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Linkages between education expenditure and economic growth: Evidence from 'CHINDIA'

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This paper examines the relationship between education expenditure and economic growth in China and India by employing annual data from 1970 to 2005. This study utilizes multi econometric tools such as the Johansen-Juselius (1990) co-integration test, Ordinary Least Square (OLS) method, Dynamic Ordinary Least Square (DOLS), Vector Error Correction Model (VECM) as well as variance decomposition to obtain a robust and consistent result. The findings indicate that there exists a long run trending relationship between income level (Gross Domestic Product per capita (GDPpc) and education expenditure in both China and India. In the long run, a unidirectional causal relationship could be detected for both countries, running from income level to education expenditure for the case of China, while for the case of India education expenditure Granger causes income level. The results are robust and consistent across all methods.

Keywords: Education Expenditure; Economic Growth; China; India; DOLS; VECM

INTRODUCTION

Education is known as an important determinant of economic growth. Education increases human capital in the labour force which in turn increases labour productivity. This leads to higher equilibrium of level of output and per capita real national production of a country which improves social welfare that benefits all nations of the world and therefore has become a major objective of every country's policy. Therefore, investment in education is vital for economic growth and the society. Expenditure on education as a percentage of GDP shows how much a country spends on schools, universities, public and private institutions that support educational services as compared to its overall allocation of resources. The importance of education spending can be seen in the OECD countries (Organization for Economic Cooperation and Development). On the average, these countries spend about 4.6% of their GDP on educational institution, considering only the public source of funds.

This is about USD 7600 spent per student across primary, secondary and tertiary education (OECD family database).

The main objective of this study is to explore and examine the role of education expenditure in explaining the economic growth in China and India. The data used in the study covered the period from 1970 to 2005. Investment in education will boost human capital and this will promote the growth of a country. The remainder of the paper is organised into five sections. Following this introduction is section two which presents the review of empirical literature; section three presents some stylish facts for China and India. Section four presents the data description and the methodology. Section five focuses on the results and analysis and section six presents the conclusion.

Empirical literature

Government plays an important role in human capital growth by providing fund for formal schooling in many

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countries. There are various empirical literatures exploring the relationship between economic growth and government education expenditure. A recent study by Ageli (2013) examined the relationship between economic growth and education expenditure in Saudi Arabia from 1970 to 2012 through three versions of Keynesian relations. He found that the growth of education can be explained by the Keynesian relations for both the Oil and Non Oil GDP and that causality exists in the long run. Ejiogu et al. (2013) revealed that Nigeria's current year education expenditure increases due to the previous year's GDP but is negatively related with the gross capital formation for the period 1981 to 2011. They also found that there exist causality from GDP to education expenditure.

A study by Douglass (2010) discussed the past and future of the human capital role for national economies. He found that educational attainment of a nation's population is an important factor for greater national productivity and global competitiveness. "The culture of aspiration-the sense that the individual has the freedom and the means to better themselves, to advance their knowledge, skills, and position in society" is also vital in explaining the economic growth.

Baldwin and Borreli (2008) revealed that the growth of per capita income is positively associated with higher education but has a negative association with junior college pupil-teacher ratios during 1988-2005 in the US. Spending on higher education and college attainment are negatively related and this creates a negative indirect relationship with income growth. Musai et al. (2011) studied the relationship between education and economic growth of 79 countries. They revealed that the elasticity of the production of human capital, physical capital and labor force are 0.28, 0.696 and 0.044 respectively. Increases in education spending, physical capital and labour force will increase the economic growth. A study by Yildirim et al. (2011) revealed that a unidirectional causality exist from Turkey's real GDP per capita to real per capita education expenditure from 1973 to 2009. Their study also found that public education expenditure does not affect Turkey's economic growth.

Human capital has been used as one of the indicators to measure economic growth. In 1990, a study by Romer suggested that spending on education can be used as an approximation of human capital where human capital is defined as formal education and on-the-job training. He found that the increase in supply of human capital will boost the growth in the economy. Lee and Lee (1995) found that high initial stock of human capital per capita will not only increase the growth rate of real GDP per worker but will give a high proportion of physical investment to GDP and decrease the fertility rate. They used the test survey on students achievement conducted by the International Association for the Evaluation of Educational Achievement (IEA) to a sample of ¼ milli on students from 21 countries to measure the effect of human capital on economic growth. The science scores in the test were used as a proxy to initial stock of human capital per worker.

