

Comparative gdp analysis essay



**ASSIGN
BUSTER**

ix Figures 2. 1. Total Population Sizes, and China and India, 2000–2035

. 8 2. 2. Crude Birth Rates, China and India, 2000–

2035 10 2. 3. Total Fertility

Rates, China and India, 2000–2035 10 2. 4. Number of Women of Childbearing Age (Ages 15–49), China and

India, 2000–

2035 11 2. 5. Crude Death Rates, China and India,

2000–2035 12 2. 6. Life E

xpectancy at Birth, China and India, 2000–

2035 13 2. 7. Population Growth Rates,

China and India, 2000–2035 14 2. 8. Age-

Sex Structure of the Populations of India and China, 2000, 2010, 2025, and

2035 15 2. 9. Percentages of the Population That Are Under

Age 15, of Working Age (15–64), and Older Age (65+), China and India,

2000–2035 17 2. 10 . Age Br eakdown of

Working-Age Populations in China and India in 2025 18 2. 11 . Age Co

mposition of Older Population (Age 65+) in China and India in 2025

. 19 2. 12 . Yout h and Old-Age Dependency Ratios, China

and India, 2000–2035 20 2. 13 . Total Dependency Ratios in China

and India, 2000–2035 21 2. 14 . Sex Ra tios,

by Age Group, in China, India, and the United States, 2010 22 2. 15 .

Link ages and Mechanisms Between Policy and Socioeconomic Influences on

Demographics and Economic Growth

..... 24

2. 16 . Esti mated and Projected Percentage of Population Living in Urban Areas, 1965-2050

..... 32

3. 1. Chin a-India Macroeconomic Comparisons: Salient Estimates, 2025

38

3. 2. Chin a-India GDP Growth Rate Estimates by the Three Clusters, 2020-2025

.....

..... 48

3. 3. Summ ary of the Average, High, and Low Estimates, for All 27 Studies and by Cluster

..... 49

3. 4. Five G DP Growth Scenarios, India and China, 2020-2025

52

3. 5. Five S cenarios: GDPs of China and India in 2025, Market Exchange Rates

53

3. 6. Five S cenarios: GDPs of China and India in 2025, Purchasing Power Parity Conversion Rates

..... 54

4. 1. Comp onent Shares of R&D Expenditures for Selected Countries, 1995-2005

..... 58

Science and t echn ology 77 tant barriers to investment, China appears to be lagging behind not only in efficiency but also in lack of competitiveness of its human capital. While India faces its own chal- lenges, mainly related to the financial sector, its strong presence at the high end of the value chain combined with innovations addressed to low-income consumers make it likely to become a more important player in S&T in the coming decades.

Finally, our study highlights the crucial need for better statistics. This includes the harmonization of quality standards and definitions at cross-

country levels. Further, important information on R&D activities is not collected or is highly aggregated and not consistent with international definitions. For instance, information is incomplete about the activities of multinational companies in China that affect supply of and demand for HRST. Harmonization of concepts and systematic collection of uncollected information will facilitate international comparisons and enable a more accurate analysis of current and future trends.

9 Chapter Five Chinese and Indian Defense and Defense Procurement Spending to 2025

1 As discussed in previous chapters, just as India's and China's endowments—vast populations, growing and increasingly sophisticated and diversified economies, and growing technology sectors—contribute to their growing strategic importance, so too do their substantial and growing defense capabilities. Accordingly, understanding the outlook for Indian and Chinese long-term defense and defense procurement is a crucial dimension of our comparative assessment of the two countries.

