The Role of Trade, R&D and Human Capital in Growth: A Story of the Chess Piece Fallacy

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An eye-opening econometric analysis of real GDP growth from 1980 to 2020 reveals the divergent and dynamic impacts of R&D activities and human capital on the Indian and Chinese growth regimes. Similar in population quantum, GDP and growth patterns before 1980, the two countries parted ways. China grew its economy by an average of 10% annually between 1980 and 2020, reaching a tremendous valuation of 10 trillion USD. In contrast, India experienced several economic downturns and reached an economic valuation of 3 trillion USD following growth at an average rate of 6% annually after 1990. In this study, the endogenous growth model is applied to explain the discrepancy between these figures via a comparison of the tremendous advances of each country. The ARDL-bounds approach to cointegration, followed by the Toda– Yamamoto test for causality, reveals that R&D and human capital contributed greatly to propelling growth in China, while in India, GDP growth was influenced by a nonsignificant, negative coefficient of human capital and a lower contribution from R&D. India missed an opportunity for growth because of policy restrictions on the creation of high-quality human capital, which downscaled its prospects via lower labor productivity. Moreover, under Deng Xiaoping's leadership, China developed a successful policy framework nurturing human and intellectual capital.

Keywords: innovation-led growth, human capital-led growth, endogenous growth, India-China growth, Toda–Yamamoto causality test

INTRODUCTION

The comparison of economies worth 10 trillion USD and 3 trillion USD comes from a fundamental question: How did China, like India, begin with an initially downscaled output and investment but achieve accelerated growth to reach such a mammoth figure, while India failed to achieve similar outcomes, even though it fared well from 1990–2017? The authors have explained the contribution of capital, labor, and technology to economic growth. However, the in-depth analysis of the interaction of these factors reveals that the key features of Chinese growth were a strategy focusing on long-term investment and the nurturing of human capital and R&D, while India failed to create a pool of human capital because of its lack of foresight. However, its R&D activity fared better in the later stages of growth.

India and China are the oldest extant civilizations in the world, and both have achieved economic milestones in GDP growth. The kind of economic progress these countries have achieved cannot be said to be new or by chance. Even before the British entered India, these economies made major contributions to the world production system. The table below explains these regions' contributions to the global GDP. They contributed almost 50% of the world's GDP in the 16th century. Later, they were conquered by external forces (Britain in India and the Manchus in China), which hampered their progress (Maddison A, 2007).

TABLE 1
GDP IN MILLIONS OF 1990 INTERNATIONAL DOLLARS

Years	1000 AD	1500 AD	1600 AD	1700 AD
India	33750	60500	74250	90750
China	26550	61800	9600	82800
Western Europe	10165	44345	65955	83395
World Total	116790	247116	329417	371369

Source: Angus Maddison estimates

After the Second World War, a new world order was introduced, and these economies started their independent paths toward economic progress by assuming different economic characteristics. At the beginning of the 1950s, China was a command economy, while India adopted a model of Fabián socialism under the Nehru regime. The two countries had similar outcomes in terms of the quantum of GDP and growth pattern until the 1980s.

From the 1980s onward, China created seismic shifts in its policy framework by opening up the economy and making it more market-oriented. It commenced with the phaseout of collectivized agriculture, slow price liberalization, economic decentralization, increased autonomy for state enterprises, growth of the private sector, development of stock markets and a modern banking system, and opening to foreign trade and investment. China continued to pursue industrial policy, state support for key sectors, and a restrictive investment regime. From 1980 to 2002, China grew at an average of 10% per annum. Compared with China, India was 13 years late initiating the kind of market economy transition it needed. The collapse of Soviet Russia in 1991 and the impending economic recession led India to take revolutionary steps in its transition to a market economy. The new economic policy, comprising measures including industrial deregulation, the privatization of state-owned enterprises, and reduced foreign trade and investment controls, began in the early 1990s and accelerated the country's growth, which averaged nearly 7% per year from 1997 to 2017.

