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FDI and human capital in SAARC region and China: a panel data analysis

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Abstract: *The empirical analysis based on the simultaneous equation fixed effect estimation method indicates that there is a significant causality between net inflow of FDI[1] and human capital in the South Asian Association for Regional Cooperation (SAARC) region with China. It is evident from the panel data analysis that human capital, GDP growth, and trade openness played vital role, and invite higher FDI[2] in the domestic economy. Moreover, the higher level of FDI net inflow in China is explained by the sustainable and high growth rate of the Chinese economy during the period 1990 - 2017. Similarly, FDI inflow and life expectancy are the significant determinants of human capital level for SAARCregion.*

Background: *There are several studies to unbutton the determinants of Foreign Direct Investment (FDI) flow in China, but there are very limited studies comparing the causal relationship of FDI and human capital in China and in SAARCcountries. This paper examines the role of FDI and human capital for SAARCregion and China, and explores the causes of higher FDI inflow in China than in SAARCregion from 1990-2017.*

Materials and Methods: *This paper examines the causal relationship of the level of human capital and FDI in SAARCcountries and China based on the simultaneous equation fixed effect estimation method using panel data analysis.*

Results: *The empirical analysis indicates that 1% increase in the GDP growth of China contributed 0.39 % increase in the net FDI inflow as percent of GDP, whereas such contribution of GDP growth to explain the level of net FDI inflow is calculated as 0.09% for SAARCregion. Human capital as measured by human capital index, trade openness as measured by total trade to GDP, and GDP growth rate have shown positive and significant impact on net FDI inflow as percent of GDP for SAARCregion. Moreover, human capital significantly explains the level of net FDI inflow such that one-unit increase in the level of human capital leads to 1.93% increase in the net FDI inflow as percent of GDP for the entire SAARC region. In contrast, 1% increase in the net FDI inflow as percent of GDP leads to only 0.023-unit increase in the level of human capital for SAARCregion, ceteris paribus.*

Conclusion: *This paper inquires the causes of higher FDI flow in China and sums up that there is a significant causality between net inflow of FDI as percent of GDP and human capital level as indicated by simultaneous equation fixed effect panel data analysis. Hence, the higher growth of the economy and higher level of human capital further invite more FDI in China compare to SAARCregion during the period from 1990 to 2017.*

Keywords: Causality, Foreign direct investment, Human capital, Panel data.

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I. Introduction:

Foreign Direct Investment(FDI) plays remarkable role for the economic growth in many developing economies including China and India. The impacts of FDI in a country are double-fold. In one hand, it supports in mitigating the financial and technical deficiencies in the host countries. On the other hand, it helps to enhance the capability of the human resources through job trainings on the areas of technical and managerial skills (Li & Liu, 2005).

[1] FDI inflow is defined as "The value of inward direct investment made by non-resident investors in the reporting economy" (World Bank, 2018).

[2] Foreign direct investment (FDI) is also defined as an investment involving a long term relationship and reflecting a lasting interest & control by a resident entity in one economy (foreign direct investor or parent enterprise) and having at least 10 % of the ownership control by investing in equity capital, reinvested earnings and intra-company loan or debt (UNCTAD, 2018). For details of the definition , see https://datahelpdesk.worldbank.org/knowledgebase/articles/114954-what-is-the-difference-between-foreign-direct-inve