In this chapter, we summarize our comparative analysis and forecasts of Chinese and Indian defense and defense procurement spending through 2025. The main findings can be briefly stated as follows:

- The most likely outcome in 2025 is that Chinese defense spending will continue to exceed that of India, and the ratio of Chinese to Indian spending is likely to continue in China's favor, or even grow.
- Chinese defense procurement spending also appears likely to continue to exceed that of India, but it is plausible that the ratio of Chinese to Indian spending could either grow or shrink. India's defense and defense procurement spending are more transparent than China's, because of the public and detailed nature of India's public budgeting

process. For its part, China's policy of reporting its defense and defense procurement spending in terms of budgetary aggregates probably omits substantial amounts of defense-related spending. • It is easier to establish a rough floor on Chinese spending than a ceiling. Official U. S. estimates of Chinese defense spending are as much as two to three times higher than China's official estimate of defense expenditures. • Under many—perhaps most—plausible circumstances, the recently observed high levels of double-digit growth in defense and defense procurement spending

1 The authors wish to thank Deba Mohanty, Senior Fellow in Security Studies at the Observer Research Foundation (ORF), New Delhi, India; Professor Shaoguang Wang of the Chinese University of Hong Kong; and Chaoling Feng, a Doctoral Fellow in the Pardee RAND Graduate School, for their invaluable assistance.

80 China and India, 2025: A Comparative Assessment in both China and India will likely be politically unsustainable well before 2025.

It will therefore be important to carefully monitor the Chinese and Indian leadership discourse for signs that growth in defense spending will be tapering off. • Indeed, China's recent announcement that defense spending in 2010 will grow by only 7.5 percent—about half the rate of growth of the previous year—and India's announcement that defense growth in 2010–2011 will be about 4 percent—compared with more than 20 percent growth in the previous year—suggest that both countries' defense budgets already are under pressure as a result of competing domestic demands. • Many other international and domestic “wild cards” could affect the future trajectory of Indian and Chinese defense and defense procurement spending; a detailed

analysis of these factors would be a useful complement to the present effort. This chapter is divided into four parts. The first part describes the approach used for our analyses and forecasts. The second part reviews, summarizes, and critiques official unclassified sources of data on defense and defense procurement spending for both India and China, as well as data from other studies dealing with defense spending by the two countries.

This review concludes with a set of baseline estimates of Chinese and Indian defense and defense procurement spending in 2009. The third part of the chapter presents a range of comparative forecasts of Chinese and Indian defense and defense procurement spending from the 2009 baseline figures through 2025 with varying assumptions about growth, GDP share of defense, and other factors. We close with comparative observations about the two countries, based on our analyses and forecasts, and conclusions.

Appendix C contains tables with detailed historical data on GDP and defense and defense procurement spending, estimates of nominal and real growth in these aggregates, implicit deflators used to convert spending estimates from nominal to real growth rates, exchange rates, and other technical assumptions related to the analyses and forecasts. Analytic Approach To understand the composition of Chinese and Indian defense spending, the analysis begins with a review of scholarly efforts that have analyzed Chinese and Indian defense spending. 2 2 Among the more noteworthy efforts examining Chinese defense spending are Wolf et al. (1995); Jane's (1995); Wang (1996, 1999); Bitzinger (2003); Crane et al. (2005); International Institute for Strategic Studies (IISS) (2006, 2010a, especially pp. 391-392); Surry (2007); Blasko et al. (undated); and GlobalSecurity.org (2010). On the <https://assignbuster.com/comparative-gdp-analysis-essay/>

Indian defense budget, see Ghosh (2009, p. 7); Mohanty (2009, 2010); and Behera (2010). Chinese and Indian Defense and Defense procurement Spending to 2025 81 The main line of our research was based on a review of openly available English-language primary and secondary sources, especially official documents and public statements, with modest reliance on Chinese-language sources. Historical GDP and defense and defense procurement spending data through 2009 were compiled in local currency units (LCUs) in current prices, i. e. , Chinese ren- minbi (RMB) or Indian rupees (INR), 4 and historical real growth rates were estimated using implicit price deflators from the International Monetary Fund. 5 We produced several dozen alternative forecasts of defense and defense procure- ment spending in 2025, with the estimated 2009 levels of defense and defense procure- ment spending and GDP serving as baselines for all of these forecasts.