Similarly, human capital and physical capital were found essential in attaining industrial development in Africa (Oketch, 2006). Human capital investment expenditure was measured as percentage of GDP invested in total expenditure on education. A two way causal flow was found between per capita growth and investment in education. Investment in education and physical capital contributed to per capita growth, economic growth and development of Africa. A number of studies continue to demonstrate the importance of human capital. Anwar (2008) found that increased spending on R&D, advanced education and training, will not only increase the supply of human capital but also attract foreign investment to Singapore. Foreign investment and human capital play a vital role in the growth of Singapore's manufacturing sector. A long run relationship exist between real human capital, real foreign investment and real value added in manufacturing which suggested that the Singapore manufacturing sector will depend on foreign investment and increased availability of human capital.

Charles et al. (2011) found that fair wages was an important determinant in linking human capital development to economic growth. They found that India lagged behind High-Performing Asian Economies (HPAEs) on human capital development due to this factor. Oluwatobi and Ogunrinola (2011) found that a long run relationship between human capital development and economic growth in Nigeria. Physical capital and government recurrent expenditure on human capital were found to be positively correlated with the level of real output. Instead, government capital expenditure in human capital were negatively correlated with the level of real output.

Some stylized facts for China and India and Literature Review

In the following sections we will be exploring some preliminary analysis on the current scenario of the education expenditure and income level of both China and India.

Figure 1 shows that education expenditure for China has a higher rate of increase as compared to India from 1970 to 2005. The data for China appear to move gradually from 1970 to 1992 before showing a rapid increase from 1993 to 2005. This change might be attributed to the China government's policy to increase the spending on education. The government aimed to increase the education expenditure to 4% of its GDP by the year 1999. However, in 1999, only 2.79% of GDP

