Impact of human capital growth on FDI: an econometric analysis

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ABSTRACT

Human capital have become a more sturdy as countries vie for investors investment in an over saturated global market. Most research on foreign direct investment concentrates on social bonds, business relationships and regionalization issues. Little research considers importance of human resource capacity building and its importance for investors within relationships. In this research, we will use secondary data about FDI in Pakistan and human ingeniousness. The result should assist marketers to ascertain whether human capital perceived as important tool for FDI or whether prerequisite for investors. First, conceptual framework was built from the literature included theoretical papers, comparative research reports, and grey literature .Secondly, to investigate the impact of human capital Ingeniousness on FDI, ARDL approach applied on the data collected over the period of 2002-2012.ARDL approach to Cointegration analysis based on ARDL used to estimate relationships among variables. Test results shows that there exists the long run cointgrating relationship among human capital ingeniousness demand, GDP growth and foreign direct investment inflow. This study presents positive and significant impact of human Ingeniousness on FDI of Pakistan. Furthermore, the results indicate that technical bonds interact with social bonds for investor's solicitation. Human capital allurement are more effective tool in attracting investors attraction and being consider important than those with lower level of Ingeniousness human resources, but may led to more distraction of FDI.

Introduction

Today's fast-paced world is becoming increasingly characterized by strong economic activities. In Pakistan, the aim of foreign direct investment inflow is to create revenue and increase savings instead of increasing GDP deficit. Human capital Ingeniousness is important determinant of FDI that help investors to take investment decision for market equity.

The continuing effort for FDI on the ground conveys the need for study that extends beyond the interpersonal dynamics of FDI encounters into this human Ingeniousness context.This need is illustrated in many ways:For example, study found that FDI inflow depend on sufficiently qualified human capital in the host country (Borensztein et al.,1998).In addition,although,FDI inflows depends on the host country's openness to trade (Bhagwati, 1978) and a certain level of development in the local financial markets (Alfaro et al., 2004).importance of skill and knowledge of host country human capital continue to be important.

It is increasingly evident that stock of Human capital Ingeniousness and its development will continue to be a critical component for investor's investment decision. Human capital growth is expected to become a key criterion for long term FDI investment decision. Borensztein list the growing importance of human capital stock by 69 developing countries cross sectional time series data.

To further our understanding, we explored human capital involving Ingeniousness to identify FDI inflow and outflow. The research questions driving the study are as follows:

➢ What are the determinants of FDI inflow in encounters involving human capital knowledge and skills?

➢ Are the determinants of FDI inflow and outflow with human Ingeniousness similar to or different from the sources of FDI inflows with interpersonal encounters?

➢ How are FDI inflow and outflow encounters with human Ingeniousness related to saving, foreign exchange, revenue, and management?

To investigate these questions, ARDL approach developed by Pesaran, Shin & Smith (1996) and later on Pesaran et was used to al. (2001).

After introduction, section 2 presents a brief review of literature. Section 3 deals with the methodology adopted in the paper with the description and results of findings. While the remaining sections 4, 5, 6 presents concluding remarks, references and appendix respectively.

Literature review

In this paper we will review and analyze role of human resource development on foreign direct investment inflow in Pakistan. We will do an empirical based study by time series data of past years trends in Pakistan. The study uses time series data from 2000 to 2012 and Autoregressive Distributed Lag Model (ARDL) for empirical estimations. This is a unique study conducted with special focus on human ingeniousness (knowledge and skills) with ARDL in case of Pakistan.

There have been heavily discussed about determinants of foreign direct investment at various literatures, conferences. Many issues and conflicts explores at the route of inflow and outflow of FDI.

An overview of foreign direct investment (FDI)

The contribution of FDI as key player in economic development in developing countries has been widely recognized. There are country studies that examined

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macroeconomic effects of attracting FDI and its impact on domestic economy and on the average level of productivity in sector in which foreign investment is made (Caves, 1974; Globerman, 1979) .Majority of South Asian countries are facing problem in low growth of FDI inflow. However, countries like India and Bangladesh in recent years are witnessing rising and stable growth trend.

Human capital

Several cross-country studies support the importance of human capital in economic development (Barro, 1991; Benhabib and Spiegel, 1994). The cross-country studies find that FDI flows have been positively related with sound macroeconomic policies, per capita GDP growth or productivity (Borensztein et al. 1998).

