

THE EMERGING ECONOMIES OF INDIA AND CHINA: AN ECONOMETRIC ANALYSIS ON THE EDUCATION SECTOR

Eben Priya A R P¹ and K. Karthikeyan²

¹ Research Scholar (FT) in Management Sciences, Karunya Institute of Technology and Sciences, Coimbatore – 641 114

ORC ID: <https://orcid.org/0000-0003-2873-8173>

² Assistant Professor (SG), Department of Management Studies, Karunya Institute of Technology and Sciences, Coimbatore – 641 114

Abstract:

The Economic health of a nation is assessed using various economic indicators. Economic growth is one major indicator employed by investors worldwide to decide into which nation their surplus incomes should go. For almost close to three decades, the emerging economies of India and China are the centre of attraction for these investors. Not just for investors, students worldwide are looking at these destinations as destinations of Higher education and research. Emerging economies are those economies which are transitioning from a low income economy to a middle income economy. Although the Chinese growth trajectory is a peaked curve compared to India, the researcher wants to investigate in this paper, if the growth story has resulted in a transformation in their respective education sectors? Developing an econometric model, the study intends to understand the relationship between growth and human capital /the education sector.

Keywords: *India, China, Education sector, Econometric analysis*

Introduction

The 21st century has witnessed the dynamic growth of developing countries like Brazil, People’s Republic of China (PRC), India, Indonesia emerge as drivers of global growth (Vandana Chandra et al 2013). Studying the emerging economies of India and China has been fascinating the economists world over. Economists who compare India China have their reasons for comparing these two Asian economic giants. India got its independence in 1947.

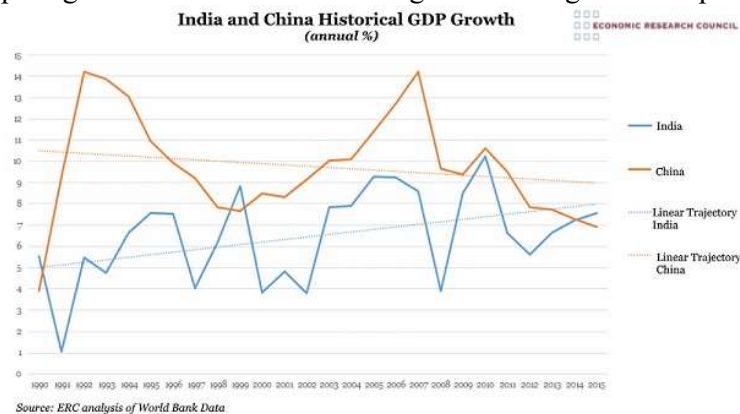


Figure 1: India China GDP Growth

Source: ERC analysis of World Bank Data

PRC was formed in 1949. Both the countries followed industrialization, the soviet style pattern of development and had similar economic developments until the 1980s. The opening up of the Chinese nation to market reforms and inflow of FDI, resulting in globalisation kick started economic growth for China. India on the other hand, which was so skeptical about allowing foreign investments, liberalized its economy in 1991, resulting in a growth pattern for three decades (Srinivasan TN 2013).

The erstwhile dormant economies with the world’s largest population (40% of the world’s population live in India and China) have turned dynamic economies with spectacular economic growth by implementing economic reforms. The economic growth which hovered around 3% has jumped 7% to 9% for India and China, making them economic superpowers in the world.

What are Emerging Economies and why do we call India China as Emerging Economies?

The definition of an emerging economy is an economy with low to middle per capita income and a country that is in the process of moving from a developing economy stage to an advanced economy stage. The first characteristic of an emerging economy is its growth rate. The growth rates hover between 6% to 7%. Both India and China have this trait. The per capita income of the economy improves leading a nation from poverty to becoming a rising middle income class population. Both India and China’s middle income class is bulging. India’s middle class (spending \$2 to \$10 per day) is 28% of its population doing 70% of its consumer spending. China is now an upper middle income country and the country boasts of half of its population in the middle income class. That is why India and China are called as emerging economies by economists.