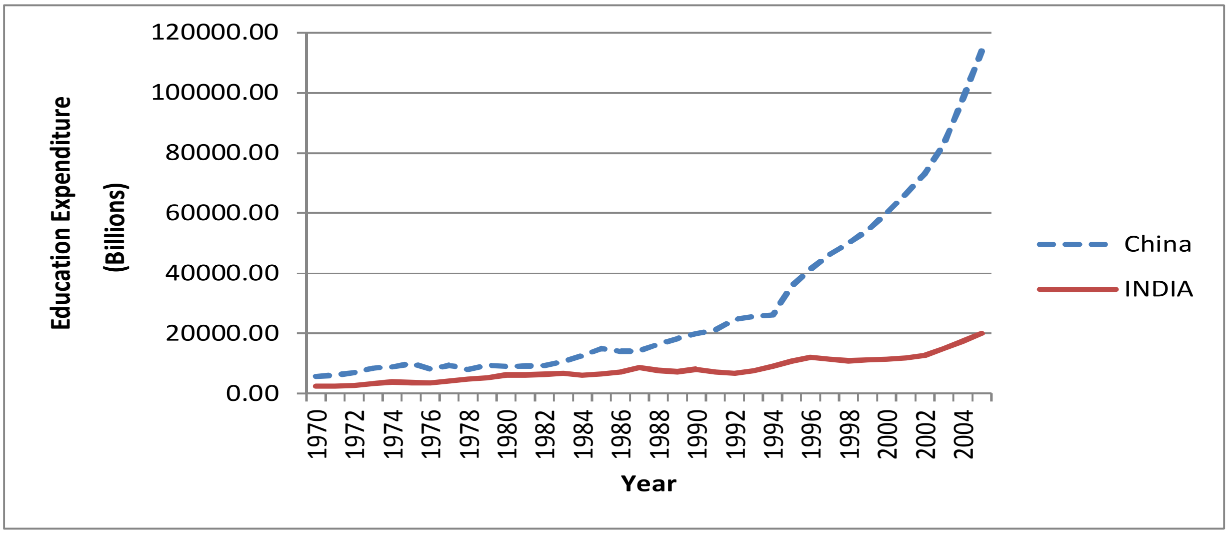

Figure 1. Education expenditure for China and India

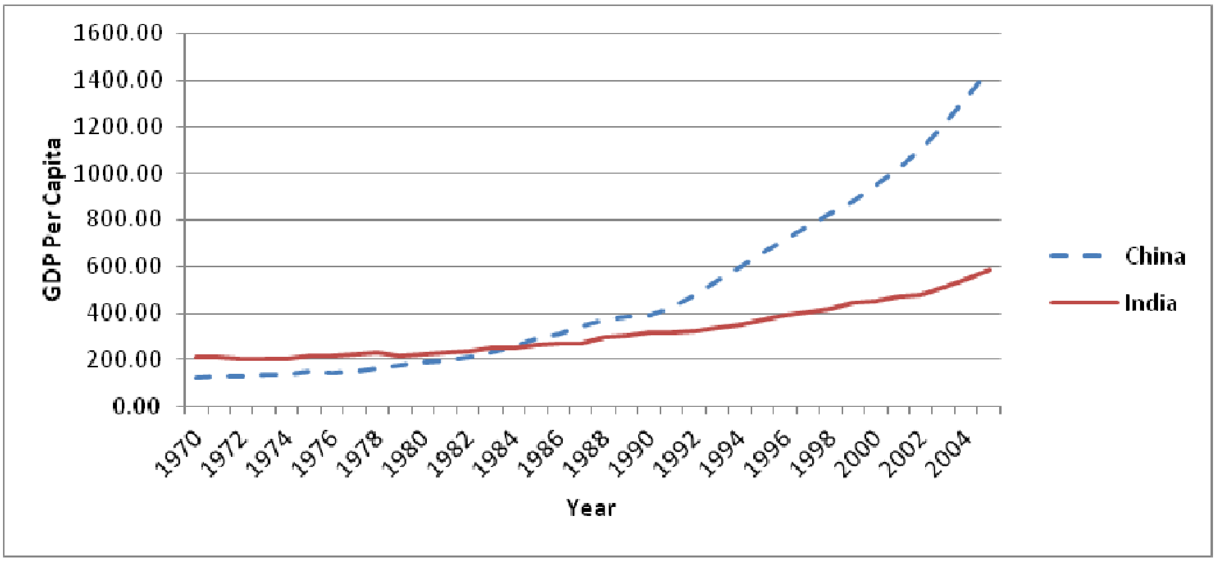

Figure 2. GDP per capita for China and India

was spent on education. In 2000, 2.86% of GDP was allocated to education, increasing to 3.14% and 3.28% in 2001 and 2003 respectively (National Bureau of Statistics of China, 2005). An additional 50 billion Yuan per year was allocated for the 1995 National Compulsory Education programme from 1998-2002 to prolong the compulsory education to 9 years in cities and 6 years in the rural area and also to provide free textbooks for poor families (OECD Economic Surveys: China). India, on the other hand, emphasized more on higher education and primary education was neglected but from 1980's onwards, the government's priority was more on primary education (Deshpande, 2010).

The GDP per capita for both China and India was quite low prior 1983 and had increased rapidly ever since. China's GDP per capita has increased by seven times since 1983 while and India had doubled its own figures as shown in Figure 2. This could be attributed to China's agricultural reform, improvement in manufacturing and services and implementation of open economy in 1990s.

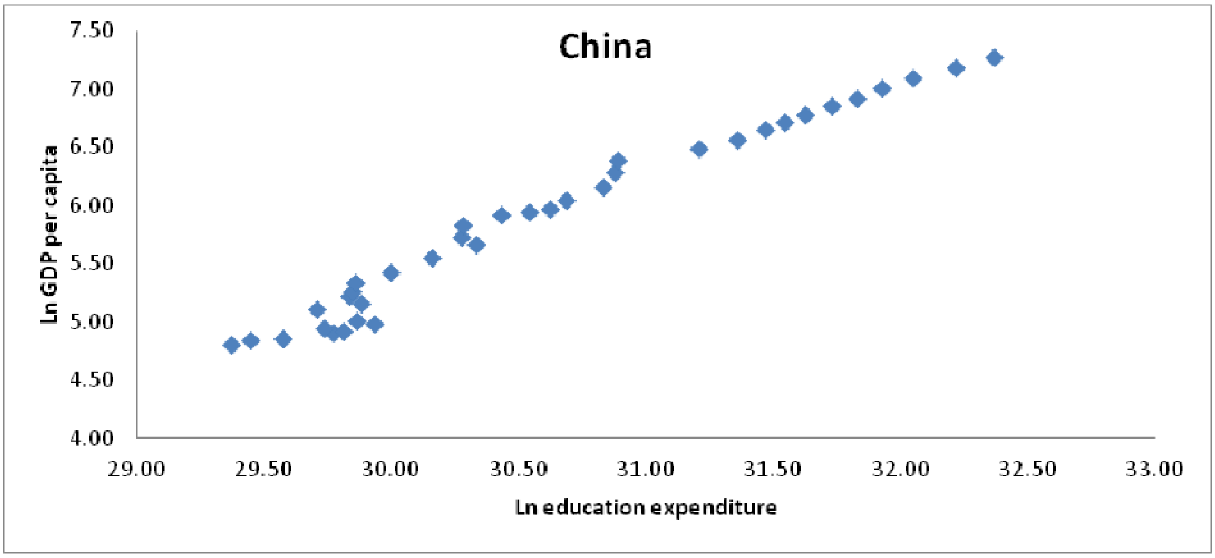

Figure 3. Education expenditure and GDP per capita (China)