The central question triggering research comparing the growth regimes of India and China during the period 1980–2016 is the following: 'How did China achieve tremendous growth in GDP, culminating in an economy valued at 10 trillion USD, while India staggered and lagged, achieving a mediocre position of 3 trillion dollars?' Why is there such a vast difference? Finally, is it possible to answer these questions using human capital and R&D measures?

The rest of the paper is arranged as follows. Section 2 covers the literature review, Section 3 describes the methodology, Section 4 presents the econometric results, and Section 5 discusses the conclusions and policy suggestions.

LITERATURE REVIEW

Jones (1999) classifies endogenous growth models into three types. The first type of model includes prototypes developed based on Romer (1990), followed by Grossman & Helpman (1991) and Aghion and Howitt (1991). In these models, per capita growth is positively correlated with population size. The next type of model shares a common element of knowledge as a factor of production, added with diminishing returns and a positive population growth that warrants the economy's long-term growth; the examples of Jones (1995) and others, such as Kortrum (1997) and the follow-up by Segerstrom (1998), are salient cases of this type. Coming to the third classification, in 1998, Young, Dinapolous & Thompson, Paretto, and Howitt (1999) generated certain growth paradigms where R&D activities have two functions. While it establishes the process for the creation of new products, R&D also improves the technological characteristics of existing products. These philosophies of semiendogenous growth propose a linear association between the magnitude of research and population growth. The larger the population, the greater the number of skilled and gifted people (Simon Kuznets, 1960 and Jones, 1998). Douglas (2002) documented the transformation across four industries in China and predicted the imminent emergence of world-class Chinese brands. Zeng and Williamson (2003) examined the international growth prospects of Chinese firms (and found them to be positive). Holz et al. (2005) observed that during 1990–2000, China narrowed the relative gap with the US regarding education. In 1990, the number of U.S. citizens with a high school education was 1.65 times greater than that of China. By 2000, China had reduced this gap to 1.17 times. China's economic growth continued to increase constantly until it slowed in 2015. Whalley and Zhao (2013) found that human capital plays an important role in China's economic growth, explaining 38.1% of economic growth from 1978–2008 and an even greater percentage when the study period was reduced to just 1999–2008. Lu (2019) found that China's desire to achieve an "ecological civilization" has resulted in decoupling from production methods that emit major pollutants since 2015, while strong coupling with CO2 emitters remains an evident trend.

In brief, economic theories implicitly or explicitly discuss the twofold effect of population growth: larger populations generate human capital and invest a portion of this human capital in R&D initiatives that build intellectual capital.

The role of innovation has been widely discussed as the key feature of growth in national output among developed nations (Plosser 1992, Porter 1990; Nelson 1993). The context of growth in India has been explained differently, as the nation was late in developing an innovation-led growth strategy and obtaining desirable results. Some scholars argue that countries with slower growth have a comparative advantage in land and labor and have benefited from foreign investment and technology (Naughton 2007). Jones (1995) argues that foreign technology benefits newly industrialized countries in striving toward economic growth, provided they have accumulated human capital. According to this observation, the benefit of foreign technology spillover is highly apparent. In addition, newly industrialized countries have high rates of savings and investments, which help them utilize the technology from leading nations (Collins & Bosworth 1996 and Krugman 1994). Examples of economies that have used this development approach include South Korea, Taiwan, Singapore and Hong Kong. Other scholars, along with documenting the influence of technological progress on economic growth, stress how transitions in national innovation and policy strategy led to the creation of indigenous R&D initiatives in India and China (Katrak 2002, Fan and Watanabe). Assimilation theory supports similar arguments explaining productivity growth as an outcome of learning, innovation and entrepreneurship, which help newly industrialized nations grow (Dahlman 2007 and Kim 1998).