Country	Year	GDP per capita	Middle income class
India	2020	\$1,900	29%
China	2020	\$10,500	50.5%

Table 1: GDP per capita and Middle Income Class of India and China

Source: World Bank Data (Most recent data available*2022)

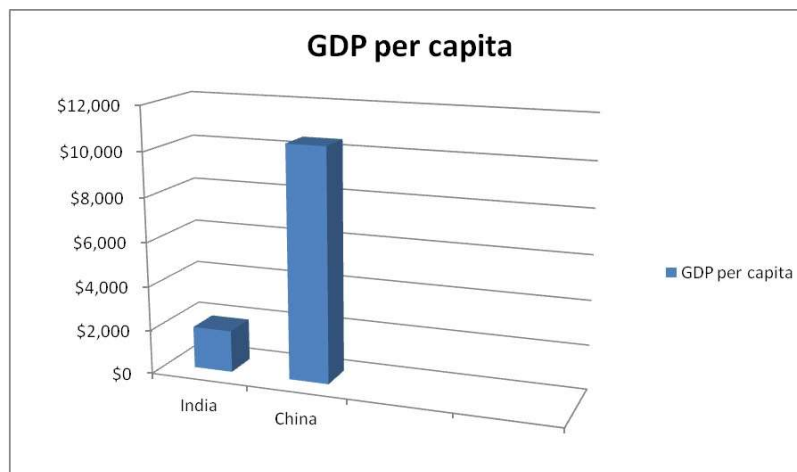


Figure 2: GDP per capita of India and China

Impact of Economic growth on Education in India and China

The Economic growth stories have led to a transformation in the Education sectors of India and China. Researchers like Gaba A.K. & Li.W, Bosworth and Collins, Srinivasan T.N. have compared India and China’s economic growth stories. An interesting study reveals that Chinese researchers publish close to 0.6 million articles per year (2018) compared to just 629 publications (1980).

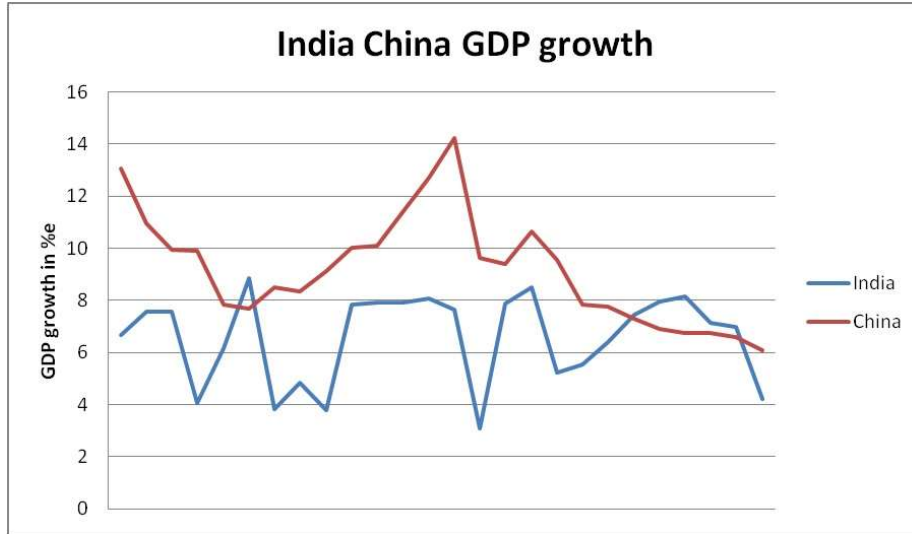


Figure 3: India China’s GDP Growth

Data: 1994-2019 (World Bank Data)