Human capital ingeniousness

Appropriate knowledge and market-driven skills are indispensable towards achieving highly sustainable economic growth and creating a congenial environment for foreign investment (Dr. Muhammad Aslam Khan,2007).

The ability to read, write and use numeracy, to handle information, to express ideas and opinions, to make decisions and solve problems, as family members, workers, citizens and lifelong learners."[(Adult Literacy and Numeracy in Scotland (2001)]. One of the main characteristics of developed industrialized economies is the availability of a workforce with a high level of human capital.

Human ingeniousness and FDI

Mlambo (2006) asserts the importance of regional infrastructure projects which serve the objectives of regional cooperation, integration and enhance of FDI.Human resource development Many authors attributed low FDI to low knowledge base, inadequate skills and the use of outdated technology. The South Asian countries have to diversity their production structures towards high value-added and sophisticated industries by improving scientific, technological, vocational and technical skills.

Impact of human resource on FDI

The evidence of various studies undertaken in countries which have developed human capital reveals that human capital attracted FDI in progressive way. Subsequently, FDI impacted positively on growth and productivity of developed country. A. Wagner, 2001 witnessed the growth of FDI in South Asian countries towards diversification of production structures,high value-added and sophisticated industries by improving scientific, technological, vocational and technical skills.

Relation of reserves rate with FDI inflow

A higher level of savings and investment is necessary to for progress in capital formation. However, in developing countries the level of domestic savings falls below the desired level because of low per capita income [Khan (2007)]. In Pakistan, need to pursue active liberalization policies to overcome trade deficit and encourage investment in export-led sectors to ensure that FDI stimulates domestic economic activity, the host country should make it mandatory for the foreign investor to use a certain amount of locally made inputs in the production of final goods [Zaidi (2004)]. Freer capital flows, it seems, transformed a part of the savings of developed countries into foreign currency reserve of developing countries. fact that the existing literature has highlighted is that, in many cases, capital inflows lead to a widening of current account deficits and not vice versa(Leiderman and Reinhart (1996)).

Impact of GDP rate on FDI inflow

Gross domestic product rate is major determinant of many studies.Yi and Chiang (2008) find out the effect of FDI on economic growth using the data of 62 countries and found that FDI has positive impact only when host country has better condition of initial GDP and human capital. Economic reforms with healthy policies play an important role to ensure the economic effect of FDI.

The consequences of determinants of FDI

Studies show large number of determinants of FDI in developed, developing and underdeveloped countries. This include Political instability ,income inequality, social welfare, history, location, experience with democracy, the relationship with, superpowers, the countries' infrastructure, membership in World institutions such as International Monetary Fund, and other related factors should be carefully examine. Return on investment is also very important determinant when there is political risk the investors may not decrease or withdraw their funds because of the expected return on investment. (Kholdy at el. 2008). Research which is conducted by (Javorcik. 2004) which shows that FDI become more productive when there is joint investment of foreign and domestic ownership but not from fully owned foreign affiliates.

Methodology

The data used in this study were the Pakistani yearly FDI, reserves, GDP and literacy rate over period of 2000-2012.Data collected from the World Bank Statistical Bulletins, Annual report state bank of Pakistan as well as from world Investment report.