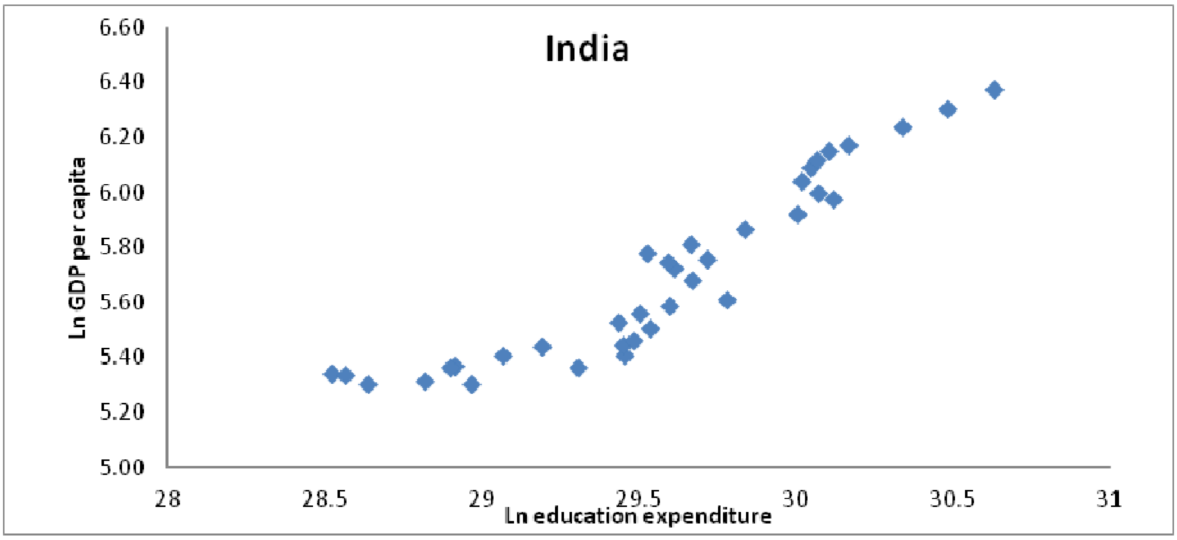

Figure 4. Education expenditure and GDP per capita (India)

Ever since China became a member of WTO, it has become the world's third largest trader and one of the largest FDI recipients (WTO press release). Unlike China, India's economic growth rate was slower as India started moving towards globalization only after 1991. This is also due to lack of encouragement from the government for greater competition and failure to encourage private sector investment (Oxford Economics).

Figure 3 and figure 4 show the scatter plots of China and India's education expenditure against GDP per capita. It can be safely assumed that there exist a strong positive association between the education expenditure and GDP per capita.

From the preliminary analysis we could establish that there could exist important links between these variables thus encouraging us to conduct further in-depth analysis.

Data description

The empirical investigation has been carried out in the case on China and India economy with the data set of the period 1970 to 2005. The data was obtained from World Development Index, 2006. GDP per capita was taken as a proxy to economic growth and education expenditure to measure human capital. The data variables used in this study are LGDPC (log of real GDP per capita with constant 2000 US$) and education expenditure (% of GNI), referred to as LEE log of real education expenditure.

METHODOLOGY

To test for stationarity, we employed augmented Dickey-fuller (ADF) and Phillips-Perron (PP) unit root tests. Then we apply the maximum likelihood approach to cointegration test developed by Johansen (1988) and Johansen and Juselius (1990), henceforth the JJ test. This test provides us information on whether the set of non-stationary variables under consideration is tied together by the long-run equilibrium path. Denote *X* as a vector of the variables under study, the JJ test is based on the following vector error correction (VECM) representation:

$$\Delta X_t = \alpha + \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + ... + \Gamma_p \Delta X_{t-p} + \Pi X_{t-1} + u_t \quad (1)$$

where α is an $n \times 1$ vector of constant terms, Γ_i (i = 1, 2,..,*p*) and Π are $n \times n$ matrices of coefficients, *p* is the optimal lag order and n is the number of variables in the model. The JJ test is based on determining the rank of Π, which depends on the number of its characteristics root (eigenvalue) that differ from zero. Johansen (1988) and Johansen and Juselius (1990) develop two test statistics – the trace test and the maximal eigenvalue test statistics – to determine the number of cointegrating vectors that govern the long run co-movements of the variables. The trace test statistics tests the null hypothesis that there are at most *r* cointegrating vectors against a general alternative. Meanwhile, the maximal eigenvalue test is based on the null hypothesis that the number of cointegrating vectors is r against the alternative hypothesis that it is r + 1.