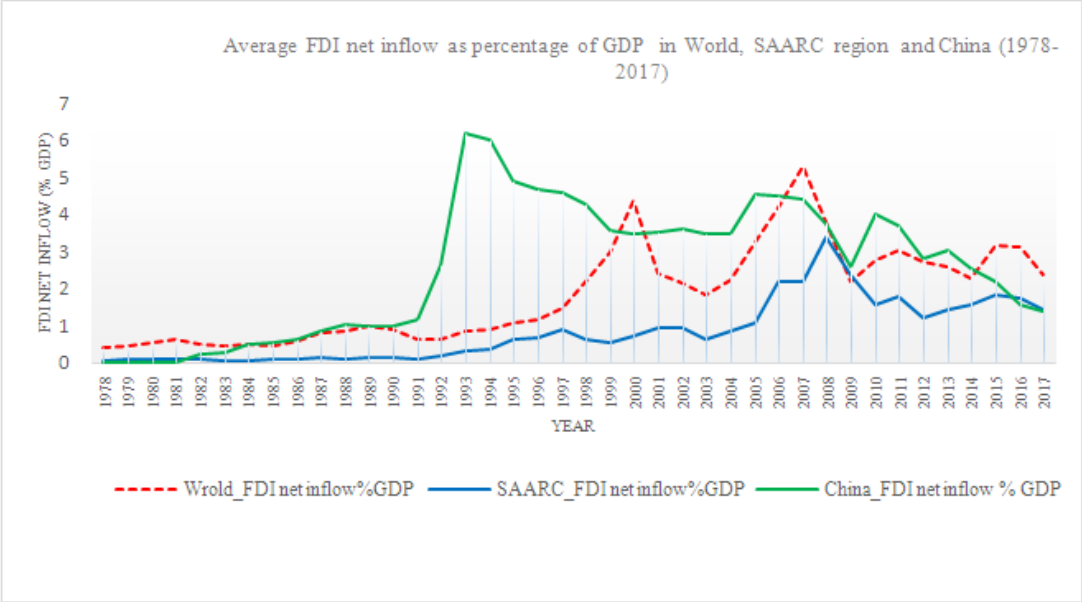

Figure 1:FDI net inflow as % of GDP in World, SAARC region and China during 1978-2017

Besides this, government policies[3] play a vital role to attract remarkable amount of FDI in the host country and hence many developing countries have lucrative FDI policies incorporating trade facilitation, subsidies mechanism through tax incentives, and promoting export promotion zones (Kapstein, 2002; Velde & Willem, 2002). In addition, FDI is also sensitive to the market size, availability of physical infrastructures, and wage rates (Coughlin, Terza & Arromdee, 1991)[4].

The causality between FDI inflow and its determinants including institutional and economic variables established the fact that there is a better association between FDI and its determinants[5] including market size, labor cost, infrastructure and cultural variable. Therefore, cheap labor, more market and good infrastructure blended with proper institutional framework invite more FDI (Fu, 2003). The bidirectional causal relations between FDI and human capital for 55 developing countries using panel data analysis are found to be significant (Kheng, Sun & Anwar, 2017). Their paper analyzes the role of FDI and human capital using panel data approach in SAARC member countries and China, and try to answer the question: Why is FDI inflow higher in China than in SAARC region from 1990 to 2017? To respond it, a panel data[6] analysis is used for the empirical model as exploited by Kheng, Sun & Anwar (2017) with some modifications. The control variables used for the equation in which FDI is used as dependent variable are taken from Noorbakhsh, Paloni & Youssef (2001) which captured the impact of human capital on FDI in SAARC region and China. The control variables used to study the determinants[7] of human capital are taken from Schultz model (1961). There are many literatures which have studied the impact of FDI on growth and human capital conversely, there are very limited literatures which study the causal relation between FDI and human capital in China and SAARC region.

There is a huge gap between SAARC region's average human capital index and that of the global average, however, China's human capital index is very close to the world's average. In an average, world's human capital index is increased by 0.2 unit per year whereas SAARC region's human capital index is increased just by 0.1 unit per year during 1990-2014 (Penn World Table 9.0). My research paper delves into the existing literatures by providing the causal relation between FDI inflow and human capital in China and South Asian

[3] (Velde, 2002) reviewed the effect of transnational companies on human capital under different FDI policy options using supply and demand framework.

[4] They use conditional logit model to study the location decision of the foreign firms in manufacturing sectors in United States during 1981-1983. They found that the states having higher per capita and higher number of the manufacturing firms attracted more FDI. They also indicated that high wage rate had negative impact, however, good infrastructure and high unemployment had positive impact on FDI inflow.

[5] In the model, Independent variables are classified broadly into 3 types: economic, cultural(informal), and institutional (formal) advantages. For details of the methodological part see (Fu Jun, 2000 p. 198-210)

[6] Data source: World Development Indicator, 2018

[7] There are five major determinants of human capital in the Schultz (1961):
"(1)health facility and services, broadly conceived to include all expenditures that affect the life expectancy, strength and stamina, and the vigor and vitality of a people; (2) on-the- job training, including old-style apprenticeship organized by firms; (3) formally organized education at the elementary, secondary and higher levels; (4) study programs for adults that are not organized by firms, including extension programs notably in agriculture; (5) migration of individuals and families to adjust to changing job opportunities." Schultz (1961). Investment in human capital. *The American Economic Review.* vol.51, no.1, p. 9.

region. I employ the panel data analysis to explore the country fixed effect and the causal relationship between FDI and human capital during 1990-2017. The findings of this study provide comprehensive policy implications to redesign FDI and human development policies in SAARC region and China to achieve sustainable economic growth by 2030. This paper explores that FDI and human capital are key drivers of the economic growth in many developing countries including China and SAARC region, like the appendage body.

