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RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND HUMAN CAPITAL (THE CASE OF PAKISTAN)

For a capital scarce country like Pakistan, foreign direct investment plays a vital role in human as well as physical capital formation. Besides having positive and significant impact on economic growth, FDI enhances the productivity of human capital and physical capital through a transfer of technology into a recipient country. FDI accelerates the process of capital formation and generates more employment opportunities. In this study we have used time series data in order to analyze the long-run impact of different levels of human capital available in Pakistan on FDI and for this purpose Johansen cointegration technique is used, followed by ECM for the short-run analysis. This study deduces that Pakistan lacks the minimum threshold level of human capital to mobilize the skill-seeking FDI.

Keywords: *foreign direct investment, human capital, capital movement.*

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ЗАЛЕЖНІСТЬ МІЖ ПРЯМИМИ ІНОЗЕМНИМИ ІНВЕСТИЦІЯМИ І ЛЮДСЬКИМ КАПІТАЛОМ (НА ПРИКЛАДІ ПАКИСТАНУ)

У статті показано, що для країн з дефіцитом бюджету, таких як Пакистан, прямі іноземні інвестиції (ПІІ) грають дуже важливу роль у формуванні людського і фізичного капіталу. Окрім позитивного й істотного впливу на економічне зростання, ПІІ підвищують продуктивність людського і фізичного капіталу шляхом передачі технологій у країну-одержувача. ПІІ прискорюють процес накопичення капіталу і створюють більше можливостей для працевлаштування. Використано дані часових рядів для аналізу довгострокового впливу різних рівнів людського капіталу, доступного в Пакистані, на ПІІ. Для цієї мети використано метод коінтеграції Йохансена з корекцією помилок для короткострокового аналізу. Зроблено висновок, що в Пакистані не вистачає мінімального порогового рівня людського капіталу для мобілізації ПІІ.

Ключові слова: *прямі іноземні інвестиції; людський капітал; переміщення капіталу.*

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ЗАВИСИМОСТЬ МЕЖДУ ПРЯМЫМИ ИНОСТРАННЫМИ ИНВЕСТИЦИЯМИ И ЧЕЛОВЕЧЕСКИМ КАПИТАЛОМ (НА ПРИМЕРЕ ПАКИСТАНА)

В статье показано, что для стран с дефицитом бюджета, таких как Пакистан, прямые иностранные инвестиции (ПИИ) играют очень важную роль в формировании человеческого и физического капитала. Кроме положительного и существенного влияния на экономический рост, ПИИ повышают продуктивность человеческого и физического капитала путем передачи технологий в страну-получателя. ПИИ ускоряют процесс накопления капитала и создают больше возможностей для трудоустройства. Использованы данные временных рядов для анализа долгосрочного влияния различных уровней человеческого капитала, доступного в Пакистане, на ПИИ. Для этой цели используется метод коинтеграции Йохансена с коррекцией ошибок для краткосрочного анализа. Сделан вывод, что в Пакистане не хватает минимального порогового уровня человеческого капитала для мобилизации ПИИ.

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Ключевые слова: *прямые иностранные инвестиции; человеческий капитал; перемещение капитала.*

1. Introduction. High level of human capital is considered to be an important determinant for efficiency-seeking FDI which requires skilled labor force as a factor input from a host country. Like physical capital, human capital can be increased by investing in education, training and healthcare. In the era of knowledge-based economy, only cheap labor is no longer the decisive factor in attracting FDI, as previously was considered. Now managerial skills and technological innovations which require skilled and educated labor are crucial for higher productivity.

Economic theory suggests diminishing returns in physical capital market and capital, being scarce in developing countries, has higher marginal product as compared to that in developed countries. Provided there prevails perfect competition at capital market, capital should move from developed to developing countries until capital-labor ratio and eventually ratio of respective rewards get equalized in developed and developing countries. Empirical evidence, however, has not fully supported this direction of capital movement. As a developing economy, Pakistan can also benefit from such a theorized flow of physical capital. Therefore, this paper scrutinizes the role of human capital in attracting FDI for the case of Pakistan.

1.1. Objective of the study. This article is an attempt to explore the impact of human capital at different educational levels on foreign direct investment. So the objective of this study is to determine the level of human capital for a host country to attract FDI.

In order to achieve this objective we set the following proposition.

1.2. Proposition: Human capital is an important determinant to attract FDI.

2. Literature Review. Lucas (1990) observed a phenomenon that if trade in capital goods is free then a direction of capital flows must be from rich to poor countries as marginal productivity of capital is higher in developing countries as compared to developed ones. So all new investments in capital goods should flow to the areas where MPk is higher, until capital labour ratios are equalized which will eventually equalize wages and capital returns in two countries. Although capital flows from rich to poor countries but it falls short than the magnitude predicted by theory. So, besides difference in external benefits of human capital like cultural impacts and imperfections in capital markets, the difference in human capital is the actual cause of low pace of capital flight from rich to poor countries. Hence human capital is a dynamic factor in international trade.