Figure 1: Time Plot of FDI, Reserves, GDP and Literacy rate
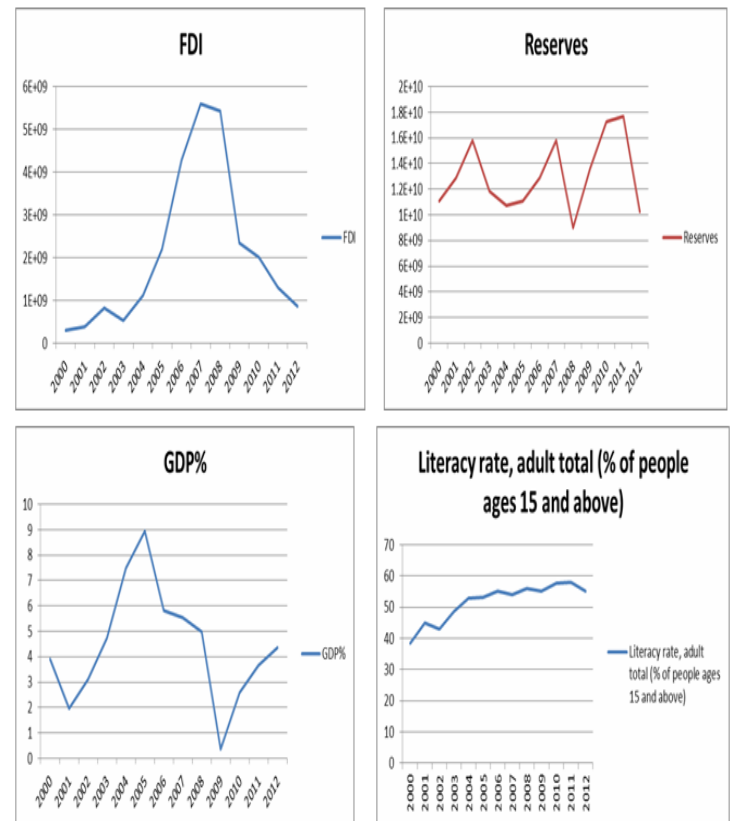
Descriptive Statistics

The Descriptive Statistics for the three time series show that the rate of FDI in Pakistan steady moving at the initial stage but grew rapidly between 2007 and 2008,which happens to be the time when the impact of educational reforms of 2002 brought out with increase in political stability of Pakistan. Reserves rate

shows haphazardly trend from 2000-2012, that's seems to be correlated with FDI. Literacy rate shows an steady growth in the series, the growth could be associated to various political and economic reasons with impact of government progressive policies.GDP rate shows unsteady growth with little spot impact on future FDI growth rate.

Empirical Findings

Unit roots for all variables tested before applying ARDL approach to cointegration for random walk stochastic trend. Table 1 represents the results of Phillips-Perron test and Augmented

Dickey Fuller test at Critical values of 1%, 5% and 10%. According to results of both tests stated in table 1, ln(FDI), ln(HI), ln(GDP) and R,are significant at one percent in Augmented Dickey Fuller test and ln(FDI), ln(HI), ln(GDP) and R,are significant at ten percent in Phillips-Perron test. ARDL approach to cointegration can be applied in this situation.

To estimate a linear equation, we regress FDI_t against R_t .From this we get F(1,11) = 0.07,Prob>F=.7894,R^2=.0068,ADJ R^2=.0835,Root MSE=1.0006.The result of the residual shows that there are problems with this model.We Generate logarithmic transforms of the FDI_t, R_t, HI_t and GDP_t series. All the variables are first tested for stationary using the Augmented Dickey-Fuller (ADF) and Phillips-Perron test. (Results are shown in the table A1 in the appendix section).

Dickey Fuller Test Statistic and Phillips-Perron Test Statistic shows p-value is less than or equal to a specified significance level of 0.05 (5%), or 0.01 (1%) and even 0.1 (10%).So our data the test statistics don't follow t distribution, test statistic are not extreme. For stability (and stationarity) of the model, we require $-1 < p < 1$(autocorrelated).

Testing by ARDL Model

To investigate the impact of human capital on FDI along GDP and reserve, we specify the following model in the form of equation:

$$\ln(FDI_t) = \beta_0 + \beta_1 \ln(HI_t) + \beta_2 \ln(GDP_t) + \beta_3(R_t) + U_t$$
Equation 1

Where, FDI_t, HI_t, GDP_t and R_t denote foreign direct investment, Human capital Ingeniousness, Gross domestic product and Reserves respectively. β_1, β_2 and β_3 are the parameters for long run elasticity of FDI with respect to HI, GDP and RT respectively. U_t (white noise) represents independently distributed random errors of our model. The relationships and properties of a series' are then modeled using the Autoregressive distributed lag (ARDL) model. ARDL has recognized various econometric merits over other approaches as this approach does not required all the variables to be integrated at same order(Engle and Granger (1987), Johansen (1991), Phillips and Hansen (1990)).

Estimating an AR (1) model

In order to estimate an AR(1) model ,Although the usual least squares standard errors are not correct, we can compute consistent standard errors using an estimator proposed by Newey and West. Newey-West standard errors have the advantage of being consistent in models that have higher order autocorrelated errors. By estimating the model with least squares with Newey-West standard errors on 95% confidence intervals, we get following results:

As we can see, the standard error of this test is larger than standard errors of more efficient estimators. So, Nonlinear least squares is used to efficiently estimate the parameters of the AR (1) model. Nonlinear least squares uses numerical methods to find the values of the parameters that minimize the sum of squared errors.