Since our task is to determine the causal direction between the two variables in question, we proceed to estimate the following vector error correction model and for a two variable case, we specify the following bi-variate vector error correction models (VECM) as:

$$\Delta y_t = a_0 + \sum_{i=1}^{k} \alpha_i \Delta y_{t-i} + \sum_{j=1}^{k} \alpha_j \Delta x_{t-j} + \gamma_1 ecm_{t-1} + \varepsilon_{1t} \quad (2)$$

$$\Delta x_t = b_0 + \sum_{i=1}^{k} \beta_i \Delta y_{t-i} + \sum_{j=1}^{k} \beta_j \Delta x_{t-j} + \gamma_2 ecm_{t-1} + \varepsilon_{2t} \quad (3)$$

Where ecm_{t-1} is the lagged residual from the cointegration between y_t and x_t in level. Granger (1988) points out that based on equation (1), the null hypothesis that x_t does not *Granger* cause y_t is rejected not only if the coefficients on the x_{t-j}, are jointly significantly different from zero, but also if the coefficient on ecm_{t-1} is significant.

The VECM also provides for the finding that x_{t-j} *Granger* cause y_t, if ecm_{t-1} is significant even though the coefficients on x_{t-j} are not jointly significantly different from zero. Furthermore, the importance of α's and β's and represent the short-run causal impact, while γ's gives the long-run impact. In determining whether y_t *Granger* cause x_t, the same principle applies with respect to equation (2). Above all, the significance of the error correction term indicates cointegration, and the negative value for γ's suggest that the model is stable and any deviation from equilibrium will be corrected in the long-run.

As to test for consistency and robustness we also conducted Ordinary Least Square (OLS) and Dynamic Ordinary Least square (DOLS) The conditional long-run model for economic growth can be obtained from when *Δ gdpc = Δ education expenditure = 0*

$$gdpc_t = \psi_o + \psi_1 education\ expenditure + \mu_t \quad (4)$$

Where $\Psi_0 = -\alpha_0/\beta_1$, $\Psi_1 = -\beta_2/\beta_1$, and μ_t are white noise. In this study we estimated the long-run coefficients, Ψ_1, using OLS since the existence of cointegration between the two variables of interest eliminates the problem of spurious regression results, and furthermore the estimates are super-consistent.

On top of that we employed DOLS whereby the DOLS involves regressing any I(1) variables on other I(1) variables, any I(0) variables and leads and lags of the first differences of any I(1) variables as follows:

$$gdpc_t = \alpha_o + \alpha_1 education\ expenditure_t + \alpha 2 \Delta education\ expenditure_t + \alpha_3 \Delta education\ expenditure_{t-1} + \alpha_4 \Delta education\ expenditure_{t+1} + \mu_t \quad (5)$$

Parameter α_1 is the long-run elasticity.

Results and Discussion

The ADF test results displayed in Table 1 suggest that all the variables were non-stationary at level but were stationary at the first difference. In order to see the robustness of the ADF test, the Phillips-Perron (PP) unit root test was used and it gives the same results as ADF test. Therefore, both the education expenditure and GDP per capita for China and India were integrated of order one, I (1).

Since the variables were integrated at order 1, the long run relationship between the variables was examined using JJ co-integration test. The lag length, k, of 1 was

Table 1: Unit root test

		Augmented Dickey Fuller (ADP)				Phillips Perron (PP)			
		Level		First Difference		Level		First Difference	
		Intercept	Trend & Intercept	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Intercept	Trend & Intercept
China	**LEE**	1.352368	-0.970164	-6.458470*	-3.732039**	2.736155	-0.607058	-6.448798*	-7.781426
	LGDPC	1.003562	-3.181976	-2.902350**	-3.180259	2.237239	-3.086704	-3.578810**	-4.117539**
India	**LEE**	-0.538101	-3.099293	-4.296673*	-4.223064**	-0.5685	-2.331976	-4.143713*	-4.058425**
	LGDPC	2.861488	-1.805504	-5.174945*	-6.750631*	4.070330	-1.70673	-5.160366*	-8.277252*

Notes: the null hypothesis is that the series is non-stationary (contains a unit root). The rejection of null hypothesis for both ADF and PP tests are based on McKinnon (1996) critical values; *, ** and *** indicates the rejection of null hypothesis of non-stationary at less than 1% , 5% and 10% significance level, respectively.