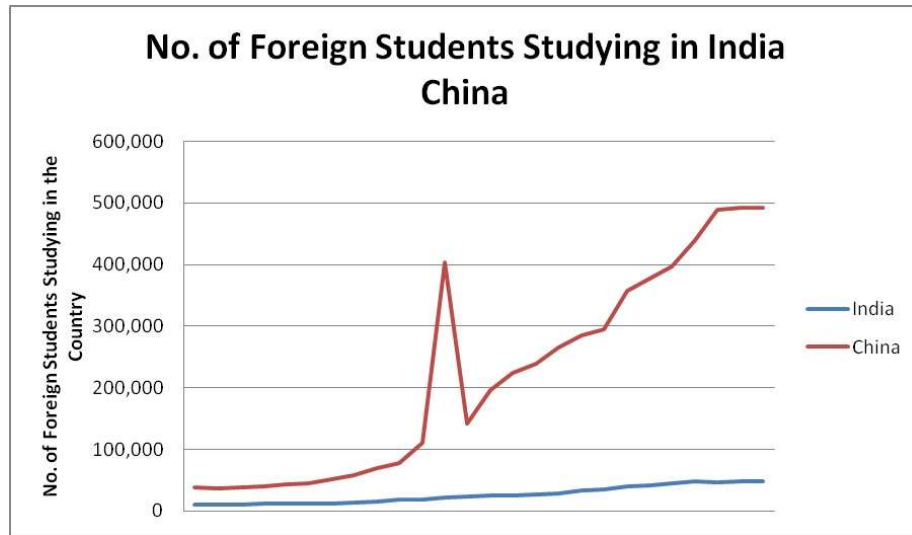


Figure 4: No. of Foreign Students Studying in India China

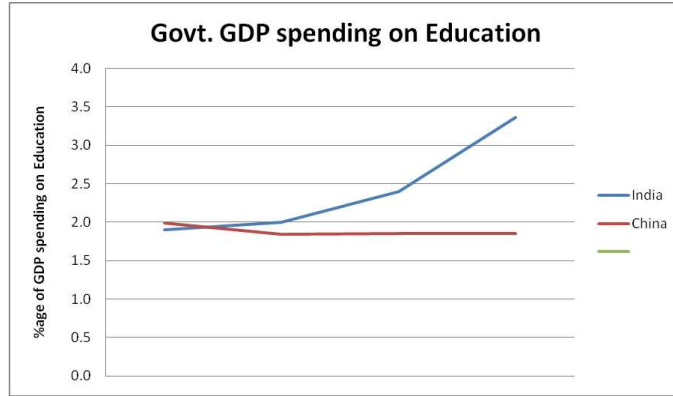


Figure 5: Pattern of Government GDP spending on Education of India China

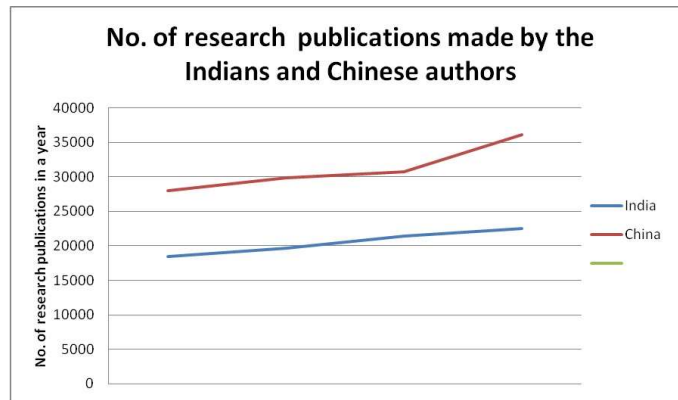


Figure 6: Number of research publications made by the Indians and Chinese authors

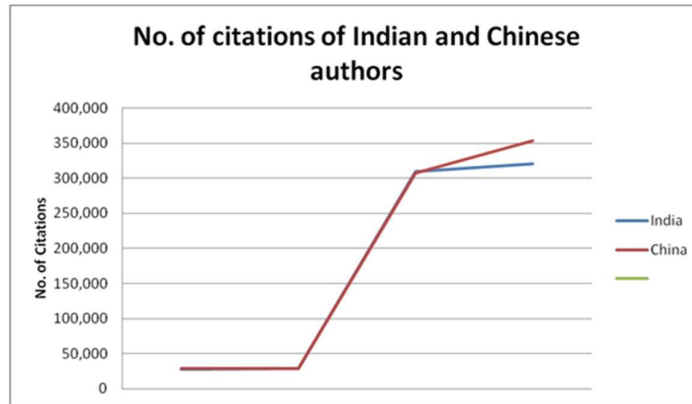


Figure 7: No. of citations of Indian and Chinese authors

Source: scimago.com

Literature Review

Time and again researches have shown Human capital impacting economic growth. Adam Smith in his book An Inquiry into the Wealth of Nations (1776) emphasized the significance of human capital in productivity leading to wealth formation. Education has played a big role in the growth and development of developed nations. Researchers have empirically shown that higher education leads to skill and capacity building of individuals which in turn leads to higher wages and salaries for individuals. As efficiency of human beings

improve, the nations productivity improves, contributing to further economic development and better living standards.

Heena Upadhyaya (2013) who has attempted to study the growth of higher education in India from 1950 to 2005 has concluded that India with a population of 1.3 billion has 342 universities (2006). India had just 28 universities in 1947 and 130 universities in 1980. Japan with a population of 0.127 billion has 684 universities (2006) and US with a population of 0.27 billion has 2364 universities (2006).