Zang (2001) deduced that FDI is supposed to be the engine of economic growth for a host country in the following dimensions:

- FDI boosts up the pace of capital formation and opens more employment opportunities;
- Inflows of FDI positively affect the current account of BOP;
- FDI enhances the productivity of human capital in a host country;
- When FDI enters into geographical boundaries, it becomes a cause of transfer of technology and managerial skills.

Abbas and Peck (2008) concluded that human capital is inevitable to absorb the world technological changes. According to them, in Pakistan economic growth is endogenous in nature but returns to secondary education are below the expectations which means there is deficiency of investment in human capital at this level. Further, there is no consistent policy for human capital formation in order to make rapidly increasing population a useful skilled labor force.

Buckley at al. (2002) deduced that quality of environment and social conditions are important factors in a recipient country which make FDI more productive. FDI-friendly environment in a host country depends upon the rate of savings, trade openness and technological development.

Xu (2000) studied the impact of US foreign direct investment in 40 countries for the period of 1966-94 and he deduced that FDI becomes an immediate cause of transfer of technology and enhances productivity in developed countries but FDI fails to produce the same results in developing countries due to inadequate human capital.

Yao and Zhang (2001) discussed the nature of Chinese research and development activities. According to them, in China most of R & D investments are made in public sector instead of private sector. So, when the threshold level of human capital is achieved, positive spillovers initialize as a result of R&D investments.

3. The Model. The model used in this study is borrowed from Romer (1990):

$$FDI_t = f(GDP_t, L_t, H_t)$$

Its modified form in terms of Cobb-Douglas production function is given by:

$$FDI_t = A_t GDP_t^{\alpha} L_t^{\beta} H_t^{\gamma} e_t,$$

where:

GDP = gross domestic product.

A_t = gross domestic investment used as a proxy variable for capital.

L_t = employment level as a proxy for labor.

H_t = enrollment rates used as a proxy variable for human capital.

We shall estimate the following equation for all the proxy variables of human capital:

$$\ln(FDI_t) = \alpha + \beta\{\ln(GDP_t)\} + \gamma\{\ln(L_t)\} + \delta\{\ln(H_t)\} + \varepsilon_t$$

By replacing all 5 proxy variables for human capital, we get the following set of equations:

$$\ln(FDI_t) = \alpha + \beta\{\ln(GDP_t)\} + \gamma\{\ln(L_t)\} + \delta\{\ln(Hp_t)\} + \varepsilon_t \quad (1)$$

$$\ln(FDI_t) = \alpha + \beta\{\ln(GDP_t)\} + \gamma\{\ln(L_t)\} + \delta\{\ln(Hs_t)\} + \varepsilon_t \quad (2)$$

$$\ln(FDI_t) = \alpha + \beta\{\ln(GDP_t)\} + \gamma\{\ln(L_t)\} + \delta\{\ln(Hcol_t)\} + \varepsilon_t \quad (3)$$

$$\ln(FDI_t) = \alpha + \beta\{\ln(GDP_t)\} + \gamma\{\ln(L_t)\} + \delta\{\ln(Huniv_t)\} + \varepsilon_t \quad (4)$$

$$\ln(FDI_t) = \alpha + \beta\{\ln(GDP_t)\} + \gamma\{\ln(L_t)\} + \delta\{\ln(Hvoc_t)\} + \varepsilon_t \quad (5)$$

Following Romer (1990), schooling enrollment rates (SER) as a proxy variable of human capital are used. Although SER is quite limited in scope as it does not take into account the important features of the human like marginal product and quality of work, yet it is considered to be a reasonable indicator for developing countries like Pakistan, where a large fraction of population is still illiterate. We have disintegrated the enrollment rates for 5 different levels of education like primary, secondary, col-

lege, university and vocational training in Pakistan. These enrollment rates are obtained by the following formula:

$$SER_t = \frac{TotalEnrollmentinSpecificGrade}{TotalPopulationofCorrespondingAgeGroup}$$

where:

Primary enrollment rate = H_p

University enrollment rate = H_{univ}

Secondary enrollment rate = H_s

College enrollment rate = H_h

Vocational enrollment rate = H_{voc}

4. Empirical Findings. In order to test the long-run relationship between two or more than two time series, cointegration technique is used. In this research we are using Johansen cointegration test to investigate the long-run relationship between dependent and independent variables.

Most of the times, dealing with the time series data, it shows the property of non-stationarity at level form. We have tested the stationarity of the data through unit root tests. In this regard, augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are used.

Unit Root Test Results. In this research we have used both PP and ADF tests to test the stationarity of the data.

Table 1.a. **Augmented Dickey-Fuller (ADF) Test Statistics**

Variable name	At level	At first difference
FDI_t	-1.56	-5.26
GDP_t	-2.17	-4.09
L_t	-1.93	-4.73
H_p	-2.01	-7.95
H_s	-0.86	-4.37
H_{col}	-0.94	-6.64
H_{uni}	-0.54	-5.62
H_{voc}	-0.82	-5.26

At the 5% level of significance critical value is -2.95.