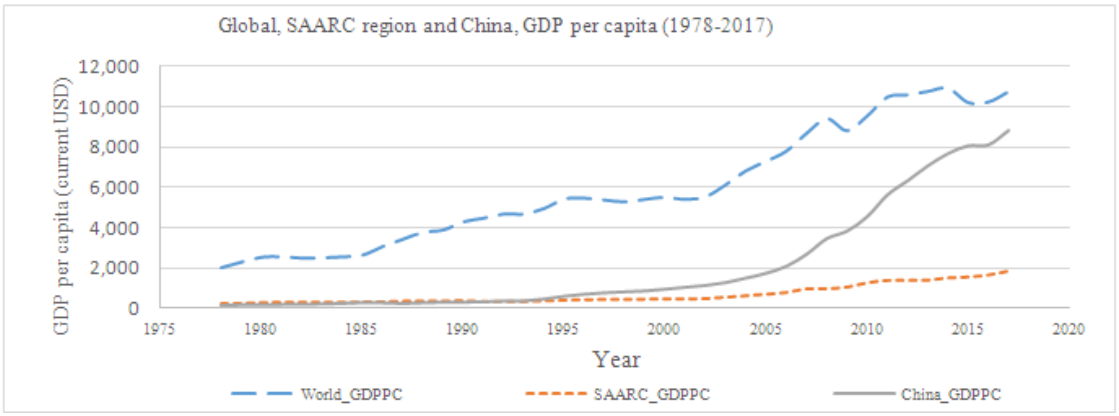

***Figure 2*:** GDP percapita growth of the World average, SAARC region, and China during 1978-2017.

The figure 2 indicates that after 1995 the gap of GDP per capita between China and SAARC region has been widening and SAARC region seems to be lagged far behind the global's average GDP per capita. However, China has made outstanding progress in GDP per capita in the last 22 years since 1995.

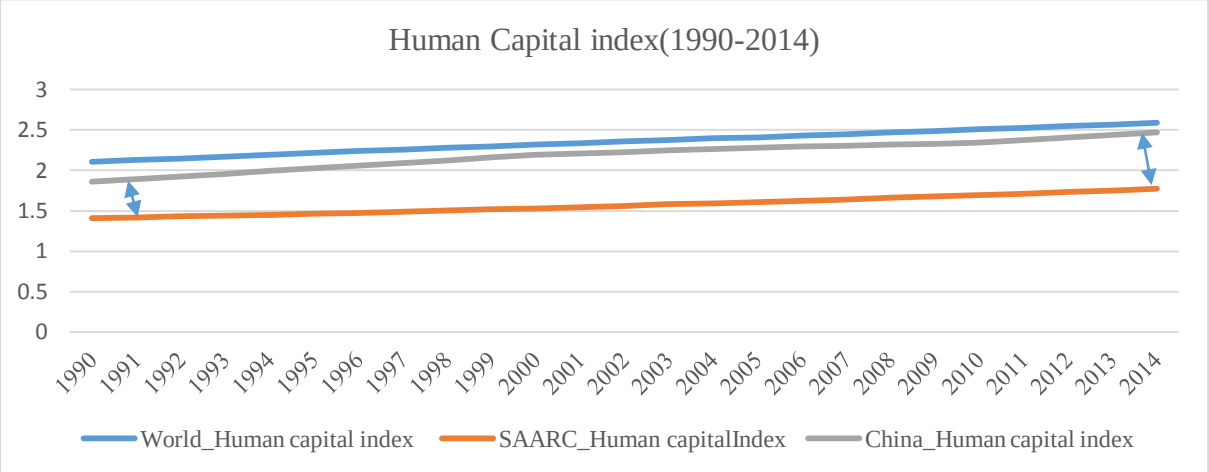

***Figure3*:** Human capital index of world's average, SAARC region and China during 1990-2014.
Data source: Penn world table version 9.0.

Aforementioned figure highlights that there is a huge gap between SAARC region's average human capital index and that of the global average. China's human capital index is very close to the world's average. Over the period, the gap in the human capital index of SAARC region is widening comparing to the world average and China.

The rest of the paper is designed to enquire this issue as follows. The section II presents some relevant literature reviews of empirical studies, section III explains the theoretical framework and methodology including data and compilation techniques used in the study. The empirical results are presented in section IV, and discussion is contained in section V. Finally, conclusion is presented in the section VI.

II. Literature review:

The previous empirical works are divided into two parts. In the first part, the literatures that used FDI as dependent variable are reviewed, whereas, in the second part, those studies which used human capital as explained variable are studied. Human capital in many developing countries is not able to absorb the spillover impact of FDI and hence empirical studies of different time and geographical location provide diverse results, therefore, it is difficult to generalize the casual relationship of FDI and human capital. Moreover, Lucas (1990)

observed that capital is not moving from rich to poor country and still exhibiting the same phenomena in the 21st century for many developing countries with some exceptions. Human capital is migrating in the large scale from developing countries to the developed world. One of the reasons for the Lucas puzzle is that the physical capital in developing countries is not productive (Kheng, Sun & Anwar, 2017). Hence, the lower level of human capital discourages FDI inflow in many developing countries. China can be taken as one of the counter examples for the Lucas puzzle where good institutional set up, proper sequencing of FDI policies, effective regulatory framework, cheap labor, and better infrastructure attracted more FDI during 1990-2000.