Country	Population	No. of universities
India	1.165 billion	342
Japan	0.127 billion	684
USA	0.27 billion	2364

Table 2: Research finding based on a study made in 2013

**The above data is for the year 2006.*

Panel Data Analysis and Discussions

The data in the study is of panel data type and the researcher is trying to estimate the panel data.

1. **Model Specification**

Neoclassical production function has been employed to analyze the effect of economic growth (gdp) on higher education (human capital):

$$Y = f(x_1, x_2, x_3, x_4)$$

Where Y is the dependent variable (DV) and x₁, x₂, x₃, x₄ are Independent variables(IV)

In the logarithmic form, it becomes

$$\text{Log}y = f(\text{log}x_1, \text{log}x_2, \text{log}x_3, \text{log}x_4)$$

$$Y = f(\text{npubn_documents}, \text{govspnd_edn}, \text{citations}, \text{fn_stdnt}) \dots \dots \dots (1)$$

The equation (1) is written in the panel model type as follows:

$$\ln Y_{it} = \beta_0_{it} + \gamma_1 \ln \text{npubn_documents}_{it} + \gamma_2 \ln \text{govspnd_edn}_{it} + \gamma_3 \ln \text{citations}_{it} + \gamma_4 \ln \text{fn_stdnt}_{it} + \epsilon_{it} \dots \dots \dots (2)$$

Y is the dependent variable, gdp.

Where i= 1 to 2 stands for the countries of India and China

t stands for the time period from 1994 to 2019 (a period of 26 years)

β, γ are co-efficients

ε_{it} is the error term

2. **Descriptive Statistics**

Descriptive Statistics helps the researcher to understand the nature of data. Does the data follow a normal distribution? What is the peakedness of the normal curve? How much is the normal curve skewed? These questions are well answered by the following table.

	GDP	NPUBN DOCUMENTS	GOVSPND EDN	CITATIONS	FN_STDNT
Mean	7.891402	164593.3	3.267173	1497995	122656.2
Median	7.848814	81346	3.385	946301	43817

Std. Dev.	2.312265	177793.5	0.884044	1534818	152652.8
Skewness	0.343994	1.351165	0.160021	1.265724	1.336982
Kurtosis	3.465784	3.684737	3.60047	3.315462	3.298851
Jarque-Bera	1.495612	16.83816	1.003148	14.10011	15.68535
Probability	0.473404	0.000221	0.605577	0.000867	0.000393

Table 3: Descriptive Statistics of the Panel Data

The rule of thumb to check for the peakedness of the curve is that Kurtosis should be either equal to or lesser than or greater than 3($= < > 3$). The kurtosis values for observed variables are greater than 3, meaning the curve is Leptokurtic.

Skewness values are based around zero. From the table, we understand that the variables *gdp*, *govspnd_edn* are normally skewed whilst *npubn_documents*, *citations* and *fn_stdnt* are skewed to the right. The curve exhibits long right tail.

Jarque Bera Test is a test of normality.

H_0 = Data has normal distribution

Reject $H_0 < 0.05$

The null hypothesis assumes normal distribution. Observing the probability values, we accept or reject the Null hypothesis. From the table, we infer that 3 variables do not have a normal distribution, because their probability values are less than zero (*npubn_documents*, *citations*, *fn_stdnt*) and 2 variables *gdp* and *govspnd_edn* have normal distribution.

3. *Unit Root Tests*

Cointegration tests, test for the existence of long run relationship among the variables of study. Cointegration test assumes that the data is stationary (having no unit root). Therefore the panel data has to pass the Unit root test. Data should be stationary at I_0 or I_1 , to proceed with the test.

