

Submission For  
**CRISIL YOUNG THOUGHT LEADER 2007**

**What are the similarities and differences between the  
Brazilian and Indian economies? What conclusions can  
you draw on the equity investment side?**

(Topic No: 9, Post Graduate Category)

**Dissertation**

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**Word Count (Excluding references, footnotes, appendices, table of contents) – 2478**

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## EXECUTIVE SUMMARY

This paper evaluates the Indian and Brazilian economies to determine which of the two countries is more attractive for equity investment. The paper gives a holistic picture by covering the following dimensions.

1. Reforms and structural changes in both the economies in the recent past have been the most significant contributors for propelling them into the investment radar of an international investor. Thus, evaluating these changes forms the first dimension of our study.
2. We use the basic economic indicators like savings rate, demographics, trade-deficit, etc as the second dimension of our study to project the long term growth potential of the economy. The comparison of economies along these indicators helps us to predict whether the growth momentum is sustainable beyond the initial triggers that launched the countries into a phase of high growth.
3. One of the main motives of an international investor while investing in emerging markets is to achieve diversification. But the benefits of international diversification are limited when the equity markets are cointegrated. So, we investigate the co-movement of the Indian and Brazilian equity markets with those of US, UK using advanced financial time series analysis techniques, namely the *Johansen Cointegration Model* and *Granger Causality Test*.
4. Another salient feature of this paper is the study of factors whose impact may not have been visible from the current trends, but some of these may become big roadblocks while some may boost the economy. They may not have occurred in the past like macroeconomic stability in Brazil, and secondly, their impact may not have been significant till now, but may increase in the future. An example is the slow growth of agricultural sector in India. We evaluate these factors along with the probability that they will have an impact, as well as the nature of impact.

The second and third dimensions are quantitative in nature and the numbers are clearly stacked in favor of India, while the first and fourth dimensions are abstract, and India seems to be better even along those. So, India seems to be a better investment destination.

# INTRODUCTION

India and Brazil are considered as two of the most attractive emerging markets today. Their inclusion in the research paper published by Goldman Sachs<sup>1</sup> which asserts that they could be a much larger force in the world economy and other such research reports may lead an international investor to fall under the trap of generalization. Because of the structural differences inherent to the two economies, a comparative study becomes important.

## 1. OVERVIEW OF THE ECONOMIES

### INDIA

India's growth began to catch-up after the reforms process took off in 1991. In the last 3-4 years, India has been one of the fastest growing major economies growing at a CAGR of about 7-8%. Some of the key aspects of the Indian economy are as follows –

#### 1. Turnaround in Manufacturing Sector

The argument that the Indian growth story (which is service-led) is a sharp deviation from the manufacturing-led growth seen historically across the globe is coming to an end with turnaround in the manufacturing sector which registered an average annual growth of about 8% after 2003. Rapid expansion of businesses supported by government policies leading to greater productivity on supply side and high consumption appetite due to greater purchasing power on demand side are mainly responsible for growth in this sector.

#### 2. More efficient and productive private sector

With gradual liberalization of the economy, deregulation and de-licensing of industry and allowing of FDI in India, the private-sector began facing a very competitive and dynamic business environment. Many private-sector enterprises restructured their business to make it more efficient and productive. This led to the emergence of a new and vibrant corporate sector.

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<sup>1</sup> Global Economics Paper No: 99 – Dreaming with BRICs: The Path to 2050

### **3. Very high growth rates in service sector**

The service sector has been growing at an average rate of 10% since 2004 and contributes to more than 60% of GDP compared to about 35% in the early 1960s. The financial, IT, construction, transport, hotels and other services have been mainly responsible for this growth evidenced through increases in financial deepening (leading to greater availability of capital), IT spending, rapid cell phone penetration, etc.