Table 2: Co-integration test

	China					
Number of co-integrating vectors	**Trace Test**			**Eigenvalue test**		
	Eigen value	**Trace statistics**	**0.05 Critical value**	**Eigen value**	**Max-Eigen statistics**	**0.05 Critical value**
r = 0	0.389378	15.88973*	15.49471	0.389378	14.79833*	14.26460
r ≤ 0	0.035726	1.091403	3.841466	0.035726	1.091403	3.841466
	India					
Number of co-integrating vectors	**Trace Test**			**Eigenvalue test**		
	Eigenvalue	**Trace statistics**	**0.05 Critical value**	**Eigenvalue**	**Max-Eigen statistics**	**0.05 Critical value**
r = 0	0.373031	17.71981*	15.49471	0.373031	14.47261*	14.26460
r ≤ 0	0.099449	3.247206	3.841466	0.099449	3.247206	3.841466

chosen for both China and India. The trace and the maximum Eigenvalue tests suggest the presence of a long-run relationship, with one co-integrating vector at 5% significance level. Detailed results of the co-integration test results are provided in Table 2. Therefore, it can be concluded that a long run trending relationship exists between income level and education expenditure in each of the two countries.

Three methods were used to determine the long term relationship as per the explanation in the earlier part of this study, albeit, the OLS method, DOLS and VECM, as shown in Table 3. In the long run, all the coefficients in the three methods were found to be statistically significant and have the expected signs.

The regression equations 1 to 4 in Table 3 were obtained using OLS method. Equation (1) and (3) implies that there is an increase in the economic growth in both the countries when education expenditure increases. It can be observed that a 1% increase in education expenditure will lead to 0.8915% increase in GDP per capita for China. As for India, 1% increase in education spending will increase the GDP per capita by 0.5681%. The coefficient of education and GDP per capita are both significantly different from 0 which indicates that education expenditure is an important determinant for income level and income level is an important factor for education expenditure for the countries in the study. This is further supported by the Wald test, as shown in Table 4. However, a 1% increase in income level increases China's education expenditure by 1.089% and India's education expenditure by 1.519%. The results show that in long run, income level is elastic for both China and India. The Dynamic OLS (DOLS) gives similar results in Equation 5 to 8 in Table 3. A 1% increase in China's education expenditure increases the GDP per capita by 0.9010%. Similarly, India's education expenditure increases by 1%, the GDP per capita increases by 0.639%.

Since GDP per capita and education expenditure were co-integrated, the vector error correction model was

Table 3: Long term equations using OLS, VECM and DOLS

OLS (Ordinary Least square)
$LGDP_{CHINA} = -21.40048 + 0.8915{*}LEE_{China}$ …….. (Eqn 1)
(33.75227)
$LEE_{CHINA} = 24.19548 + 1.089157{*}LGDP_{China}$ ……… (Eqn 2)
(33.75227)
$LGDP_{India} = -11.09581 + 0.568064{*}LEE_{India}$ …….. (Eqn 3)
(14.63125)
$LEE_{India} = 20.90930 + 1.519096{*}LGDP_{India}$ ……… (Eqn 4)
(14.63125)
DOLS (Dynamic Ordinary Least square)
$LGDP_{China} = -21.70682 + 0.901022{*}\ LEE_{China}$ ……… (Eqn 5)
(15.02274)
$LEE_{China} = 24.15966 + 1.143357{*}LGDP_{China}$ ……… (Eqn 6)
(21.85469)
$LGDP_{India} = -13.21362 + 0.638953{*}LEE_{India}$ …….. (Eqn 7)
(9.199963)
$LEE_{India} = 22.64891 + 1.196986{*}LGDP_{India}$ ……… (Eqn 8)
(6.055706)
VECM (Vector Error Correction Model)
$LGDP_{China} = -18.04743 + 0.781965{*}\ LEE_{China}$ ……… (Eqn 9)
(-16.5050)
$LEE_{China} = 23.07958 + 1.278830{*}LGDP_{China}$ ………. (Eqn 10)
(-19.3948)
$LGDP_{India} = -26.69745 + 1.096022{*}LEE_{India}$ ……. (Eqn 11)
(-7.98272)
$LEE_{India} = 24.35850 + 0.912391{*}LGDP_{India}$ …… (Eqn 12)
(-4.42809)

where * denotes significance at 1% level and t-statistics is in parentheses

estimated for China and India (equations 9 to 12 in Table 3). A 1% increase in China's education expenditure increases the income level by 0.781965%. Similarly, India's education expenditure increases by 1%, the income level increases by 1.096%. In the long run, the education expenditure will increase by 1.27% if China's income level increases by 1%.