The results of the ADF test are presented in Table 1.a. These results reveal that at level form estimated values of t-statistics for all variables are not significantly negative. Therefore, the data are not stationary at level form.

The results of the differenced variables show that the estimated values of t-statistics are significantly negative at 5% level of significance. So, according to ADF all the variables are stationary at first difference.

The results of the PP test are presented in Table 1.b. The table reveals that at level form estimated values of t-statistics for all variables are not significantly negative. Therefore, the data are not stationary at level form.

The results of the differenced variables show that the estimated values of t-statistics are significantly negative at 5% level of significance. So, all the variables are said to be integrated of order I (1).

Table 1.b. **Phillips-Perron (PP) Test Statistics**

Variable name	At level	At first difference
FDI_t	-2.67	-6.84
GDP_t	-1.18	-5.17
L_t	-1.24	-4.78
H_p	-1.96	-8.15
Hs	-0.74	-5.32
H_{col}	-0.84	-6.36
H_{uni}	-0.68	-5.74
H_{voc}	-0.97	-5.85

At the 5% level of significance critical value is -2.95.

Results of Johansen Cointegration. Cointegration of two or more than two variables means that there exists a long run relationship between them. Johansen (1988) and Johansen and Juselius (1990) developed conintegration technique to test the long-run relationship between variables.

There are two basic criterion of Johansen conintegration results — trace statistics and Eigen value. If trace statistics and Eigen value are greater than critical value at 5%, then there exists a long-run relation between variables. In this study for all the equations the results of trace statistics and Eigen values reveal at least one cointegrating vector. The estimated equations are as follows:

$$\ln(FDI_t) = 10.15 + 2.88\{\ln(GDP_t)\} + 0.67\{\ln(L_t)\} + 1.21\{\ln(Hp_t)\}$$
$$\ln(FDI_t) = 5.75 + 3.05\{\ln(GDP_t)\} + 1.41\{\ln(L_t)\} + 0.54\{\ln(Hs_t)\}$$
$$\ln(FDI_t) = 15.25 + 4.23\{\ln(GDP_t)\} + 0.40\{\ln(L_t)\} + 0.23\{\ln(Hcol_t)\}$$
$$\ln(FDI_t) = 7.16 + 2.05\{\ln(GDP_t)\} + 1.64\{\ln(L_t)\} + 1.43\{\ln(Huniv_t)\}$$
$$\ln(FDI_t) = 4.09 + 1.85\{\ln(GDP_t)\} + 2.01\{\ln(L_t)\} + 0.47\{\ln(Hvoc_t)\}$$

Table 1.1. **Johansen Cointegration Results**

Human capital (in terms of education at following levels)	GDP_t	L_t	H_t
Primary(H_P)	2.88[4.25]	0.67[2.98]	-1.21[-5.94]
Secondary(H_s)	3.05[5.94]	1.41[3.87]	0.54[3.01]
College(H_{col})	4.23[6.17]	0.40[4.17]	0.23[3.14]
University(H_{uni})	2.05[4.75]	1.64[4.58]	1.43[4.25]
Vocational(H_{voc})	1.85[5.35]	2.01[5.25]	0.47[5.17

The level of significance is at 5%.

Table 1.3 shows that with negative coefficient —1.21, our primary level human capital fails to attract FDI. It means at primary stage our students are not skilled enough to meet the requirements of human capital seeking foreign firms. Human capital at secondary, college, university and vocational levels have positive but very weak effect on economic growth. So, the existing human capital in Pakistan is not able to fully mobilize the foreign direct investments.

The results in Table 1.1 reveal that all the short-run coefficients are insignificant. The value of ECM value at for all the levels of education is negative which indicates the speed of convergence of short-run deviation towards the long-run equilibrium path.

Table 1.2. **Short Run Dynamics for Real Demand for Import**

ECM estimates for Human Capital as Determinant of Foreign Direct Investment			
Regressors	Short Run		Long Run
	Coefficient	ECM	
$DlnH_p$	0.84 [1.25]	-0.64	-1.21[-5.94]
$DlnH_s$	0.07 [0.034]	-0.18	0.54[3.01]
$DlnH_{col}$	-0.25 [-0.85]	-0.08	0.23[3.14]
$DlnH_{uni}$	0.23 [1.84]	-0.17	1.43[4.25]
$DlnH_{voc}$	-0.36 [-0.75]	-0.08	0.47[5.17

Level of significance is at 5%.
D indicates differences of the variables used.

5. Conclusions And Recommendations.

Conclusions:

Primary stage of education has negative relationship with FDI, hence providing a weak base for the rest of the stages in education. Secondary, college, university and vocational levels of human capital have positive impact on FDI but in a very weak magnitude.

Recommendations:

Output per labor is a function of skill-embodied labor, i.e., effective labor. For surviving in knowledge-based economy of the 21st century, high quality human capital is of crucial importance. FDI is likely to follow high quality human capital. For developing countries to attract foreign direct investment, it is necessary to upgrade their human capital, mainly through education at all levels. In this regard, public-private partnerships should be encouraged to provide quality education through regularly updated curricula.

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Стаття надійшла до редакції 20.01.2012