The literature favors arguments for human capital-led and innovation-led growth regimes, which are defensible in the context of China's development. However, the existing research is missing a long-run endogenous- growth spectrum analysis comparing the pros and cons of growth regimes using human capital and R&D in India and China.

METHODOLOGY

The growth regimes of China and India are explored using the endogenous growth model, in which human capital and intellectual capital are the major factors determining technical progress. These factors are invisible in the normal production function, which assumes constant returns to scale with diminishing returns for each factor. These characteristics are supposed to halt reinvestment by bringing the economy to a standstill when per capita output growth is zero (Solow,1956). However, the experiences of developed countries demonstrate that positive per capita income growth prevails in the long run. Solow suggests this could be due to exogenous contributions from technological progress. Breaking away from the model assumptions of perfect competition, the endogenous growth models include the invisible factors of human capital, intellectual capital and production function with increasing/constant/diminishing returns. Lucas (1988), Romer (1990), Grossman & Helpman (1991), Aghion and Howitt (1991), Kortrum (1997), Segerstrom (1998), Simon Kuznets (1960), and Jones (1998) are major proponents of this notion.

We have modeled the following relationship, inspired by previous theoretical and empirical studies.

$$\mathrm{L}GDP = f(LGRS, LEX, LRP) \qquad (1)$$

where LGDP is the real GDP in constant 2010 USD and LGRS is the gross enrollment ratio (GER) of the population at the secondary level and is used as a measure of human capital. R&D stands for intellectual capital and is measured using residential patents. The data are sourced from the World Bank. The period of study is from 1980–2020. Missing data for the gross enrollment ratio and the number of residential patents are filled using the extrapolation and interpolation data-filling techniques.

The autoregressive distributed lag (ARDL) model is employed because it outperforms traditional cointegration tests. This method can be used irrespective of the order of integration of the variables. In addition, it estimates both short-term and long-term results at the same time. The general form of the ARDL model for the long term is expressed as:

$$LGDP_t = a + \sum_{i=1}^{n_1} y\ LGDP_{t-i} + \sum_{i=0}^{n_2} \beta_1\ LEX_{t-i} + \sum_{i=0}^{n_3} \beta_2\ LGRS_{t-i} + \sum_{i=0}^{n_4} \beta_3\ LRP_{t-i} + \varepsilon_t \qquad (2)$$

The short-term form is:

$$\Delta LGDPA = \alpha + \sum^{n1} \gamma\ \Delta LGDP + \sum^{n2} \beta\ \Delta\ LEX + \sum^{n3} \beta\ \Delta\ LGRS$$

$$t \qquad i=1 \qquad t-i \qquad i=0 \qquad 1 \qquad t-i \qquad i=0 \quad 2$$

$$\sum_{i=0}^{n4} \beta_3 \Delta\ LRP_{t-} + \delta EC$$

where LGDP, LEX, LGRS, and LNP are focus variables and ε_t is a white-noise term. The bounds testing mechanism involves the F test procedure with the required stock of lags based on the torch bearing effect of the Akaike information criterion (AIC) to determine the presence of cointegration (Pesaran et al., 2001). The methodology displays lower and upper bound restrictions inclusive of all the likely class orders of the variables. When the F-statistic crosses the upper bound, the null hypothesis of no cointegration is rejected, while we fail to reject the null hypothesis if the F-statistic falls below the lower critical value. Inconclusiveness becomes a problem if the sets of critical values sandwich the values. Translating equation (1) into an error correction model (ECM) specification elicits the short-term status quo. δ is the coefficient of the ECM that determines the pace of adjustment from short-run disequilibrium to long-run equilibrium, provided that the coefficient is negative and statistically significant (Shahbaz et al., 2013).

The diagnostic check ensures that the estimation is empirically sound by inquiring whether it preserves the critical ARDL assumptions, such as the serial independence of error terms, the normal distribution of error terms and the absence of heteroscedasticity. The corresponding tests in this regard are the Breusch–Godfrey serial correlation LM, Jarque–Bera test, and ARCH test.