Our “ defense growth rate” forecasts of defense and defense procurement spend- ing were predicated on alternative assumptions about the future average annual real growth in defense and defense procurement expenditures. For example, we used recent historical trends in the annual average real growth rates of defense and defense procure- ment spending and GDP through 2009 as the basis for some of our forecasts of defense and defense procurement spending levels from their 2009 baselines through 2025. To bound these forecasts, we also generated alternative forecasts assuming lausibly lower and higher real growth rates than the actual ones that have recently occurred. An alternative set of “ parametric” forecasts of defense spending relied on different combinations of assumptions about the average annual real growth rates in Chinese and Indian GDP and their

corresponding defense shares of GDP. Thus, within each of these two types of forecast—" defense growth rate" and " parametric"—we used varying assumptions to explore the wider range of plausible trajectories in defense and defense procurement spending to 2025.

Finally, to directly compare Chinese and Indian spending, we converted the defense spending and defense procurement spending estimates from constant 2009 local currency units—INR or RMB—to constant 2009 U. S. dollars using both market exchange rates (MXR) and purchasing power parity (PPP).^{6 3} For China, this included official announcements of defense spending levels for the next year, China's biannual white paper on defense, and other sources. For India, we relied on budget documentation related to India's Union Budget.⁴

Indian budget data generally are reported in crores (tens of millions) of rupees, which necessitated conversion to billions of rupees; Chinese budget and economic data generally are reported in billions of renminbi.⁵ See International Monetary Fund (2010b). Table 5A. 1 (in International Monetary Fund, 2010b) presents the IMF's estimates of 2009 GDP for China and India in local currency units and U. S. dollars using the World Bank's 2009 average market and PPP-based exchange rates and shows that China's 2009 GDP was 2-1/2 to four times larger than that of India, depending on the exchange rate used (MXR or PPP).

Appendix C, Tables C. 2 through C. 4, detail the basis for our estimates of nominal and real growth in GDP and defense and defense procurement spending.⁶ We converted constant 2009 local currency units to constant

2009 U. S. dollars using the World Bank's estimates of MXR and PPP for 2009, from World Bank (undated). The market exchange rates that we use are 82 China and India, 2025: A Comparative Assessment Baseline Estimates for China Crane et al. 2005) reported that " the official Chinese defense budget excludes a wide variety of military accounting items commonly included in Western budgets" and provided a " notional full Chinese military budget" consisting of the following elements: 7 • the official Chinese defense budget • paramilitaries (People's Armed Police, PAP) • local support to defense and paramilitaries • funds for foreign arms imports 8 • defense research and development (R&D) • defense industrial subsidies 9 • foreign arms sales revenues. 10

Analysts also have identified a number of additional categories of defense spending and suspected sources of additional defense resources that are not easily estimated from Chinese budget documents. 11 6. 8 RMB/\$ and 48. 4 INR/\$, and the PPP-based rates are 3. 7 RMB/\$ and 16. 5 INR/\$, both rounded to the first decimal place. See Table 5A. 1 (in International Monetary Fund, 2010b) for additional details. 7 Crane et al. (2005, p. 133). 8 Arms imports are generally believed to be funded from hard-currency accounts managed by the State Council and are not included in the official Chinese estimate of defense spending. 9

As Chinese defense industry reforms and restructuring appear to have eliminated most defense industry subsidies, we follow IISS's lead and do not include these in our estimate. The IISS's The Military Balance included defense subsidies in 2003 and 2006, but its estimate of Chinese defense spending in 2008 dropped these items, stating: "[T]he level of state

subsidies to the defence industry is now unlikely to be significant and is no longer taken into account by The Military Balance " (IISS, 2010a, p. 392).¹⁰ Wang (1999) suggests that the PLA receives commissions for arms exports as an extra-budgetary source of Chinese defense resources.