FDI inflow in SAARC region shows heterogeneous[8] characteristics across sectors, however, it follows the similar fashion as indicated by the global FDI flow (Sahoo, Nataraj & Dash, 2014). Globally, higher FDI is attracted by the service sector followed by the Manufacturing and Agriculture sectors (UNCTAD, 2017). FDI inflow declined worldwide by 13 percent and reached to 1.3 trillion in 2018 mainly due to the large amount of repatriation of accumulated earnings, tax reforms and insufficient compensation, however, the global share of FDI for developing countries increased to 54 percent in 2018 from 46 percent of 2017 (UNCTAD, 2019).

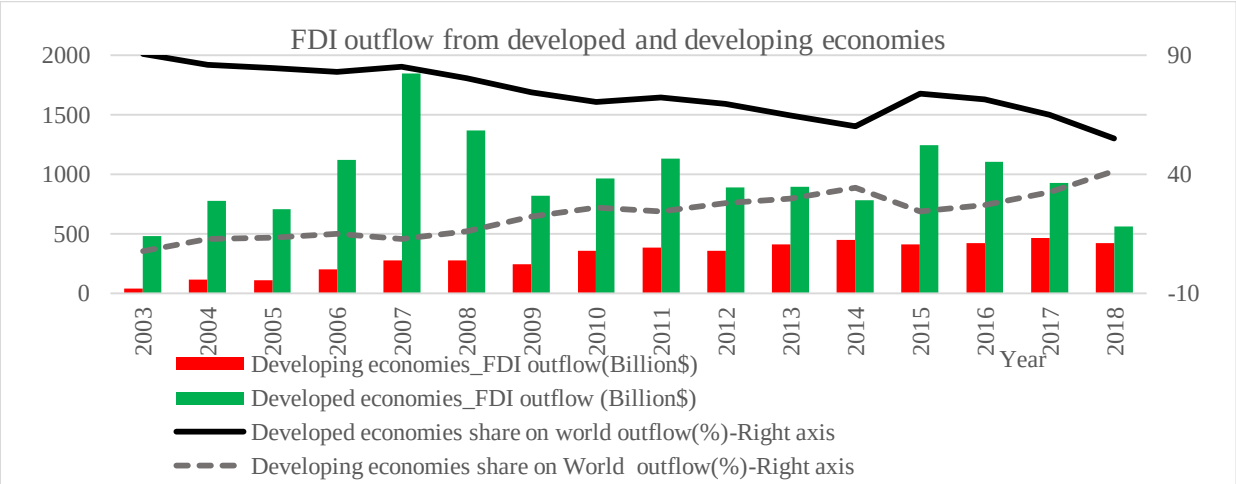

Figure 4: FDI outflow from developed and developing economies and their shares in world outflow (2003-2018)

Data source: UNCTAD,FDI/MNE database,2019

Panel data analysis of the 36 developing countries over the period 1980 – 1994 by Noorbakhsh, Paloni & Youssef (2001) indicated that human capital as measured by secondary enrollment rate is one of the major explanatory variables for FDI, however, the estimated coefficient was not statistically significant. Another similar study done by Hanson (1996) for 75 developing economies found that estimated coefficient for the human capital is negligible. The structure of FDI has shifted towards the service and high technology sector so that human capital had no significant effect before 1980s, however, explanatory power of human capital has increased after 1980 as observed by Noorbakhsh, Paloni & Youssef (2001).

Zhuang (2017) examined the impact of FDI on human capital using panel data from 16 East Asian countries from the period of 1985 to 2010 using FDI-GDP(nominal) ratio as a measure of FDI, human capital as measured by average years of tertiary schooling attended, and the control variables: domestic investment as a ratio of GDP per-capita; real GDP per worker and government spending on education as ratio of total government expenditure. His study found that FDI in East Asian economies contributed human capital at the level of secondary education, however, the impact of FDI is negative for the tertiary schooling in developing and small East Asian countries. His study further signposts that FDI has both positive effect on secondary and tertiary education for OECD countries. Another provincial level study in China is conducted by Basu & Yao (2009) using panel data from 1995 to 2001 and found that FDI has substantial and positive impact on higher education.