A CUSUM chart coupled with the CUSUM of squares (Pesaran and Pesaren, 1997) is adopted to identify the tendency of parameter instability.

To elucidate the nuances of causality, the modified Wald test (MWALD) was proposed by Toda and Yamamoto (1995). The test avoids the moral hazard associated with conventional Granger causality, which cannot handle nonstationary variables and thus cannot reveal any cointegrating relationship (Rufael, 2005).

The required use of a standard VAR model thus minimizes the likelihood of commission error in determining the order of integration (Mavrotas & Kelly, 2001).

RESULTS OF THE ECONOMETRIC EXERCISE

The dynamic relationship between GDP and its determining factors, such as human and intellectual capital and the exchange rate, is analyzed in an endogenous growth model using integrating regression to obtain a new view of the relationship among the variables over both the long and short terms.

Descriptive Statistics

The similarities observed in the descriptive statistics in Table A1 in the appendix enable us to frame a comparative analysis of India and China. Each country's mean and median values are similar and distributed closely to each other. Jarque–Bera statistics indicate that the data points for the variables are normally distributed.

Correlation Matrix

The correlation matrix in Table A2 in the appendix suggests that there is no perfect correlation among the independent variables, such that there is no problem of multicollinearity. In addition, the correlation matrix reveals co-movement among the regressors and the regress and, which is a prerequisite for regression analysis.

Unit Root Test

The unit root test results of the augmented Dickey–Fuller test (ADF, 1979) and Phillips Perron test (PP, 1990) indicate that, apart from the exchange rate in the case of China, all other variables are *I(1),* which leads us to use the ARDL-bounds approach to cointegration.

TABLE 2
UNIT ROOT TEST RESULTS

		ADF		PP	
Country	Variables	Level	1st Diff	Level	1st Diff
China	LGDP	-1.18	-4.10***	-0.83	-3.37***
	LEX	-3.87***	-	-3.87***	-
	LGRS	-2.25	-2.99**	1.04	-4.15***
	LRP	0.01	-4.88***	-0.12	-4.90***
India	LGDP	2.13	-5.38***	9.79	-5.38***
	LEX	-2.53	-4.16***	-2.15	-4.23***
	LGRS	-0.54	-4.57***	-0.58	-4.57***
	LRP	1.97	-5.00***	1.71	-5.00***

Notes: *, ** and *** indicate significance at the 1%, 5% and 10% levels, respectively.

Bound Test Results

The bound test results for the data of China and India have F statistics above the upper bound at a significance level of 1% and 5%, respectively. This indicates that these countries satisfy the preliminary conditions for a cointegrating relationship between real GDP and its determining factors.

TABLE 3
BOUNDS TEST RESULTS

China	K	India	K
6.12^{***}	3	5.10^{**}	3

Note: *, ** and *** denotes the rejection of the null hypothesis at the 10%, 5% and 1%levels, respectively.

Short-run Elasticity Coefficients

In the case of China, the one-year lagged impact of GDP influences its current value. The exchange rate has a positive significant relationship with GDP. Residential patent applications have a significant positive impact with a one-year lag, while the immediate and two-year lagged impacts are significant. The error correction coefficient is negative and statistically significant at the 1% level, and the speed of adjustment from short-term disequilibrium to long-term equilibrium is 116%. In the case of India, the one-year lagged impact of GDP is as significant as the one-year lagged impact in China. The influence of the exchange rate is nonsignificant, and the lagged impact is negative, indicating that India has suffered from a worsening exchange rate. This finding might be credited to the depreciating exchange rate, which cannot bring in export revenue, leading India to struggle in the market for industrialized products and remain a below-average performer in export creation. The gross enrollment ratio is negative in its lagged and nonlagged forms, implying that human capital with secondary education does not add to national income. R&D activities positively impact GDP even though the coefficient is small. R&D activities do not have a strong immediate impact and might benefit GDP only in the future.

