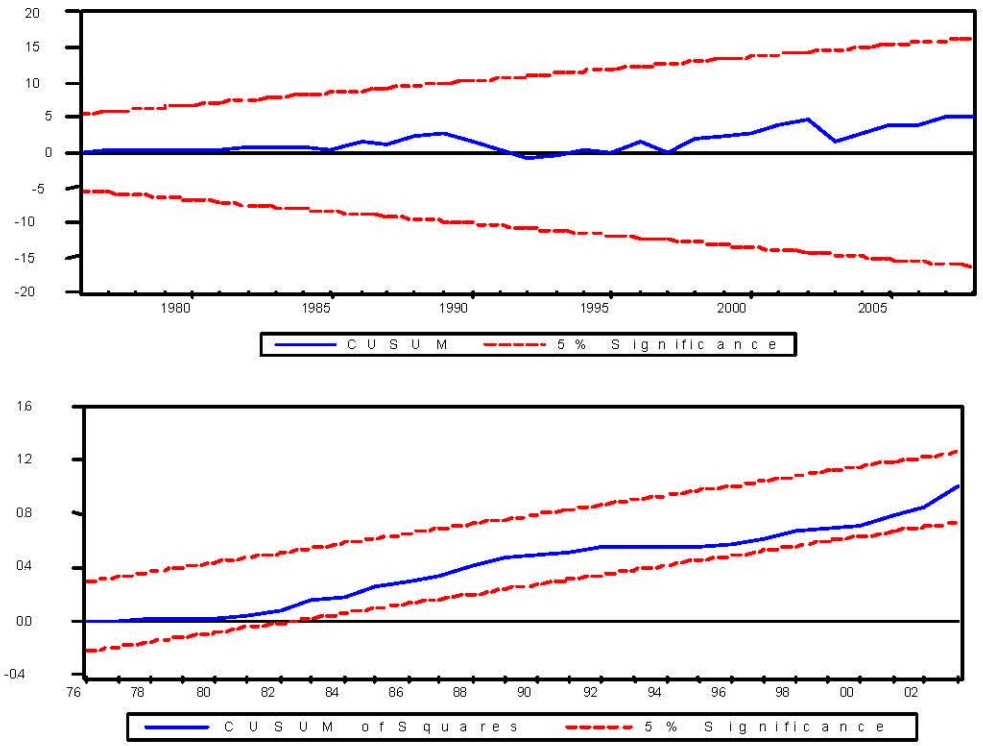

Fig. 1: CUSUM and CUSUMsq Tests for Primary Sector

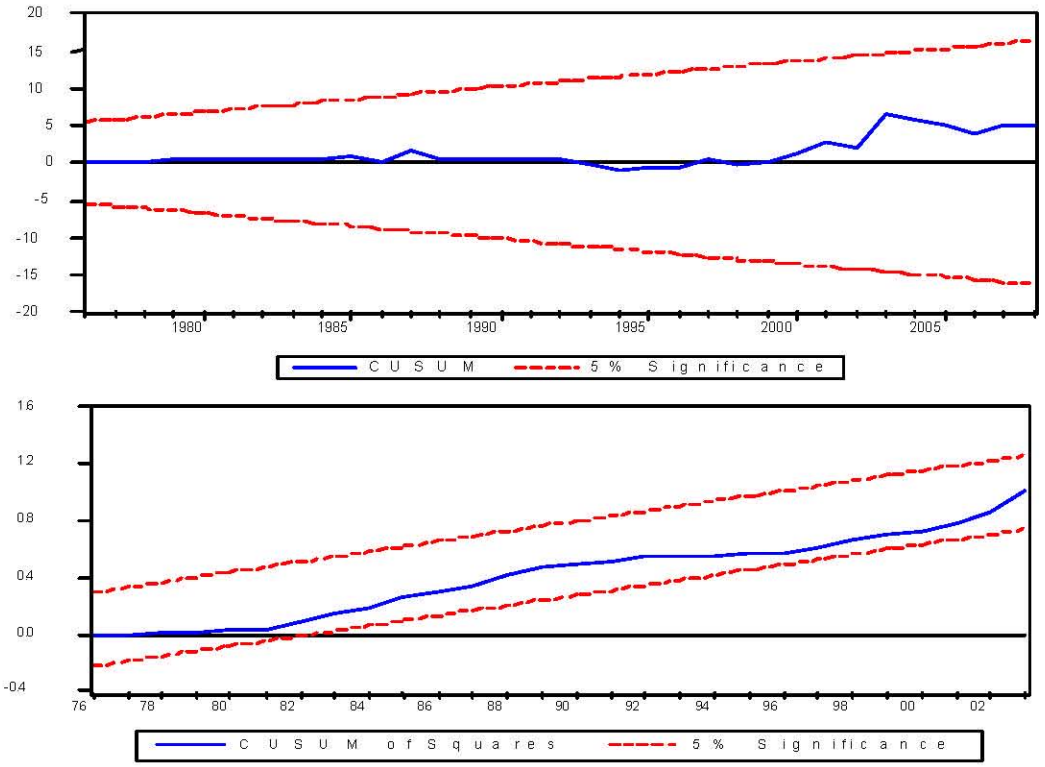

Fig. 2: CUSUM and CUSUMsq Tests for Secondary Sector

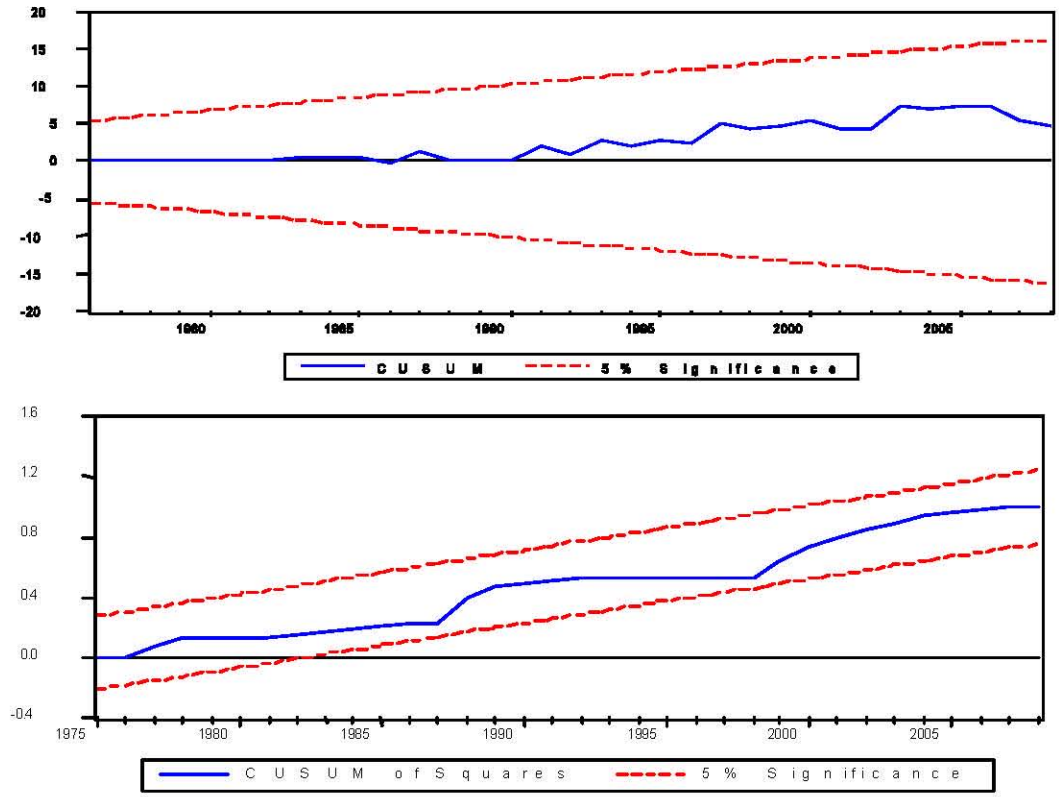

Fig. 3: CUSUM and CUSUMsq Tests for Tertiary Sector

CONCLUSIONS

To find the impact of FDI on employment, the study uses aggregate-GDP proxy for aggregate demand and sector-specific FDI as independent variables and sector-specific employment as dependent variable. The study uses the data of primary, secondary and tertiary sector and the data is taken from 1972 to 2008 for analysis. The study uses ARDL cointegration bound testing technique to find the long run and short run relations for each sector separately. Results show that long run relationship exists in the model. The short run relationship exists in case of secondary and tertiary sector employment models. The short run relationship does not exist in case of primary sector employment model. Sector-specific FDI has positive and significant impact on employment in case of secondary and tertiary sector. In case of primary sector model, FDI does not have significant impact on employment. So, the study concludes that FDI is helpful in raising employment in secondary and tertiary sectors in Pakistan. Aggregate demand is helpful in raising employment in all sectors.

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