As will be described, we assume that most foreign arms sales revenues go to the defense industry groups that are responsible for defense production of the arms that are sold, either directly or as a pass-through from the Ministry of Defense. We acknowledge the possibility of additional potential subsidies to defense accounts resulting from these transactions.¹¹ For example, Crane et al. (2005) mention spending on nuclear weapons and strategic rocket programs and extra-budget revenue (yusuanwai), and Bitzinger and Lin (1994) report that " China's nuclear weapons program is largely hidden within the PRC's nuclear energy and space programs. For his part, Wang (1999) mentions the following expenses as military expenditures that are detailed in non- defense budget categories: People's Armed Police; defense research, development, test, and evaluation (RDT&E); construction of research facilities and military production lines operated by civilian institutions; one-time demobilization expenses; subsidies to military production; and special appropriations for arms acquisitions from abroad. Wang also mentions commercial earnings from domestic business activities and PLA commissions for arms exports as extra-budgetary sources of Chinese defense resources.

Chinese and Indian Defense and Defense procurement Spending to 2025 83

Using a slightly modified version of Crane et al. 's framework,¹² we estimated China's total defense spending in 2009.¹³ We began with the

<https://assignbuster.com/comparative-gdp-analysis-essay/>

official Chinese defense expenditure estimate of 481 billion RMB in 2009 and added state, provincial, and local funding for PAP paramilitary forces (about 75 billion RMB) and estimated arms imports in 2009 (about 10 billion RMB).

14 We then estimated defense-related R&D and government-funded science and technology (S&T) in 2009. 15 We did this by increasing the IISS estimates for 2008 46. 1 billion RMB in defense-related R&D and 34. 5 billion RMB in defense-related government-funded S&T) by the estimated growth rate in the official Chinese defense budget from 2008 to 2009 (14. 9 percent). Thus, we assume that the growth in nominal defense-related R&D between 2008 and 2009 was at the same rate as the nominal growth rate in China's official defense budget during the same period. This yielded an estimated total of 53 billion RMB in defense-related R&D and 40 billion RMB in S&T spending in 2009 current prices. 16 12 As discussed below, the principal differences with Crane et al. s framework are that, in line with more recent analyses, we have eliminated defense industry subsidies and have added the net defense-related revenues of the defense industry groups. In addition to Crane et al. (2005), we relied on the following sources: Bitzinger and Lin (1994); IISS (1996, pp. 270-275; 2006, pp. 249-253; 2009, pp. 375-376; 2010a, pp. 391-393); and Wang (1999, pp. 334-349). 13 It is noteworthy that the Chinese also appear to distinguish between " defense spending," which is captured entirely in the official defense budget, and " military spending, which also includes additional items of defense-related expenditure.

According to press describing a recent internal Chinese report, The gap [between the official estimate of Chinese defense spending and the actual

level of defense-related spending] shows the PLA appears to have a concept of “ military spending,” which is different from—and larger than—a defense budget. The sources said military spending represents the defense budget plus military- related outlays for the Ministry of Industry and Information Technology and other organs under the State council. “ China’s 2010 Military Spending 1. 5 Times Larger Than Defense Budget,” 2010) 14 Our estimate of Chinese arms imports is based on Grimmett (2010) and Stockholm International Peace Research Institute (undated). 15 Wang Shaoguang reported in 1999 that at that time military research and development was coordinated by the Commission on Science, Technology and Industry for National Defense (COSTIND), and that the defense portion of military R&D was to be found in the general R&D fund account called “ expenditure on research” (anzhi jingfei) and a counterpart in the new product development fund called “ expenditure on test, evaluation and prototypes” (shizhi jingfei). See Wang (1999, p. 339). 16 See IISS (2010a, p. 392). Past estimates of China’s military-related R&D and S&T spending include the following: growth in Chinese military-related R&D from 1 billion RMB in 1989 to 6. 9 billion RMB in 1998 and growth in test and evaluation (T&E) from 1. 7 to 6. 5 billion RMB over the same period (Wang, 1999); 5. billion RMB in direct military R&D allocations in 1993 (IISS, 1996); 6. 9 billion RMB in Chinese military-related R&D in 1998 and test and evaluation amounting to 6. 5 billion RMB; 23. 1 billion RMB in R&D and 25. 2 billion RMB in “ New Product Expenditure” in 2003; 45 billion RMB in R&D and 47. 8 billion RMB in “ New Product Expenditure” in 2006; and 46. 1 billion RMB in R&D and 34. 5 billion in “ government funded science and technology” in 2008. See IISS, The