As for India, a 1% increase in income level will increase the education expenditure by 0.9124%. The results indicate that income level is elastic for China but inelastic for India. The results for India using the VECM differ slightly from the other two methods shown above.

The results of the Wald test using OLS method shows that education expenditure granger causes GDP per capita for both China and India as the p-value is less than 0.05, as shown in Table 4.

- $H_{0:}$ Education expenditure does not Granger cause income level

Table 4: Wald Test

	China			India		
Test Statistic	**Value**	**df**	**Probability**	**Value**	**df**	**Probability**
t-statistic	33.75227	34	0.0000	14.63125	34	0.0000
F-statistic	1139.215	(1, 34)	0.0000	214.0734	(1, 34)	0.0000
Chi-square	1139.215	1	0.0000	214.0734	1	0.0000

Table 5: Error Correction Term

D(LGDPCCHINA)	D(LEECHINA)	D(LGDPCINDIA)	D(LEEINDIA)
0.106667*	-0.206380*	-0.056618*	-0.069696
[3.45849]	[-2.91911]	[-3.77336]	[-1.21200]

where * denotes significance at 1% level and t-statistics is in parentheses

The error correction term based on VECM, shown in Table 5, for GDP of China is 0.106667 which is positive but significant at 1% significance level. This shows that in the long run, China's education expenditure does not Granger cause income level. However, the error correction term for India is significant with a negative sign. The error correction term of -0.056618 measures the speed of adjustment. Therefore the India's economy will converge towards its long run equilibrium level at a speed of 5.66% after the shock of education expenditure. It also shows that a Granger causality exist from India's education expenditure to income level. It was also found that short run causality does not exist from education expenditure to income level for both China and India. The error correction term for China's education expenditure is negative and significant with a value of -0.206380.

Therefore the speed at which the level of China's education expenditure adjusts to changes in GDP per capita in order to achieve long run equilibrium is approximately 20.64%. Granger causality exists from income level of China to education expenditure in the long run. The error term for India is negative but not significant (-0.069696) which indicates that income level does not Granger cause education expenditure.

To evaluate the dynamic interactions and strength of explanations on the variance of the variables, variance decomposition was computed. There are two variables in the system and each variable is decomposed within a twenty period horizon. The results of the variance decomposition are displayed in Table 6 and Table 7.

In this study, each variable is decomposed within a twenty period horizon. The analysis of generalized variance decomposition tends to suggest that each of the variables used in the empirical analysis can be explained by the disturbances in the other variables. From Table 6 and 7, the own series shocks of GDP per capita explain most of the error variance (of GDP per capita) up until 17 years for China and 14 years for India, respectively. After that period, error variance of income level is highly affected by shocks of education expenditure. This indicates that income level is highly endogenous. In the second year, 97.35% of the variability in China's income level is explained by its own innovations and 2.65% of the variability is explained by innovations in education expenditure. In the 20th year, 52.56% of variation in GDP per capita is attributed by the variation in China's education expenditure. Education expenditure seems to be contributing a higher percentage to the variation in economic growth over time.

Table 6 and 7 also presents the generalised variance decomposition for education expenditure. In the second year, 96.44% of China's education expenditure variability is attributed to shocks in itself while 3.56% is due to changes in income level. In the 20th year, 53.92% of variation in education expenditure is explained by its own innovations and 46.08% is explained by the changes in GDP per capita.

As for India, 97.77% of the variation in income level is attributed by its own innovations and 2.23% of the variability in GDP per capita is attributed by the variability in education expenditure. At the end of 20 years, education expenditure contributes 60.28% of the variation in India's income level. The generalised variance decomposition for education expenditure shows that in the second year, 95.51% of India's education expenditure variability is explained by its own innovations while 4.49% is due to changes in income level. In the 20th year, 89.58% of variation in education expenditure is explained by its own variation while 10.42% is attributed by the variability in income level.