Following model is specified after considering the merits of ARDL:

nl(logfdi={b1}*(1{rho})+{b2}*logreserves_1+{rho}*logfdi_1{ rho}*{b2}*(logreserves_1)),variables(logreserves   logfdi logfd)   Equation 2

Here, rho is a parameter that describes the dependence of variables. In this model, FDI considers as dependent variable, while reserves, GDP and literacy are independent variables.

The R squared is lower because here we are explaining the change in log. Here we can see that the long-run elasticity of b1 (HI_t) to earnings is 93.19479 and significantly different from unity Error correction representation of the selected ARDL model has been made in above Table.

Results indicate that human ingeniousness is significant factor of foreign direct investment in short run in case of Pakistan, whereas, the most significant variable in short run is $\Delta\ln(b1(HIt))$ with coefficient which reveals that one percent change in reserves pulls foreign direct investment down by 93%.In short run, GDP effects negatively to foreign direct investment with coefficient (-3.0805) which indicates that rise of GDP by one percent decrease foreign direct investment by 3.0805%. Existence of long run relationship among factors has been reinforced by highly significance of error correction term. The coefficient (-0.64) depicts that the speed of adjustment from previous year's disequilibrium in foreign direct investment to current year's equilibrium is 64%. The value of R^2 is 0.72 which reflects that 72% variations in the dependent variable are explained by the independent variables. The value of adjusted R^2 is 0.66. F-statistic value is 11.99 is significant at less than 0.1% which indicates that the model is a good fit.

To determine the presence or extent of autocorrelation and test whether residuals are correlated with one another using an LM(Lagrange multiplier) test.The Breusch-Godfrey LM test for autocorrelation statistics suggest that the hypothesis of normality shows no serial correlation among variable.So we can conclude there is significant autocorrelation.

Autoregressive Distributed Lag

We consider an autoregressive model that also contains a finite distributed lag for consideration of the model's specification. Finite distributed lag models contain independent variables and their lags as regressors , that's given in annexure.

Table 5 presents that HI is the most significant factor of foreign direct investment of Pakistan. The coefficient of ln(HI) is (.109) shows that percent increase in HI(Literacy rate) increase foreign direct investment by .109% in the long run in Pakistan. GDP, The coefficient of ln(GDP) is (-.323) shows that percent increase in GDP deteriorates foreign direct investment by .323% in the long run in Pakistan. In accordant with the findings of MT Majeed,(2008),R Chakrabarti (2012). These results provide guidelines to concerned authorities interested in uplifting foreign direct investment level in Pakistan. While the Reserves coefficient of ln(R) is (-.04134) shows that percent increase in GDP deteriorates foreign direct investment by .O413% in the long run in Pakistan. The value of R^2 is 0.6123 which reflects that 61% variations in the dependent variable are explained by the independent variables while the value of adjusted R^2 is 0.88.

Table 1: Unit Root Test

Variable	Dickey-Fuller test				Phillips-Perron Test			
	1% Critical Value	5% Critical Value	10% Critical Value	MacKinnon approximate p-value for Z(t)	1% Critical Value	5% Critical Value	10% Critical Value	MacKinnon approximate p-value for Z(t)
In(FDI)	-3.750*	-3.000*	-2.630*	1.0000	-3.750*	3.000	-2.630*	0.5308
In(HI)	-3.750*	3.000	2.630	0.0494	-3.750*	-3.000*	-2.630*	0.0030
In(R)	-3.750*	-3.000*	-2.630*	1.0000	-3.750*	-3.000*	-2.630*	0.0265
In(GDP)	-1.712 *	3.000*	-2.630*	0.4248	3.750	-3.000*	-2.630*	0.3857

Note: * shows significance level at 1%,5% and 10% respectively.