Military Balance , various years. 84 China and India, 2025: A Comparative Assessment

Our estimate of about eight billion RMB in revenues from foreign arms sales in 2009 was subtracted from our estimate of the defense share of defense industry group revenues, described next. We did not attempt to estimate the profits or commissions from foreign arms sales that might be used to advance Chinese military purposes, as most contemporary scholars appear to view these profits and commissions as modest. 17 In any event, the amounts involved have a negligible effect on the bottom-line estimates for defense spending.

Our estimate differs from most others in one other important respect: our handling of Defense Industry Group (DIG) revenues. China's ten DIGs are state-owned enterprises responsible for the indigenous production of Chinese defense goods and, increasingly, a range of civilian goods such as commercial ships, aircraft, and electronics as well. In theory, DIG revenues related to defense production should approximately equal the total of the "Equipment" account in the official budget, plus foreign arms sales of defense goods produced by the DIGs.

Building on Surry's earlier effort to estimate the defense-related revenues of China's DIGs (Surry, 2007), we estimated total DIG revenues for 2009 by projecting 14.9 percent nominal growth over the estimated 2008 level of 909 billion RMB, or 1,044 billion RMB. Using Surry's 2007 estimate that up to 35 percent of defense industry group revenues was defense-related and evidence that this share has been declining, we then assumed three

alternative defense shares of total DIG revenues: a “ low” estimate of 20 percent, a “ mid” estimate of 25 percent, and a “ high” estimate of 30 percent.

We then subtracted from the resulting estimates of defense-related revenues the official Chinese estimate for the “ Equipment” account of defense spending and estimated foreign arms sales. ¹⁸ This yielded an estimated 41 to 145 billion RMB in revenues, depending on whether the defense share of DIG revenues was assumed to be 20, 25, or 30 percent of total revenues (see Table 5. 1). ¹⁹ That all of the estimates of defense-related DIG revenues exceeded the sum of the “ Equipment” account and estimated foreign arms sales suggests that the difference may be a form of off-budget defense spending.

As a practical matter, we used our middle estimate of defense-related DIG revenues in 2009 for our baseline estimates ¹⁷ See, for example, Wang (1999), who cautions against exaggerating PLA profits from arms sales. If PLA commissions on foreign arms sales constituted 10 percent of the total revenues, the profits from our estimated 8. 0 billion RMB in 2009 arms sales would be less than 1 billion RMB—a tiny share of our estimate of 700–800 billion RMB in total Chinese defense spending in 2009.

Thus, the inclusion or omission of profits is unlikely to affect our overall estimates of Chinese defense spending. ¹⁸ The revenue for foreign arms sales goes primarily to the defense industry groups, although some revenues reportedly also go to the PLA. See Crane et al. (2005, p. 131) and IISS (2006, p. 252). ¹⁹ See Appendix C, Table C. 5, for our detailed estimates of Defense

Industry Group revenues and defense shares. Chinese and Indian Defense and Defense procurement Spending to 2025 and forecasts and simply note that there is some uncertainty about the true value of those revenues. As just discussed, our estimate of total Chinese defense spending in 2009 is based on the official estimate of 481 billion RMB, plus spending on the PAP (75 billion RMB); foreign arms purchases (10 billion RMB); defense research and development (53 billion RMB); government-funded defense science and technology (40 billion RMB); and net DIG revenues of 41, 93, or 145 billion RMB, the number depending on whether the defense share of DIG revenues is assumed to be 20, 25, or 30 percent.