TABLE 4
SHORT-RUN ELASTICITY

Country	Variable	Coefficient	Std. Error	t-Statistic	Prob.
China	D(LGDP(-1))	0.58^{***}	0.16	3.65	0
	D(LGDP(-2))	0.21	0.22	1.21	0.24
	D(LGDP (-3))	0.04	0.18	0.24	0.82
	D(LEX)	0.09^{***}	0.03	2.82	0.01
	D(LGRS)	0.06	0.09	0.66	0.51
	D(LCRP)	-0.09^{***}	0.03	-3.2	0
	D(LCRP(-1))	0.05^{*}	0.03	1.74	0.1
	D(LRP(-2))	-0.22^{***}	0.03	-8.21	0
	CointEq(-1)	-1.16^{***}	0.06	-18.36	0
	R-squared	0.83	-	-	-
	Adjusted R-squared	0.73	-	-	-
	F statistic	9.02	-	-	-
	Prob (F statistic)	0	-	-	-
	Akaike info criterion	-5.59	-	-	-
	Schwarz criterion	-5.05	-	-	-
	Hannan–Quinn criter.	-5.41	-	-	-
	Durbin–Watson stat	2.31	-	-	-

Country	Variable	Coefficient	Std. Error	t-Statistic	Prob.
India	D(LGDP(-1))	0.54**	0.21	2.62	0.02
	D(LGDP(-2))	0.22	0.18	1.22	0.24
	D(LEX)	-0.04	0.04	-0.96	0.35
	D(LEX(-1))	0.12*	0.06	2.02	0.06
	D(LEX(-2))	-0.06	0.06	-0.97	0.34
	D(LEX(-3))	0.09**	0.04	2.09	0.05
	D(LGRS)	-0.26**	0.1	-2.49	0.02
	D(LGRS(-1))	-0.22**	0.1	-2.29	0.03
	D(LRP)	0.02	0.04	0.53	0.61
	D(@TREND())	0.06***	0.02	3.76	0
	CointEq(-1)	-1.12***	0.27	-4.16	0
	R-squared	0.79	-	-	-
	Adjusted R-squared	0.63	-	-	-
	F statistic	4.84	-	-	-
	Prob (F statistic)	0	-	-	-
	Akaike info criterion	-5.8	-	-	-
	Schwarz criterion	-5.12	-	-	-
	Hannan–Quinn criter.	-5.57	-	-	-
	Durbin–Watson stat	2.22	-	-	-

Note: *, ** and *** denote the rejection of the null hypothesis at the 10%, 5% and 1% levels, respectively.

Long-Run Elasticity Coefficients

The long-run coefficients for China indicate that all the variables, including the exchange rate, human capital and R&D, positively impact GDP. The impact of human capital is much greater than the impact of the other two factors, revealing that China benefited greatly in its output growth by leveraging its human capital. Innovation is also revealed to be a significant factor, which is expected in the context of China as a global technology giant. The technological expansion led by indigenous innovation increased economic productivity. China could reap positive outcomes from its exchange rate regime. This finding is noteworthy because China could benefit from a depreciating exchange rate by exporting manufacturing products to large markets, such as India.

India’s long-term situation is not as simple as China's. The exchange rate regime has negatively influenced GDP. This might be because a lack of specialization and competitiveness in industrial products handicapped Indian exports. India could not benefit from exchange rate depreciation because it lacked both competitiveness and a market for products that would bring foreign exchange (Lakshmanan, 2006). The effect of human capital, as measured by the gross enrollment ratio, is nonsignificant, and the coefficient is negative. India did not enjoy a comparative advantage in labor given the low quality of the labor pool due to the low-quality education system and the lack of diversification and development of vocational education. The government funding for education as a percentage of GDP was remarkably low.