[8] Among SAARCcountries, for Bangladesh: Trade, Construction and Commerce sectors, for Nepal: Service, Tourism and Energy sectors, for Pakistan: Construction, Transport and Chemical sectors, for India: Computer software, Hardware and Telecommunication sectors, and for Sri Lanka: textile, wear apparel and leather sector are the key sectors which have attracted FDI in the recent years (Sahoo et al. 2014, pp 114-115)

III. Theoretical framework and methodology

The causal relationship between FDI and human capital is analyzed with the help of augmented simultaneous equation model as utilized by Kheng, Sun & Anwar (2017).

$FDI_{it} = \alpha_i + \beta_1 HU_{it} + \beta_2 FCONVit + \mu_{it}$ (1)

$HU_{it} = \theta_i + \delta_1 FDI_{it} + \delta_2 HCONV_{it} + \omega_{it}$ (2)

Where FDI and HU are foreign direct investment as percent of GDP, and the human capital level; FCONV is a vector of control variables which impacts FDI, and HCONV is the vector of control variables that explains human capital. The subscript *it* indicates the country *i* at time *t*; α_i and θ_i are the country fixed effects in equations (1) and (2). μ_{it} and ω_{it} are the error terms. FDI is measured by the net inflow of foreign direct investment as percent of GDP and human capital is captured by the percentage of population having secondary or higher education levels (Secondry_popl). Higher level of education induced more skillful human resource (Noorbakhsh et al. 2001). Wang & Wong (2009) analyze the impact on human capital by using secondary and tertiary level education as a proxy measure for human capital.

FCONV includes trade openness (Trade_openness) as measured by the ratio of total trade (sum of export and Import) to GDP, one year lag annual growth rate of GDP(GDP_growth), energy import as percentage of energy use(Energy_imp). The control variables which affect human capital i.e. HCONV includes government expenditure on education as percentage of GDP (Govexp_Edu), life expectancy at birth (Life_expect), and remittance received as percentage of GDP (Remit_GDP). I use remittance in the model to augment the model as remittance create opportunities to attend the higher education level and also improves the health condition of the remittance received household in many developing countries as observed by Azize[9] (2018). The fixed effect estimation techniques are employed as used by Kheng, Sun & Anwar (2017) to address the correlation of the country specific fixed effects α_i and θ_i . De-mean method for the equation (1) and (2) to eliminate the fixed effects is employed in the following two steps.

In the first step, the average of equation (1) and (2) over time horizon is calculated and in the second step, subtracting these mean equations from the original equations. The mean difference equations are then represented as

$FDI_{it}^* = \beta_1 HU_{it}^* + \beta_2 FCONV_{it}^* + \mu_{it}^*$ (3)

$HU_{it}^* = \delta_1 FDI_{it}^* + \delta_2 HCONV_{it}^* + \omega_{it}^*$ (4)

Where the asterisk(*) indicates the deviation between the value of variable in used and its time average value i.e. $FDI_{it}^* = FDI_{it} - \overline{FDIi}$.

Here, $\overline{FDIi} = \frac{1}{T}\sum_1^T FDI_{it}$

Equation (3) and (4) consist of two endogenous variables: FDI and HU, and 6 exogenous variables. Three control variables are excluded in equation (4) and three control variables are missing in equation (3).

Data

The empirical model drawn from equation (3) and (4) incorporates nine countries (8 SAARC countries and China) using unbalanced panel data under different proxy measures for human capital. Data for 3 SAARC countries (Afghanistan, Maldives and Bhutan) are partly available. Thus, cross country analysis is not possible for these countries. In the first model, human capital index (Human_cap) is used as a measure for Human capital(HU). In the second model, percentage of population having secondary or higher level of education is taken as the proxy measure for the human capital. For the third model, education index[10] is used as a proxy measure for human capital during the period 1990-2017. In this unbalance panel dataset, each country having at least 4 observations is listed in the dataset. These datasets are retrieved from the World development indicators[11] and Penn world table[12] version 9.0.

Further, the model is estimated separately in SAARC region and later it includes China to examine the explanatory power of FDI and human capital. There are several other variables that would explain FDI inflow[13] such as political stability, degree of market economy, degree of infrastructure development, interest rate and tax

[9] From the data of 122 countries, Azize (2018) found that remittance increases the per capita health expenditure and reduced undernourishment and child mortality. Further, Remittance increases the school enrollment rate and school completion rate.

[10] Education index is the average index of expected years of schooling index and mean years of schooling index. The index is calculated as: Index = (actual – minimum)/(maximum – minimum) for each year from the country level data.