Based on these estimates, our middle estimate of Chinese defense spending in 2009 is 752 billion RMB, with a range of plus or minus 52 billion RMB (about 6.9 percent), or 700 to 804 billion RMB, depending on the assumed defense share of DIG revenues. Our estimates are between 2.1 and 2.4 percent of Chinese GDP in 2009, 21 higher than the official Chinese estimate of 1.38 percent of GDP and generally in line with other studies. However, these other estimates do not include net defense industry

Improving the basis for estimating defense-related DIG revenues is clearly an area deserving additional analysis. GDP share is based on the International Monetary Fund (2010b) estimate of Chinese GDP in 2009 of 34,050.7 billion RMB. Crane et al. (2005) estimated the defense share of Chinese GDP in 2003 to be between 2.3 and 2.8 percent of GDP; IISS (2010a) estimated 2008 Chinese defense spending at 577.8 billion RMB or 1.88 percent of GDP; and Stockholm International Peace Research Institute (undated[a]) estimated 2009 Chinese defense spending at 686 billion RMB, <https://assignbuster.com/comparative-gdp-analysis-essay/>

or about 2.5 percent of GDP. Table 5.1 Assumptions Behind Estimates of Net Defense Industry Group Revenues in 2009 (billions of RMB, current prices)

	Low	Mid	High
Estimated total DIG revenues	1,044	1,044	1,044
Estimated total defense-related DIG revenues	209	261	313
Official Chinese estimate: "Equipment"	160	160	160
Estimated foreign arms sales	8	8	8
Net DIG revenues	41	93	145

Source: As described in the main text, Surry (2007) estimated that the recent defense share of DIG revenues could have been as high as 35 percent, but this share appears to be declining.

Our low estimate assumes that 20 percent of the total revenues of DIGs are defense-related; our middle estimate assumes that 25 percent of revenues are defense-related; and our high estimate assumes that 30 percent of revenues are defense-related. See Appendix C for historical estimates of DIG revenues. 86 China and India, 2025: A Comparative Assessment group revenues, but they are reasonably close to those in recent press reporting on Chinese defense and military spending levels. 23

In estimating Chinese defense procurement, we include the official Chinese estimate of spending on "Equipment," estimated foreign arms purchases, and net defense industry group revenues, which leads to an estimate of 211 to 315 billion RMB in defense procurement spending, or 30–40 percent of total defense spending (see Table 5.2). As just described, because of the many gaps and uncertainties in China's defense procurement and defense spending data, our baseline estimates are necessarily partial; we have included only those elements we could estimate with some confidence.

Put another way, these estimates generally should be viewed as floors on Chinese defense procurement and defense spending. Baseline Estimates for India India's annual Union Budget is detailed in a large number of "Demands for Grants" (DGs) that contain the government of India's requested budget levels for its various ministries, departments, and other governmental activities, as well as updated estimates of spending in prior years. 24 In India's budgetary parlance, "Demands for Grants" correspond generally to what in U. S. terminology would be the Department of Defense part of the budget request submitted to the Congress by the president. 3 According to press reporting, a recent internal PLA study estimated Chinese "military spending"—including both the official defense budget and other defense-related spending by the State Council—at 788 billion RMB in 2010, or about 2.5 percent of GDP. This is very close to our estimates of Chinese defense-related spending in 2009. See "China's 2010 Military Spending 1.5 Times Larger Than Defense Budget" (2010). 24 The various Demands for Grants associated with India's Union Budget for 2009–2010 can be found at Government of India (undated[b]). Table 5. 2

Assumptions Behind Estimates of Chinese Defense Procurement Spending in 2009 (billions of RMB, current prices) Low Mid High Official Chinese estimate:
 "equipment" 160 160 160 Foreign arms purchases 10 10 10 net DIG revenues 41 93 145 total 211 263 315
 Note S: See the main text and the notes to table 5. 1 for an explanation of the calculation of net DIG revenues. The estimates of Chinese foreign arms purchases are based on Grimmert (2010) and Stockholm International Peace Research Institute (2010a). 90 China and India, 2025: A Comparative Assessment