Moreover, the unorganized characteristics of Indian economic activity prevents the fruitful use of labor-intensive techniques as a development strategy (Panagariya, 2006). As measured by patents and copyrights, the innovation variable positively impacts GDP, but the coefficient is notably small.

The combined effect of human capital and intellectual capital in China was a seismic shift in its growth pattern, while India struggled to develop a thriving pool of human capital. China enjoyed the benefit of an R&D-led and human capital-led growth regime, while Indian secondary education could not achieve learning by doing and learning effects, as India failed to liberalize its market structure and reinvent its secondary education (panagaria2009) system. Moreover, both government and private agents failed to generate a viable R&D environment modeled on imitation, while China successfully achieved this transition.

TABLE 5
LONG-RUN ELASTICITY

	Variable	Coefficient	Std. Error	T statistic	Prob.
China	LCEX	0.28^{***}	0.04	6.58	0.00
	LCGRS	0.98^{***}	0.18	5.41	0.00
	LCRP	0.22^{***}	0.03	6.40	0.00
	C	21.35^{***}	0.38	56.37	0.00
India	LIEX	-0.09^{***}	0.02	-4.37	0.00
	LIGRS	-0.08	0.07	-1.27	0.22
	LIRP	0.08^{***}	0.03	2.87	0.01
	C	0.06	6.36	0.01	0.99
	@TREND	0.06	0.00	15.56	0.00

Note: *, ** and *** denote the rejection of the null hypothesis at the 10%, 5% and 1% levels, respectively

Diagnostic Test

Diagnostic tests were performed to check for serial correlation, nonnormal error-term distribution, and heteroscedasticity. The LM, Jarque–Bera and ARCH tests are used to address these issues, with null hypotheses of no serial correlation, no nonnormality in the distribution of error terms and no heteroscedasticity, respectively. We failed to reject the null hypothesis in any of the tests conducted.

TABLE 6
DIAGNOSTIC CHECK

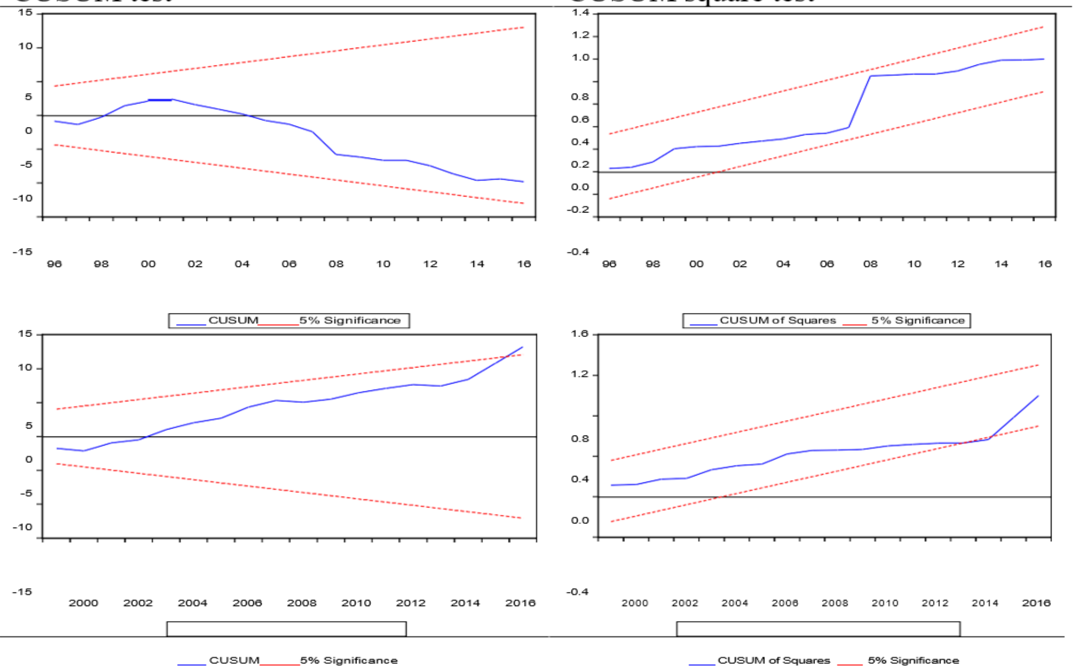
Country	Ramsey RESET test	LM test	Jarque–Bera test	ARCH test
China	0.10(0.91)	1.68(0.21)	0.06(0.96)	0.18(0.66)
India	3.45(0.00)	0.86(0.43)	0.17(0.91)	0.75(0.39)