[11] https://datacatalog.worldbank.org/dataset/world-development-indicators, data retrieved on November-21, 2018

[12] Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015), "The Next Generation of the Penn World Table" *American Economic Review*, 105(10), 3150-3182, available for download at www.ggdc.net/pwt

[13] "Under the category of economic advantage, we can consider market size, labor cost, and infrastructure as location-specific advantages in attracting FDI". *Institutions and Investments, Foreign Direct Investment in China during an Era of Reform*, Fu, Jun. (2003), The University of Michigan Press, pp-201.

preference[14]. However, in this study, due to unavailability of data for some of SAARC countries, I specify the model as in equation (3) and (4). The definition of variables and their corresponding data sources are presented in the following table 1. Similarly, the summary statistics are presented in table 2.

Table 1. Data sources and description of the Variables

Variable	Definition	Source
FDI	Net inflow of FDI as % of GDP	World Development indicator, 2018
HU	Human capital as measured by the gross secondary enrollment rate Human capital as measured by the secondary education % of population	World Development indicator, 2018
Human_cap	Human Capital composite Index	Penn world Table, 9.0 Version
FDI	FDI inflow as percent of GDP	World Development indicator, 2018
Secondry_popl	Secondary education % of population (25+ years)	World Development indicator, 2018
Secndary_enroll	Gross secondary enrollment rate.	World Development indicator, 2018
Trade_openness	Trade GDP ratio (as measure of market size and trade liberalization).	World Development indicator, 2018
GDP_growth	One year lag value of GDP growth rate.	World Development indicator, 2018
Energy_imp	Net energy import as % of energy use	World Development indicator, 2018
Govexp_edu	Government expenditure on education as % of GDP	World Development indicator, 2018
Remit_GDP	Remittance received as % of GDP	World Development indicator, 2018
Life_expect	Life expectancy at birth	Penn World Table version 9.0
Eduindex	Education index	Penn World Table version 9.0

Table 2. Summary statistics of the variables

Variables	Min	Max	Mean	Std. Dev
FDI	-.6590258	15.26593	1.74993	2.200475
HU(Secondry_popl)	8.2	82.8	38.94118	20.70064
HU(Secndary_enroll)	11.06577	99.69372	52.1165	19.16289
Human_cap	1.3100	2.8996	1.8843	.4558
Trade_openness	15.67452	184.0933	59.45064	36.0503
GDP_growth	-13.12905	26.11149	6.106511	3.730279
Energy_imp	-4.565864	50.26849	19.13652	12.51261
Govexp_edu	1.42566	7.38966	3.186923	1.225509
Remit_GDP	.0334291	31.43237	4.450495	5.933313
Life_expect	49.856	77.339	65.92533	6.352281
Eduindex	.122	.751	.4275172	.1421118

IV. Empirical analysis

Testable hypothesis

Prediction 1:

In model 1 in which the net inflow of FDI as percent of GDP is taken as dependent variable, and human capital as measured by human capital index; trade openness; GDP growth and energy import are taken as explanatory variables. It is expected that higher value of human capital index attract more FDI i.e. positive correlation is expected and the expected sign of the regression coefficient would be positive. Similarly, for higher level of FDI, foreign investors are seeking more open market to sell their products as well as to import inputs from the competitive market. Hence, the coefficient is expected to be positive for trade openness index. Further, it is expected that FDI will tend to flow higher in a country where there is higher level of GDP growth. Hence, the regression coefficient is expected to be positive. The relation between energy import and FDI net inflow, in one hand, is expected to be negative as higher level of energy dependency discourages the foreign investors. On the other hand, foreign investor may assume easy access to the energy supply as a result of higher level of energy import. Hence, the sign is unpredictable. Similar explanation could be made for the model 2

[14] Yoon, Y. & Gong, C. (2010) observed that these variables are the key determinants of FDI while examining the determinants of FDI flow from EU, US, Korea and Japan into China during 1982-2006.

where human capital is measured by population proportion having secondary or tertiary education level, and for model 3 where human capital is measured by education index.

Prediction 2:

In the regression model 1 in which government expenditure on education as percent of GDP, remittance as percent of GDP, FDI net inflow as percent of GDP, and life expectancy are taken as explanatory variables to explain the human capital index. The expected sign of the coefficient of the government expenditure in the model would be positive as higher government investment in education induced higher level of human capital. However, the immediate impact of government expenditure on education may be difficult to capture by the model. Remittance as percent of GDP in the model may support the development of human capital, but immediate impact may be very low. Hence, the expected sing of the coefficient would be positive in this case. Similarly, the higher the life expectancy, higher would be the value of human capital indicates that the expected sign of the coefficient would be positive. FDI inflow as percent of GDP is expected to affect positively to the human capital index, but the immediate impact may be very low. Similar prediction could be made for the model 2 where human capital is measured by population proportion having secondary or tertiary education level and for model 3 where human capital is measured by education index.