### **KEY INFERENCE**

*The current growth rates in the manufacturing and service sectors are expected to continue with favorable government policies (e.g. setting up of SEZs and huge spending on infrastructure and technology), availability of skilled man-power and increasing number of people with high appetite for consumption of services. A closer look at the GDS (Gross Domestic Savings) numbers reinforces our confidence. **GDS as a percentage of GDP is more than 30% in India which provides the capital for investment (much needed for a growing economy) and it has been increasing since the last 3 decades.***

## **BRAZIL**

Over the last decade, the real GDP growth in Brazil averaged 2.9% compared to an average of 5.3% since 1950. Following are the highlights of the Brazil economy –

### **1. Impact of Debt Crisis in the early 1980s**

This debt crisis was an inflection point in Brazil's economic development which led to a "lost decade" with expenditure and investment squeezed to service the debt resulting in stagnation of income per capita growth. Though the 1990s witnessed increasing recognition of the importance of macroeconomic stability and need to support private sector development, the progress has always been slower.

### **2. Plano Real – The Stabilization Plan**

Imminent hyperinflation and a virtually bankrupt public sector forced the new Government to introduce a new stabilization plan called Plano Real in 1994. The

plan included a massive privatization program, trade liberalization and encouragement to FDI. The targets of breaking inflationary expectations and achieving interest rate stability were achieved to a great extent.

### **3. Commodity-Intensive Economy**

Brazil is best placed among developing countries when it comes to natural resources and production of commodities. A huge and rising share of commodity exports, on the contrary, especially to China and US, has made the economy more vulnerable to global cyclical slowdown. However, currently Brazil is well-positioned in terms of trade balance and foreign exchange reserves.

The modern economic history of Brazil can be classified into three distinct periods –

- a) Economic Miracle** (1970-1980) – Growth – 8.8%, High external debt
- b) Lost Decade** (1980-1994) – Hyper Inflation, Recession, Growth – 1.6%, Political Transition
- c) Stabilization** (1994-2006) – Growth – 2.6%, Privatization, Stable Inflation and Interest Rates, Fiscal Prudence (exhibit 1)

### **KEY INFERENCE**

Currently, Brazil is at the threshold of high and consistent growth on the back of stable monetary policy and expansionary fiscal policies.

*Looking forward, the biggest challenge is to stimulate the economy and achieve growth rates comparable to emerging economies while ensuring stability. Solid performance of some of the key economic indicators in the recent past combined with the fact that a large number of multinational companies perceive Brazil as one of the most profitable markets leads us to the expectations that Brazil might soon achieve “Investment grade” rating.*

## 2. COMPARISON OF THE TWO ECONOMIES

1. **According to the projections made by the Goldman Sachs BRIC Report<sup>2</sup>,**
  - a. Projected Growth Rate – The Real GDP growth for India is expected to average 6% for the next 10 years compared to 4% for Brazil (exhibit 2).
  - b. Demographics – The working age population as a percentage of total population will remain between 60-65% for both India and Brazil in the next 3 decades (exhibit 3).
  - c. Investment Rate – Investment as a percentage of GDP is expected to be 19% for Brazil which is lower than 22% for India in the medium term.
2. **Internal Demand and Consumption and Reliance on Exports** – India is well-positioned to withstand the global cyclical changes compared to Brazil, mainly because of strong internal demand and less reliance on exports whereas for Brazil, the private consumption as a percentage of GDP has been declining and external dependency has been rising significantly. The private consumption in India constituted 61% of GDP and is rising whereas exports constituted 12.9% of GDP in 2005. In Brazil, private consumption declined at a rate of 0.5% over 2001-2005 and exports constituted 14.9% of GDP in 2005 (more than double from 6.2% in 1996).
3. **Current Account Surplus/Deficit and Government Debt** – India exhibits current account deficit which is difficult to sustain in the long-run whereas Brazil exhibits current account surplus. However, Brazil is relatively more burdened by Government debt and debt service compared to India. The gross public debt levels are as high as 75% of GDP (exhibit 4).
4. **Investment Rating** – According to Standard and Poor's sovereign investment ratings, India has been rated BB+ whereas Brazil has been rated BB-.