Table 6: Variance Decomposition (China)

China							
Variance decomposition of GDP per capita				Variance decomposition of education expenditure			
Period	S.E.	LGDPCHINA	LEECHINA	Period	S.E.	LGDPCHINA	LEECHINA
1	0.030314	100.0000	0.000000	1	0.088866	1.907484	98.09252
2	0.045063	97.34602	2.653982	2	0.114415	3.555040	96.44496
3	0.058451	92.72617	7.273825	3	0.128321	5.945624	94.05438
4	0.071628	87.43713	12.56287	4	0.136762	9.159507	90.84049
5	0.084890	82.20303	17.79697	5	0.142553	13.18546	86.81454
6	0.098290	77.35927	22.64073	6	0.147338	17.88227	82.11773
7	0.111805	73.02325	26.97675	7	0.152164	22.97336	77.02664
8	0.125385	69.20441	30.79559	8	0.157693	28.09224	71.90776
9	0.138976	65.86493	34.13507	9	0.164303	32.86833	67.13167
10	0.152529	62.95054	37.04946	10	0.172162	37.01405	62.98595
11	0.166003	60.40491	39.59509	11	0.181282	40.37352	59.62648
12	0.179363	58.17582	41.82418	12	0.191573	42.92066	57.07934
13	0.192581	56.21729	43.78271	13	0.202893	44.72328	55.27672
14	0.205636	54.48991	45.51009	14	0.215076	45.89843	54.10157
15	0.218511	52.96029	47.03971	15	0.227954	46.57647	53.42353
16	0.231193	51.60035	48.39965	16	0.241374	46.87895	53.12105
17	0.243674	50.38651	49.61349	17	0.255196	46.90859	53.09141
18	0.255949	49.29894	50.70106	18	0.269305	46.74704	53.25296
19	0.268013	48.32096	51.67904	19	0.283600	46.45649	53.54351
20	0.279866	47.43845	52.56155	20	0.297999	46.08301	53.91699

Table 7: Variance Decomposition (India)

India							
Variance decomposition of GDP per capita				Variance decomposition of education expenditure			
Period	S.E.	LGPPINDIA	LEEINDIA	Period	S.E.	LGPPINDIA	LEEINDIA
1	0.026365	100.0000	0.000000	1	0.092189	4.125131	95.87487
2	0.037473	97.76553	2.234468	2	0.126156	4.493904	95.50610
3	0.046660	93.49927	6.500728	3	0.149838	4.865416	95.13458
4	0.055183	88.18730	11.81270	4	0.168131	5.237690	94.76231
5	0.063454	82.55926	17.44074	5	0.183013	5.608961	94.39104
6	0.071619	77.06902	22.93098	6	0.195531	5.977673	94.02233
7	0.079725	71.95668	28.04332	7	0.206318	6.342485	93.65752
8	0.087775	67.32268	32.67732	8	0.215792	6.702254	93.29775
9	0.095756	63.18636	36.81364	9	0.224242	7.056024	92.94398
10	0.103651	59.52471	40.47529	10	0.231878	7.403013	92.59699

Table 7: Cont.

11	0.111443	56.29565	43.70435	11	0.238857	7.742593	92.25741
12	0.119116	53.45095	46.54905	12	0.245297	8.074275	91.92573
13	0.126661	50.94291	49.05709	13	0.251290	8.397689	91.60231
14	0.134067	48.72748	51.27252	14	0.256908	8.712575	91.28742
15	0.141330	46.76545	53.23455	15	0.262211	9.018763	90.98124
16	0.148447	45.02263	54.97737	16	0.267243	9.316161	90.68384
17	0.155416	43.46956	56.53044	17	0.272045	9.604745	90.39525
18	0.162238	42.08100	57.91900	18	0.276646	9.884548	90.11545
19	0.168913	40.83541	59.16459	19	0.281074	10.15565	89.84435
20	0.175445	39.71441	60.28559	20	0.285348	10.41817	89.58183

Conclusion

In this paper, the relationship between income level and education expenditure were analysed for China and India. From the empirical analysis, it was found that education expenditure play an important role in affecting the economic growth. The results of the study suggest that a long run relationship exists between income level and education expenditure in both China and India. In the long run, it was found that a unidirectional causal relationship exist from income level of China to education expenditure. As for India, education expenditure Granger causes income level which is also unidirectional. It proves a point that more emphasis should be given to formulating important policies regarding education expenditure, since this study as well as many past studies have showed that education could be an important engine of growth for an economy.

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