V. Empirical results

Table 3. Estimation results of panel data analysis (including SAARC countries and China)

Variables (de-meaned i.e deviation is taken from their corresponding mean values)*	Human capital as measured by human capital index (Model 1)		Human capital as measured by population proportion having secondary or tertiary education (Model 2)		Human capital as measured by education index- based on expected years of schooling and mean years of schooling(Model 3)	
	FDI inflow	Human capital	FDI inflow	Human capital	FDI inflow	Human capital
Human_cap	1.3756** (.5689)		.0076 (.0278)		2.0095 (1.3479)	
Trade_openness	.0138 (.0111		.0119 (.0159)		.0169*** (.0084)	
GDP_growth	.1764*** (.0641)		.1972*** (.0439)		.1756*** (.0660)	
Energy_imp	-.01927 (.0190)		-.0048 (.0391)		-.0119 (.0157)	
FDI		.0215** (.0106)		.39438 (.5498)		.0009 (.0018)
Govexp_edu		-.0309 (.0343)		-1.4540 (1.1303)		-.0053 (.0061)
Remit_GDP		-.0005 (.0063)		-.1572 (.3445)		.0010 (.0030)
Life_expect		.0447*** (.0120)		2.6788*** (.7133)		.0202*** (.0031)
R-squared	0.36	0.70	0.36	0.55	0.34	0.75
Countries	6	7	7	9	6	9
Number of observations	140	100	47	59	140	122

Figures in the parentheses are bootstrap standard errors after 50 replication bootstrap. The level of significance at 10, 5 and 1 percent is indicated by *, ** and *** respectively.

From the above table3 it is evident that the human capital index and previous year GDP growth rate have positive impact for inward FDI, however, human capital index is not significant in model 2 and model 3 for the dataset including China along with SAARC countries. GDP growth of the previous year has significant positive impact in all these three models for net inflow of FDI as percent of GDP.

Table 4. Estimation results of panel data analysis of SAARC region

Variables (de-meaned)	Human capital as measured by human capital index		Human capital as measured by population proportion having secondary or tertiary education.		Human capital as measured by education index (based on expected years of schooling and mean years of schooling)	
	FDI inflow	Human capital	FDI inflow	Human capital	FDI inflow	Human capital
Humancap	1.9329**		.0322***		3.7590***	

	(.3250)		(.0146)		(.9979)	
Trade_openness	.0189*** (.0068)		.0078 (.0096)		.0223*** (.0084)	
GDP_growth	.0921*** (.0381)		.1373*** (.0467)		.0917*** (.0418)	
Energy_imp	-.0045 (.0109)		.0103 (.0264)		-.0003 (.0098)	
FDI		.0236* (.0135)		.39438 (.5275)		.0009 (.0018)
Govexp_edu		-.0310 (.0284)		-1.4540 (1.0936)		-.0053 (.0053)
Remit_GDP		-.0000086 (.0056)		-.1572 (.5789)		.0010 (.0027)
Life_expect		.0434*** (.0120)		2.6788*** (.9324)		.0202*** (.0038)
R-squared	0.44	0.70	0.49	0.52	0.41	0.72
Countries	5	6	5	8	5	8
Number of observations	116	93	39	58	116	115

*Figures in the parentheses are bootstrap standard errors obtained from 50 replication bootstrap. The level of significance at 10, 5 and 1 percent are indicated by *, ** and *** respectively.*

From table 4, in SAARCregion, the results of the panel data analysis indicate that human capital as measured by human capital index, trade openness and GDP growth have significant positive impact on net FDI inflow as percent of GDP. Similarly, net FDI inflow and life expectancy are significant determinants of human capital as measured by human capital index. However, life expectancy has positive impact on human capital in model 2 and 3 where human capital is defined by secondary education and education index respectively.

Table 5. Estimation results of panel data analysis for China and selected SAARC Countries