The *Global Competitiveness Report (2006-2007)* published by the World Economic Forum identifies several parameters to rank the countries. (Details of these rankings for India and Brazil along with a summary are provided in the Appendix C.) ***Except “Health and Primary Education”, India fares much better than Brazil in all other pillars.***

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<sup>2</sup> Global Economics Paper No: 99 – Dreaming with BRICs: The Path to 2050

### 3. RELATIONSHIP BETWEEN THE MARKETS

In this section, we quantitatively analyze and check whether investing into Indian or Brazilian equity market really offers the portfolio diversification opportunity an investor from a developed country is looking for.

#### Data and Methodology

The data consists of weekly stock index values of major stock exchanges of India (Sensex), Brazil (Bovespa), US (Dow Jones) and UK (FTSE 100). In order to understand the change in the structure of relationships, we divide the last ten year period based on the following events.

#### Events related to India

*Abolition of 'badla' system and adoption of the rolling settlement mechanism in 2001, Derivatives trading on securities allowed in 2002, Sharp rise in FII investments and continuous rupee appreciation after 2002*

#### Events related to Brazil

*An impressive start by the newly elected President Luiz Inácio Lula da Silva resulting in aversion of a major financial crisis and leading to significant growth in stock market and foreign capital in 2003*

	<b>INDIA</b>	<b>BRAZIL</b>
<b>Sub-Period 1</b>	1998-2001	1998-2002
<b>Sub-Period 2</b>	2002-2007	2003-2007

#### **3.1 Long-term co-movement (cointegration)**

We first verify the stationarity condition using the *Augmented Dickey-Fuller* (ADF) test and then, proceed to the cointegration check using the *Johansen Cointegration* method.<sup>3</sup>

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<sup>3</sup> The choice of ADF, Johansen test and Granger causality is made after a careful study of the widely-used tests and the literature available on cointegration which led to the conclusion that these tests are reasonably accurate for practical purposes. The complete model for the tests is outside the scope of the paper

### **3.2 Short-term causal relationship**

Next, we determine the influence that one market exerts over the other using the *Granger Causality* test.

Detailed results are shown in Appendix B.

### **Interpretation of Results and Implications**

The ADF test result shows that all stock market series are stationary after differencing once and hence, cointegration test can be performed. Johansen Cointegration test, (Trace Test Statistic<sup>4</sup>) surprisingly, shows long-term co-movement of India with US and UK market only in the first sub-period and no co-movement in the second. Brazil shows long term co-movement with US stock market in the second sub-period (i.e. after a substantial increase in foreign investment). Hence, from a long-term investment perspective, a US investor may prefer India over Brazil for portfolio diversification. A UK investor can be indifferent between the two markets. Granger Causality test implies that both the Indian and the Brazilian market are significantly influenced by short-term changes in US and UK market. However, **from the quantitative analysis above, we can conclude that India is a relatively more preferable market than Brazil from the point of view of portfolio diversification for an international investor from a developed country like US.**

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<sup>4</sup> It gives similar results as the MaxEigenValue test which can also be used for interpretation in Johansen Model

## 4. FUTURE POTENTIAL – WHAT TO LOOK FOR?

This section tries to explore the factors that can have significant influence on the future growth of the two economies. The probability of the factor playing a significant role (high or low) and influence of the factor on the economy (positive or negative) are mentioned in brackets along side each factor.

### INDIA

1. **Savings Rate** (*Probability: High / Influence: Positive*)

According to the projections made by the Goldman Sachs Economic Research Group, the savings rate will cross 40% by 2020 which is enough to sustain growth.

2. **Regulations** (*Probability: Low / Influence: Negative*)

India will not be perceived to have a conducive business environment unless there is a cutting down on the number of clearances to start a business and regulations and contracts are enforced.

3. **Agricultural sector** (*Probability: Low / Influence: Negative*)

It is the only major sector (contributing to about 20% of GDP) that is growing at abysmal rates (of about 3-4% since 2003). However, the situation might improve if the \$150 billion project linking all major rivers of India is revived. The time the project will take to complete is, however, indefinite.