Table 2: Regression with Newey-West standard errors

FDI	Coefficient	Std.error	t	P>|t|	95% Conf.Interval	
R	-.1275109	.2707684	-0.47	0.650	-.7519039	.4968822
HI	1.85e+08	5.83e+07	3.18	0.013	5.07e+07	3.19e+08
GDP	6.23e+07	2.24e+08	0.28	0.788	-4.55e+08	5.79e+08
Constant	-5.90e+09	3.64e+09	-1.62	0.144	-1.43e+10	2.51e+09

Table 3: ESTIMATING AN AR(1) MODEL

Iteration 0: residual SS = 5398.755
Iteration 1: residual SS = 199.3607
Iteration 2: residual SS = 2.340692

Model: non least square

Source	SS	df	MS	F(2, 9) = 11.99
Model	6.23912163	2	3.11956081	Prob>F=.0029
Residuals	2.34069216	9	.260076906	R^2=.7272
Total	8.57981379	11	.779983072	Adj R^2=.6666
			Res.dev=14.44101	Root MSE=.5099774

LogFDI	Coef.	Std.Err.	t	P>|t|	95% conf.interval	
b1	93.19479	82.15269	1.13	0.286	-92.64749	279.0371
rho	.74725	.1551693	4.82	0.001	.3962326	1.098267
b2	-3.080501	3.522034	-0.87	0.405	-11.0479	4.886894

* Parameter b1 taken as constant term in model & ANOVA table (SEs, P values, CIs, and correlations are asymptotic approximations)

Table 4: Breusch-Godfrey LM test for autocorrelation

*lags(p)	chi2	df	Prob > chi2
1	7.265	1	0.0070

*p is the number of lagged residuals included in the model.

Table 5: Autoregressive distributed lag models

FDI	Coefficient	Standard Error	t-Ratio	P>|t|	95% Conf.Interval	
Constant	3.78e+09	1.06e+10	0.36	0.744	-2.98e+10	3.74e+10
In(R)	-.0413423	.2237431	-0.18	0.865	.7533927	.6707081
In(HI)	.1093523	.3677602	0.30	0.786	1.061025	1.27973
In(GDP)	-.3234721	.2023851	-1.60	0.208	-.9675517	.3206076

R^2= 0.8708, Adj. R^2 = 0.6123, F (6, 3) = 3.37, Prob > F = 0.1732

Annexure

FINITE DISTRIBUTED LAG MODEL

Source	SS	df	MS	F(3, 6) = 4.51
Model	2.1839e+19	3	7.2796e+18	Prob>F=.0557
Residuals	9.6920e+18	6	1.6153e+18	R^2=.6926
Total	3.1531e+19	9	3.5034e+18	Adj R^2=.5389
				Root MSE=1.3e+09

FDI	Coef.	Std.Err.	t	P>|t|	95% conf.interval	
L1.	1.025656	.3998788	2.56	0.043	.047188	2.004124

F(4, 5) = 1.31						
Prob > F = 0.3798						
R^2 = 0.5116						
Adj R^2 = 0.1210						
Root MSE = 1.8e+09						
FDI	Coef.	Std. Err.	t	P>|t|	95% Conf. Interval]	
reserves						
--.	-.2529129	.2270759	-1.11	0.316	-.8366302	.3308045
L1.	-.2103247	.2171587	-0.97	0.377	-.7685489	.3478994
L2.	-.4799974	.2653848	-1.81	0.130	-1.162191	.2021961
L3.	-.4585537	.3029797	-1.51	0.191	-1.237388	.3202804
_cons	.07e+10	8.45e+09	2.45	0.058	-1.02e+09	4.24e+10

Conclusion

The objective of this work was to investigate empirically the impact of human ingeniousness on FDI inflows into a developing country like Pakistan. This was motivated by the fact that human ingeniousness (Knowledge and skills) is considered as a significant determinant of FDI inflows and we deemed it important to undertake this work as no exclusively empirical work has been carried out by using ARDL approach to cointegration in case of Pakistan. The study estimated human resource impact on FDI inflows along with GDP and reserves in Pakistan from 2000 to 2012. The study finds that HI as the most dominating positive impact factor to attract FDI inflows in long run as well as in short run and there by confirming other studies that human capital development tends to enhance FDI inflows into any country, whereas no influence of market size on FDI inflows in short run can be found. The study also found GDP as significant negative impact determinant in short run. As far as corporate tax rate impact is concerned, we could not find any influence on FDI in long run. Thus market size has positive association whereas reserves rate have negative relationship on FDI inflows in case of Pakistan. These findings are consistent with our expectations.

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