Countries / Variables (de-meaned)	China		India		Pakistan		Bangladesh		Nepal		Sri Lanka	
	Human capital as measured by human capital index		Human capital as measured by human capital index		Human capital as measured by human capital index		Human capital as measured by human capital index		Human capital as measured by human capital index		Human capital as measured by human capital index	
	FDI inflow	Human capital	FDI inflow	Human capital	FDI inflow	Human capital	FDI inflow	Human capital	FDI inflow	Human capital	FDI inflow	Human capital
Humancap	2.6948 (2.6690)		2.9492 (4.4098)		3.2705*** (1.0285)		2.9766*** (1.0451)		.0222 (.8215)		.0977 (3.5685)	
Trade_openness	-.0101 (.0205)		.0627 (.0261)		.1248* (.0674)		.0013 (.0202)		.0077 (.0089)		.0063 (.0102)	
GDP_growth	.3939*** (.0682)		.0244 (.0615)		.2001*** (.0870)		.0297 (.0881)		.0174 (.0376)		.0188 (.0545)	
Energy_imp	-.0990 (.0616)		-.0932 (.1033)		.1089* (.0602)		-.0205 (.0222)		.0205 (.0333)		.0096 (.0581)	
FDI		.0043 (.0065)		-.0019 (.0038)		.0631*** (.0090)		.0287 (.0192)		.0678 (.0413)		.0160 (.0664)
Govexp_edu		.0579 (.0755)		.0171*** (.0048)		-.112*** (.0287)		-.0717 (.0435)		-.0348 (.0214)		.1284 (.0814)
Remit_GDP		.0012 (.1449)		.0028 (.0066)		.0064 (.0066)		.0092 (.0045)		.0045 (.0041)		.0504 (.0383)
Life_expect		.1149*** (.0156)		.0517*** (.0016)		.0699 (.0057)***		.0298*** (.0048)		.0246 (.0156)		.0503 (.0311)
R-squared	0.70	0.98	0.68	0.99	0.54	0.97	0.85	0.98	0.25	0.95	0.03	0.88
Number of observations	24	7	24	13	24	21	24	18	20	16	24	12

*Figures in the parentheses are standard errors. The level of significance at 10, 5 and 1 percent is indicated by *, ** and *** respectively.*

VI. Discussion

The first model presented in table3 indicates that one unit increase in human capital index leads to 1.37 percent increase in the inward FDI as percent of GDP, ceteris paribus. The trade openness, however, is not significant in model 1 and 2. FDI and life expectancy index are only significant in the mode l to explain human capital index. On the other hand, 1 percent increase in FDI inflow as percent of GDP leads to 0.021 unit increase in the human capital index in model 1 as presented in table3, ceteris paribus. The impact of FDI, government expenditure on education as percent of GDP, and remittances as percent of GDP have trivial impact on human capital as measured by secondary enrollment rate and education index in the model 2 and model 3 as shown in the above table 3.

Similarly, table 4 shows that FDI inflow as percent of GDP increases by 1.93 percent as a result of one unit increase in human capital index, ceteris paribus where human capital index is taken as a proxy measure for human capital in the estimation. The impact of human capital as measured by population proportion of

secondary or above level is observed to be very low and one percent increase in the proportion of population having secondary or above education level leads to 0.032 percent increase in the level of FDI net inflow as percent of GDP, ceteris paribus. However, FDI inflow as percent of GDP increased by 3.76 percent point when human capital as measured by education index increased by one unit, ceteris paribus. The table 4 shows that the regression coefficient to explain FDI inflow as percent of GDP are robust in nature for different proxy measures of human capital.

Likewise, table 5 pinpoints that GDP growth rate of China has positive and significant impact on FDI inflow as percent of GDP, but FDI is not significantly contributing to explain the human capital label as measured by human capital index. Similarly, government expenditure on education and life expectancy are significantly contributed to explain the level of human capital in India. Whatsoever, GDP growth, trade openness and human capital are unimportantly exploring the variation in FDI inflow as percent of GDP. Human capital, trade openness and energy import notably contributed to explain the level of FDI inflow in Pakistan. On the other hand, FDI inflow as percent of GDP, government expenditure on education as percent of GDP, and life expectancy also outstandingly explain the level of human capital as measured by human capital index in Pakistan. Likewise, human capital significantly explains the level of FDI inflow as percent of GDP in Bangladesh.

VII. Conclusion

In SAARC region, the level of human capital as measured by secondary school enrolment, education index, and human capital index is very low. Hence, the net inflow of FDI as percent of GDP is also at very low level as compared to the world's average. On the other hand, these two impetuses of the economic growth are relatively large in China and fairly catch up the world average values. However, in SAARCregion, Sri Lanka has very high level of human capital but the level of FDI net inflow is not significant there. Despite the fact, the level of human capital is one of the important determinants of FDI in SAARCregion.

The empirical analysis based on the simultaneous equation fixed effect estimation method indicates that there is a significant causality between net inflow of FDI and human capital in SAARC region. It is evident from the panel data analysis that GDP growth and trade openness also played vital role to invite higher FDI in the domestic economy. The higher level of FDI inflow in China is largely explained by the sustainable high level of growth of the Chinese economy during the period 1990 - 2017. However, in SAARC region, the growth is very low as compared with China. Apparently, the level of FDI net inflow is very low in SAARC region in comparison with China.

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