4. **Infrastructure** (*Probability: High / Influence: Negative*)

Despite the priority and budgetary allocation earmarked to infrastructure improvement, not much progress has been made to actually improve the overall infrastructure.

*Overall, faster growth looks improbable but sustaining the current momentum of about 7-8% seems feasible.*

## BRAZIL

1. **Macroeconomic Stability** (*Probability: High / Influence: Positive*)

Macroeconomic stability has long been a scarce resource in Brazil which has gone through a number of boom and bust cycles. Inflation and interest rates have been well controlled in recent years and have lent stability to the economy which will prove beneficial for sustained growth.

2. **Savings Rate and Investment Ratio** (*Probability: High / Influence: Negative*)

In order to achieve and sustain 4% average growth, the economy needs higher than current savings rate and investment ratio should cross 25% of GDP. Given the politically sensitive state of reforms, it would be too optimistic to expect a sharp rise in savings rate and investment ratios.

3. **Public Debt and Social Security Deficit** (*Probability: High / Influence: Negative*)

High Government expenditure and higher benefits for the old have led to very high public debt and social security deficit. Due to lack of political consensus in implementation of reforms, chances of improvement in near future are less.

4. **External Dependence** (*Probability: Low / Influence: Negative*)

One of the major reasons for Brazil's growth has been huge amount of FDI. Brazil's dependence on foreign investment and exports continues to increase which makes it heavily dependent on other economies. Though the Government plans to implement expansionary fiscal policies to stimulate private investment, external dependency may continue to rise till its impact is seen.

*Overall, expecting a modest growth of 4% is only feasible subject to the combination of a host of positive factors.*

## **CONCLUSION**

A comparative study shows that both India and Brazil have strong macroeconomic fundamentals and both have the potential to attract huge amount of foreign capital. However, the relative competitive advantages and risks associated with global economic imbalances are more different than similar. Though both the economies are likely to maintain these advantages, the challenge lies in removing obstacles to growth. India has quite aggressively pursues reforms and growth policies in the recent past compared to Brazil. Moreover, India looks more competitive than Brazil in most of the basic economic indicators and nine among ten pillars of competitiveness defined by the WEF. Finally, investing into Indian equity market is expected to not only generate higher returns but also offer the benefits of portfolio diversification. To conclude, India is a more attractive investment destination for an international investor.

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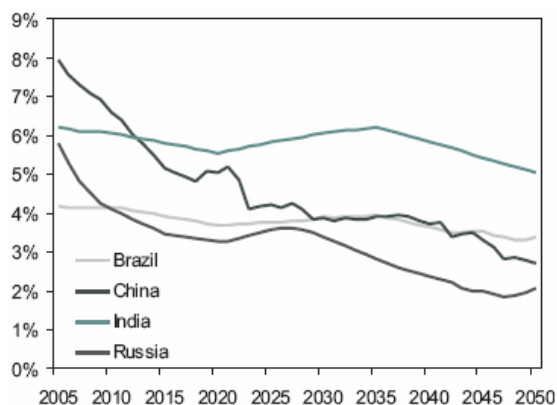
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## APPENDIX A

### 1. Structural Changes and their impact on Brazilian Economy

TIME	CHANGE/MEASURE	IMPACT
1994	A new stabilization plan named the <i>Plano Real</i>	<i>Positive: High economic growth, low inflation, stable interest rate</i> <i>Negative: Overvaluation of the “real”</i>
1998	Moderate Currency Devaluation followed by adoption of floating exchange rate	<i>Positive: Currency reform which was long overdue</i> <i>Negative: Bankruptcy, Unemployment, Poverty, Inequality, Very high interest rates, economic growth suffered</i>
1999	Austerity Policies and Measures	<i>Positive: Re-establishment of “real’s” competitiveness, curbed inflation, exports growth momentum catching up</i> <i>Negative: No improvement in perception of common man who saw inequality and unemployment (or low wages) (sense of “reform fatigue”)</i>