Stability Check

The stability test results indicate that the plots of CUSUM and CUSUMSQ are well within the bandwidth, as shown by the movement of the plotted blue line between the red lines. This implies that the models are stable and free from autoregressive structures.

FIGURE 1
STABILITY TEST RESULT

Country	CUSUM test	CUSUM square test
China		
India		



Significant at the 5% level.

Toda–Yamamoto Causality Test

The Toda–Yamamoto causality test portrays unidirectional causality escalating from human capital, R&D and the exchange rate, providing evidence of human capital and intellectual capital growth regimes in China from 1980–2016. This finding aligns with China's experience of rapid growth. In the case of India, as the regression estimation suggests, only R&D has a causal influence on real GDP growth according to the causality test described by Toda–Yamamoto (1995). The absence of human capital proliferation hampered the benefits of endogenous innovation.

TABLE 7
TODA–YAMAMOTO GRANGER-CAUSALITY TEST RESULT

China	Dependent variable: LCGDP			
	Excluded	Chi-sq	df	Prob.
	LCEX	29.25	6	0
	LCGRS	18.8	6	0
	LCRP	13.22	6	0.04
	Dependent variable: LCEX			
	Excluded	Chi-sq	df	Prob.
	LCGDP	13.16	6	0.04
	LCGRS	7.67	6	0.26
	LCRP	5.37	6	0.5
	Dependent variable: LCGRS			
	Excluded	Chi-sq	df	Prob.

	LCGDP	6.63	6	0.36
	LCEX	8.32	6	0.22
	LCRP	6.65	6	0.35
India	Dependent variable: LIGDP			
	Excluded	Chi-sq	df	Prob.
	LIEX	2.53	2	0.28
	LIGRS	2.11	2	0.35
	LIRP	5.81	2	0.05
	Dependent variable: LIEX			
	Excluded	Chi-sq	df	Prob.
	LIGDP	3.32	2	0.19
	LIGRS	1.52	2	0.47
	LIRP	2.83	2	0.24
	Dependent variable: LIGRS			
	Excluded	Chi-sq	df	Prob.
	LIGDP	8.81	2	0.01
	LIEX	6.31	2	0.04
	LIRP	1	2	0.61
	Dependent variable: LIRP			
	Excluded	Chi-sq	df	Prob.
	LIGDP	2.81	2	0.25
	LIEX	3.2	2	0.2
	LIGRS	2.63	2	0.27

CONCLUSION & POLICY SUGGESTIONS

In summary, China has highly significant coefficients on R&D and human capital affecting economic growth, while India has a negative nonsignificant coefficient on human capital for explaining GDP. Even though a positive significant R&D coefficient exists, the coefficient for China's results has much greater statistical significance and magnitude. The results of the Toda–Yamamoto causality test demonstrate that India had an R&D-led growth regime from 1980 to 2016, while China enjoyed the double benefits of both R&D-led and human capital-led growth regimes during the same period. This situation largely helped China transform into an economy worth 10 trillion USD, while India achieved medium-level growth with an economy worth 3 trillion USD.