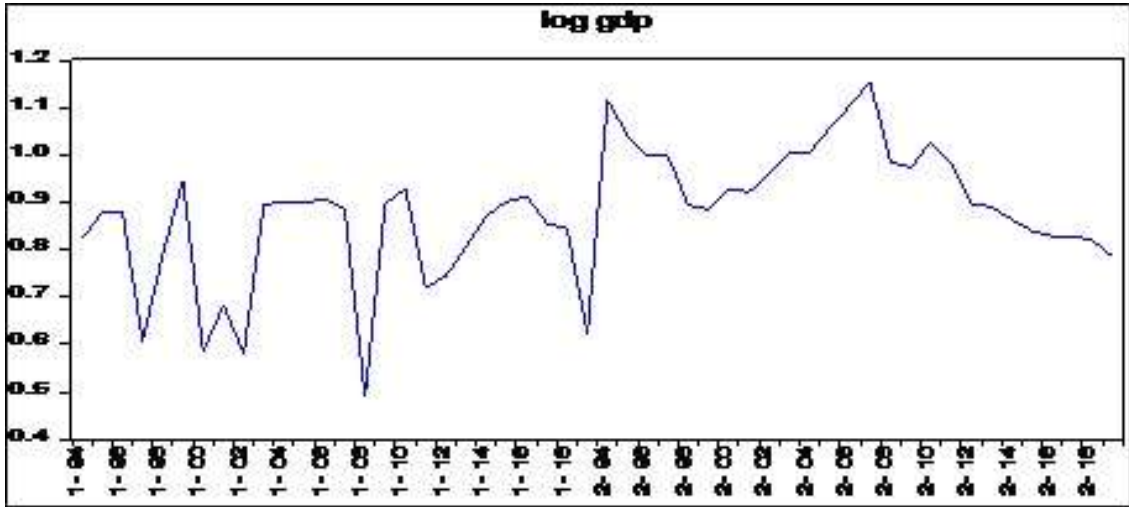


Figure 8: Stationarity of Log GDP

Variables	Type	Stationary at	Probability
Log-gdp	DV	I (0)	0.05
Log_citns	IV	I (0)	0.01
Log_Fnstdnt	IV	I (1)	0.00
Log_Npubn	IV	I (1)	0.01
Log_gspnd_edn	IV	I (1)	0.003

Table 4: Unit Root Test Results

Performing ADF-Fisher Chi-square test and the ADF-Choi Z-Stat Test, the above results have been obtained. The variables gdp and citations pass the test for Cointegration. Data has become stationary at I_0 .

H0: Series has unit root (non-stationary)

GDP series rejects null hypothesis at level.

The series of gspnd, fnstdnt and citatn reject null hypothesis and become stationary at first difference. According to the assumption laid out for Cointegration test, when variables become stationary at first difference, they become eligible for Cointegration tests. As per the empirical results, all the variables Y (gdp), gspnd, fnstdnt and citatn are integrated of order one, i.e., an **I(1) process**. Therefore the series pass the test for cointegration.

Test statistics	No deterministic trend				No Deterministic intercept or trend			
	Stat.	Prob.	Wt.St at.	Prob.	Stat.	Prob.	Weighted Statistic	Prob.

Panel Cointegration statistics (Within- dimension)

Panel v-Statistic	-0.37	0.64	-0.40	0.66	-0.04	0.51	-0.17	0.57
Panel rho-Statistic	-0.18	0.42	0.01	0.50	-0.41	0.34	-0.11	0.45
Panel pp-Statistic	-2.8*	0.00	-1.68*	0.04	-2.61*	0.00	-1.7*	0.04
Panel ADF-Statistic	-1.5*	0.05	-0.56	0.28	-1.8*	0.03	-1.13	0.12
Group Mean Panel Cointegration statistics (Between- dimension)								
Group rho-Statistic	0.62	0.73			0.31	0.62		
Group PP-Statistics	-2.9*	0.00			-2.9*	0.00		
Group ADF-Statistics	-0.55	0.28			-1.8*	0.03		

Table 5: Pedroni Panel Cointegration Tests – 2 models

Note: This table reports Pedroni (2004) residual cointegration tests. The number of lag truncations used in the computation of statistics is 1. All reported values are distributed $N(0, 1)$ under null of no cointegration.

* **Significance at 5% level.**

Conclusion and Scope for Further Study

The study intended to find the Impact of Economic growth on India and China shows interesting findings. India and China have responded well to the implementation of economic reforms, taking them to be one of the fastest growing economies of the world. China stands tall and big, compared with India. This could be due to the fact reforms were initiated 13 years prior to India. Chinese government is a socialist government. The speedy implementation of reforms and the burning desire of its policy makers to take China ahead of the world and a consistent government could be a reason. India is fastly catching up with reforms in place.

Empirical data shows there is impact and growth in India and China. The studied variables are observed to be statistically significant, showing there exists a long run relationship between economic growth and Human capital.

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