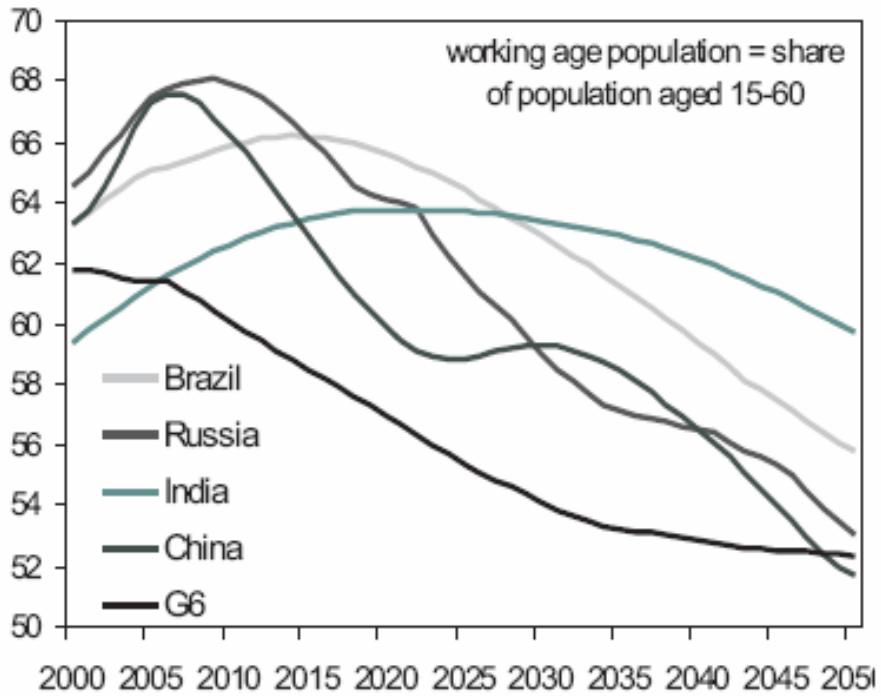
### 2. Goldman Sachs BRIC model projections



BRICs Real GDP Growth: 5-Year Period Averages				
%	Brazil	China	India	Russia
2000-2005	2.7	8.0	5.3	5.9
2005-2010	4.2	7.2	6.1	4.8
2010-2015	4.1	5.9	5.9	3.8
2015-2020	3.8	5.0	5.7	3.4
2020-2025	3.7	4.6	5.7	3.4
2025-2030	3.8	4.1	5.9	3.5
2030-2035	3.9	3.9	6.1	3.1
2035-2040	3.8	3.9	6.0	2.6
2040-2045	3.6	3.5	5.6	2.2
2045-2050	3.4	2.9	5.2	1.9