The combined effect of human and intellectual capital in China helped create a seismic shift in its growth pattern. In contrast, India failed to develop a thriving pool of human capital. The situation in India must be attributed to the lack of foresight in policy directions and the low quality of education. China focused on skill augmentation and diversification of the educational structure, with a special emphasis on vocational education to create a large pool of human capital, while India failed to invest in its social sector. Moreover, China's focus on R&D-enhanced technological progress led to the accumulation of intellectual capital. India could also perform well based on its R&D, as these initiatives contributed to India's economic growth. However, China's growth outpaced India's growth because it benefited from both human and intellectual capital. China has an R&D-led, endogenous growth model, while India has yet to transition from the Lucas model. Indian socialism hurt open market opportunities. Indian secondary education and R&D were inefficient and too fragile to catalyze income growth, while in China, efforts in both education and innovation led to a seismic shift in income growth.

China failed to understand the benefit of demographic dividends, though it successfully created a pool of human talent. China has an aging population, which will have a vast impact on the labor force's productivity. Population aging is a substantial challenge for China. However, India can advance unrelentingly, provided that it fruitfully uses the benefits of its demographic dividend. It is high time that India invested in its people through quality schooling, vocational education, skill development, and health provisions. An effort in this regard will produce a seismic shift in India's GDP.

The recent retreat of the Chinese government from market socialism has attracted the attention of economic experts and policymakers in the global arena. Chinese Premier Xi Jinping's consolidation of the political economy stifled private investment. Alibaba's founder, Jack Ma, was a victim of this authoritarian political retreat from the liberal milieu of market socialism. Ma's criticism of Chinese regulators, whom he accused of stifling the private animal spirits of economic activity, led to a massive crackdown on industrial activity by the Chinese government, and his words led to the loss of half of Ma's net worth. The ramification of this change is that the Chinese economy witnessed massive capital flight. The Chinese economy met with unprecedented stock market and housing market crashes. Hence, this paper notes that the Chinese economy has recently shifted toward the old Mao-Zedong model of Communist authoritarianism. At the same time, India hurries ever farther from Nehruvian socialism to a liberal market economy.

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APPENDIX

TABLE A1
SUMMARY STATISTICS

Country	Statistics	LGDP	LEX	LGRS	LRP
China	Mean	28.26	1.69	4.02	10.22
	Median	28.28	1.87	4.07	9.53
	Maximum	29.88	2.15	4.78	14.00
	Minimum	26.56	0.40	3.40	6.56
	Std. Dev.	1.03	0.52	0.40	2.06
	Skewness	-0.03	-1.18	0.18	0.33
	Kurtosis	1.79	3.17	1.95	1.97
	Jarque–Bera	2.26	8.58	1.88	2.30
	Probability	0.32	0.01	0.39	0.32
	Sum	1045.59	62.42	148.72	378.26
	Sum Sq. Dev.	37.92	9.62	5.79	152.87
	Observations	37	37	37	37
India	Mean	27.41	3.37	3.85	7.87
	Median	27.37	3.72	3.82	7.70
	Maximum	28.54	4.21	4.32	9.49
	Minimum	26.41	2.06	3.37	6.89
	Std. Dev.	0.64	0.65	0.26	0.90
	Skewness	0.14	-0.69	0.18	0.50
	Kurtosis	1.81	2.03	2.16	1.74
	Jarque–Bera	2.31	4.39	1.29	4.00
	Probability	0.32	0.11	0.53	0.14
	Sum	1014.19	124.84	142.55	291.37
	Sum Sq. Dev.	14.63	15.31	2.48	29.46
	Observations	37	37	37	37

TABLE A2
CORRELATION ANALYSIS

China	Correlation	LCGDP	LCEX	LCGRS	LCRP
	LCGDP	1			
	LCEX	0.73	1		
	LCGRS	0.96	0.63	1	
	LCRP	0.98	0.62	0.94	1
India	Correlation	LCGDP	LCEX	LCGRS	LCRP
	LIGDP	1			
	LIEX	0.92	1		
	LIGRS	0.98	0.89	1	
	LIRP	0.97	0.81	0.94	1