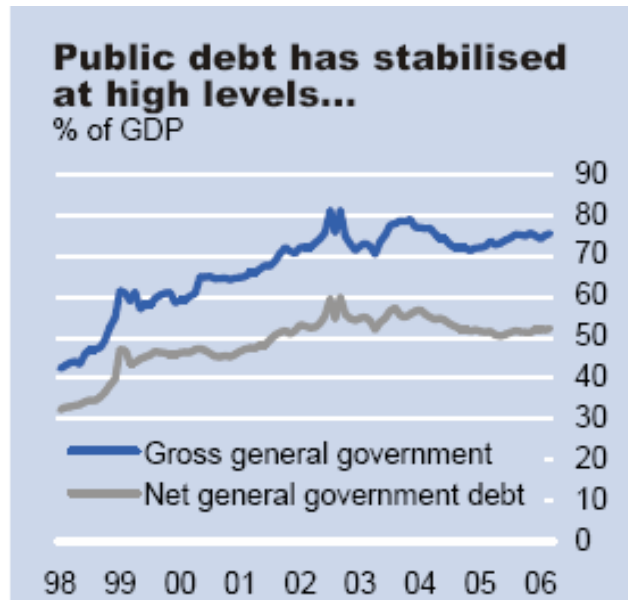
Source: Goldman Sachs BRIC Report

### 3. Working age population as a percentage of total population



Source: Goldman Sachs BRIC Report

### 4. Public Debt in Brazil



Source: DB Research

## APPENDIX B

### 1. Results of Augmented Dickey-Fuller Test

ADF TEST					
p-values		With Constant Only		With Constant and Trend	
		Test Statistic	p-value	Test Statistic	p-value
India	Index	1.69	0.99	-0.24	0.99
	$\Delta$ Index	-14.75	0	-14.98	0
Brazil	Index	2.66	1	0.58	0.99
	$\Delta$ Index	-15.5	0	-15.84	0
US	Index	0.25	0.98	-0.63	0.98
	$\Delta$ Index	-16.82	0	-16.88	0
UK	Index	-1.07	0.73	-0.94	0.95
	$\Delta$ Index	-16.89	0	-16.9	0

### 2. Results of Johansen Cointegration Test

JOHANSEN MODEL (Trace Test)							
		r	1998 – 2001			2002 – 2007	
			Trace Test	p-value		Trace Test	p-value
INDIA	US	0	25.33	0.05*		19.48	0.26
		1	4.28	0.7	1	3.18	0.85
	UK	0	31.98	0.01**		25.6	0.06
		1	4.96	0.61	1	3.03	0.86
BRAZIL			1998 – 2002			2003 – 2007	

<b>US</b>	<b>0</b>	17.18	0.41		50.23	0.00**	
	<b>1</b>	3.74	0.78		4.25	0.71	<b>1</b>
<b>UK</b>	<b>0</b>	22.78	0.12		25.4	0.06	
	<b>1</b>	5.4	0.55		4.07	0.73	

\* Critical value at 95% = 25.73 (for r = 0) \* Critical value at 95% = 12.45 (for r = 1)

\*\* Critical value at 99% = 30.67 (for r = 0) \*\* Critical value at 99% = 16.22 (for r = 1)

### 3. Results of Granger Causality Test

<b>GRANGER CAUSALITY</b>					
		<b>Test Statistic</b>	<b>p-value</b>	<b>Test Statistic</b>	<b>p-value</b>
		<b>1998 – 2001</b>		<b>2002 – 2007</b>	
<b>INDIA</b>	<b>US</b>	7.29	0.01**	10.18	0.00**
	<b>UK</b>	5.81	0.02*	8.78	0.00**
		<b>1998 – 2002</b>		<b>2003 – 2007</b>	
<b>BRAZIL</b>	<b>US</b>	62.91	0.00**	233.9	0.00**
	<b>UK</b>	58.6	0.00**	90.93	0.00**

## APPENDIX C

The parameters specifically important for International Investors are marked in **bold**.

Sr. No.	Pillar	Number of factors in favor of India	Number of factors in favor of Brazil		
<b>1</b>	<b>Institutions</b>	<b>26</b>	<b>3</b>		
2	Infrastructure	6	2		
<b>3</b>	<b>Macroeconomy</b>	<b>5</b>	<b>3</b>		
4	Health and Primary Education	1	8		
5	Higher Education and Training	6	2		
<b>6</b>	<b>Market Efficiency</b>	<b>25</b>	<b>7</b>		
7	Technological Readiness	10	5		
8	Business Sophistication	11	1		
9	Innovation	7	1		
10	Environment	3	2		
<b>1. Institutions</b>					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Property Rights	25	62	-37	India
2	Diversion of Public Funds	52	121	-69	India
3	Public Trust of Politicians	59	119	-60	India
4	Judicial Independence	14	92	-78	India
5	Favoritism in Decisions of Government Officials	37	87	-50	India
6	Wastefulness of Government Spending	41	119	-78	India
7	Burden of Government Regulation	67	124	-57	India
8	Business Costs of Terrorism	84	3	81	Brazil
9	Reliability of Police Services	48	108	-60	India
10	Business Costs of Crime and Violence	24	112	-88	India
11	Organized Crime	44	110	-66	India
12	Ethical Behavior of Firms	45	72	-27	India
13	Efficacy of Corporate Boards	27	65	-38	India
14	Protection of Minority Shareholders' Interests	13	44	-31	India
15	Strength of Auditing and Accounting Standards	21	61	-40	India
16	Effectiveness of Law-Making Bodies	20	112	-92	India
17	Quality of Information Regarding Changes in Policies and Regulation	25	100	-75	India
18	Pervasiveness of Illegal Donations to Political Parties	107	124	-17	India
19	Impact of Legal Contributions to Political Parties on Public Policy	36	111	-75	India
20	Centralization of Economic Policy-Making	11	70	-59	India
21	Freedom of the Press	12	35	-23	India
22	Irregular Payments in Exports and Imports	62	54	8	Brazil
23	Irregular Payments in Public Utilities	66	56	10	Brazil
24	Irregular Payments in Tax Collection	54	60	-6	India
25	Irregular Payments in Public Contracts	51	52	-1	India
26	Irregular Payments in Judicial Decisions	42	59	-17	India
27	Bribes for Influencing Laws, Policies, Regulations or Decrees	38	73	-35	India
28	Business Costs of Corruption	42	91	-49	India
29	Impact of Nepotism	27	87	-60	India

2. Infrastructure					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Overall Infrastructure Quality	69	79	-10	India
2	Railroad Infrastructure Development	21	81	-60	India
3	Quality of Port Infrastructure	61	88	-27	India
4	Quality of Air Transport Infrastructure	46	57	-11	India
5	Quality of Electricity Supply	97	56	41	Brazil
6	Telephone Lines	98	55	43	Brazil
7	Quality of Roads	66	96	-30	India
8	Quality of telephone/fax Infrastructure	30	49	-19	India
3. Macroeconomy					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Government surplus/deficit	122	86	36	Brazil
2	National Savings Rate	20	51	-31	India
3	Inflation	63	83	-20	India
4	Interest Rate Spread	51	118	-67	India
5	Government Debt	88	83	5	Brazil
6	Real Effective Exchange Rate	78	59	19	Brazil
7	Recession Expectations	1	58	-57	India
8	Country Credit Rating	55	61	-6	India
4. Health and Primary Education					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Medium Term Business Impact of Malaria	84	53	31	Brazil
2	Medium Term Business Impact of Tuberculosis	82	40	42	Brazil
3	Medium Term Business Impact of HIV/AIDS	95	48	47	Brazil
4	Infant Mortality	99	85	14	Brazil
5	Life Expectancy	97	75	22	Brazil
6	Tuberculosis Prevalence	100	64	36	Brazil
7	Malaria Prevalence	94	98	-4	India
8	HIV Prevalence	89	83	6	Brazil
9	Primary Enrollment	76	36	40	Brazil
5. Higher Education and Training					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Secondary Enrollment	96	19	77	Brazil
2	Tertiary Enrollment	92	75	17	Brazil
3	Quality of the Educational System	25	114	-89	India
4	Quality of Math and Science Education	7	98	-91	India
5	Quality of Management Schools	3	64	-61	India
6	Local Availability of Specialized Research and Training Services	28	32	-4	India
7	Extent of Staff Training	28	38	-10	India
8	Quality of Public Schools	101	113	-12	India
6. Market Efficiency					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Agricultural Policy Costs	56	39	17	Brazil
2	Efficiency of Legal Framework	23	89	-66	India
3	Extent and Effect of Taxation	21	125	-104	India
4	Number of Procedures Required to Start a Business	70	112	-42	India
5	Time Required to Start a Business	97	114	-17	India
6	Intensity of Local Competition	4	40	-36	India

7	Effectiveness of Antitrust Policy	27	46	-19	India
8	Imports	111	124	-13	India
9	Prevalence of Trade Barriers	34	84	-50	India
10	Foreign Ownership Restrictions	39	89	-50	India
11	Exports	108	115	-7	India
12	Hiring and Firing Practices	101	112	-11	India
13	Flexibility of Wage Determination	51	106	-55	India
14	Cooperation in Labor-Employer Relations	49	93	-44	India
15	Reliance on Professional Management	24	38	-14	India
16	Pay and Productivity	41	79	-38	India
17	Brain Drain	47	39	8	Brazil
18	Private Sector Employment of Women	33	106	-73	India
19	Financial Market Sophistication	32	28	4	Brazil
20	Ease of Access to Loans	21	76	-55	India
21	Venture Capital Availability	20	97	-77	India
22	Soundness of Banks	37	34	3	Brazil
23	Local Equity Market Access	1	46	-45	India
24	Extent of Bureaucratic Red Tape	77	80	-3	India
25	Distortive Effect of Taxes and Subsidies on Competition	58	34	24	Brazil
26	Presence of Demanding Regulatory Standards	41	40	1	Brazil
27	Extent of Market Dominance	13	45	-32	India
28	Extent of Regional Sales	48	42	6	Brazil
29	Breadth of International Markets	33	38	-5	India
30	Informal Sector	52	91	-39	India
31	Ease of Hiring Foreign Labor	28	74	-46	India
32	Recent Access to Credit	3	57	-54	India

#### 7. Technological Readiness

Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Technological Readiness	23	58	-35	India
2	Firm-Level Technology Absorption	13	47	-34	India
3	Laws Relating to ICT	31	48	-17	India
4	FDI and Technology Transfer	25	38	-13	India
5	Cellular Telephones	108	62	46	Brazil
6	Internet Users	95	59	36	Brazil
7	Personal Computers	100	54	46	Brazil
8	Prevalence of Foreign Technology Licensing	1	39	-38	India
9	Government Prioritization of ICT	11	84	-73	India
10	Government Success in ICT Promotion	17	59	-42	India
11	Quality of Competition in the ISP Sector	19	23	-4	India
12	Extent of Business Internet Use	31	23	8	Brazil
13	Internet Access in Schools	52	66	-14	India
14	Impact of Rules on FDI	34	81	-47	India
15	Internet Hosts	98	38	60	Brazil

#### 8. Business Sophistication

Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Local Supplier Quantity	9	32	-23	India
2	Local Supplier Quality	28	37	-9	India
3	Production Process Sophistication	33	32	1	Brazil

4	Extent of Marketing	29	32	-3	India
5	Control of International Distribution	25	39	-14	India
6	Willingness to Delegate Authority	30	39	-9	India
7	Nature of Competitive Advantage	46	86	-40	India
8	Value Chain Presence	22	55	-33	India
9	Buyer Sophistication	26	58	-32	India
10	Local Availability of Process Machinery	16	19	-3	India
11	Degree of Customer Orientation	31	50	-19	India
12	Extent of Incentive Compensation	26	44	-18	India
<b>9. Innovation</b>					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Quality of Scientific Research Institutions	14	36	-22	India
2	Company Spending on Research and Development	25	30	-5	India
3	University/Industry Research Collaboration	34	42	-8	India
4	Government Procurement of Advanced Technology Products	40	58	-18	India
5	Availability of Scientists and Engineers	4	61	-57	India
6	Utility Patents	54	50	4	Brazil
7	Intellectual Property Protection	34	63	-29	India
8	Capacity for Innovation	28	29	-1	India
<b>10. Environment</b>					
Sr. No.	Performance Indicator	India	Brazil	Difference	Stronger Economy
1	Stringency of Environmental Regulations	41	28	13	Brazil
2	Clarity and Stability of Regulations	49	50	-1	India
3	Protection of Ecosystems by Business	53	42	11	Brazil
4	Impact of Lack of Clean Air or Clean Water on Business Operations and Decisions	58	79	-21	India
5	Impact of Natural Disasters on Business Operations and Decisions	39	61	-22	India