Baseline Estimate of Indian Defense Procurement Spending Of the Indian Ministry of Defence's eight Demands for Grants, three—related to Capital Outlays, Coast Guard Organisation, and Defence Ordnance Factories—are directly related to procurement (see Table 5. 5) Table 5. 5 Composition of Indian Defense Procurement, as of 2009–2010 Budget (billions of INR, current prices)

Demand for Grants	2008–2009 Budget	2008–2009 Revised	2009–2010 Budget
3. Aircraft and Aero- engine	146. 6	134. 2	153. 1
4. Army	4. 3	4. 0	10. 2
5. Navy	22. 5	21. 5	24. 5
6. Air Force	119. 9	108. 7	118. 4
7. Heavy and Medium Vehicles	13. 0	13. 1	9. 3
8. Army	12. 9	12. 1	8. 3
9. Navy	0. 1	0. 1	0. 1
10. Air Force	0. 0	0. 9	0. 8
11. Other equipment	158. 0	129. 4	191. 1
12. Army	83. 5	62. 7	111. 2
13. Navy	11. 7	15. 2	11. 0
14. Air Force	62. 9	51. 5	68. 9
15. Naval Fleet	72. 4	40. 0	68. 4
16. Procurement of rolling Stock	1. 1	1. 3	1. 7
17. Demand no.	27	to	tal
	391. 2	318. 0	423. 6
20. Ministry of Defence	20. 3	4047	Coast Guard Organisation
	9. 5	7. 0	13. 0
25. Defence Ordnance Factories	3. 5	13. 3	8. 3
Grand total	404. 2	338. 3	444. 9

SOURCE : Government of India (undated[b], art II). Note : the numbers preceding the item description are the numbers of the Demand for Grants and subtitle. a t his is a capital outlay account that includes acquisition of ships, fleets, aircraft, and major works for the Coast Guard Organization. It probably also includes some nonprocurement outlays on such capital projects as docks and berths. Chinese and Indian Defense and Defense procurement Spending to 2025 95 5. 6 percent real growth); (2) each country's historically observed real GDP growth rates over the last decade (" Historical GDP," 10. and 6. 9 percent for China and India, respectively); (3) each country's historically observed real rate of growth in defense spending over the last decade (" Historical Defense," 12. 1 and 6. 5 percent); and (4) each country's

historically observed real rate of growth in defense procurement spending over the last decade (“ Historical Procurement,” 12. 8 percent). We also report the ratio Table 5. 7 Growth Rate Forecasts of Chinese and Indian Defense Procurement Spending in 2025 (in billions) Defense Procurement 2009 GDP Meta-Analysis Historical GDP

Historical Defense Historical Procurement China Growth rate, % 5. 7 10. 3 12. 1 12. 8 Constant 2009 r MB 263 . 0 638. 5 1, 262. 3 1, 635. 5 1, 817. 9 Constant 2009 U. S. \$ (MX r) 38. 5 9 3. 5 184. 8 239. 4 266. 1 Constant 2009 U. S. \$ (ppp) 70. 3 170. 7 337. 5 437. 3 486. 1 India Growth rate, % 5. 6 6. 9 6. 5 12. 8 Constant 2009 I nr 444. 9 1, 063. 9 1, 293. 9 1218. 6 3, 068. 8 Constant 2009 U. S. \$ (MX r) 9. 2 22 . 0 26. 7 25. 2 63. 4 Constant 2009 U. S. \$ (ppp) 27. 0 6 4. 6 78. 6 74. 0 186. 3 China-to-India ratio Constant 2009 U. S. \$ (MX r) 4. 2 4. 3 6. 9. 5 4. 2 Constant 2009 U. S. \$ (ppp) 2. 6 2. 6 4. 3 5. 9 2. 6 n O te S: Def ense p rocu rement 2009 (Column 1) is estimated. GD p Met a-Analysis forecasts (Column 2) are based on defense procurement growth at the mean GD p gro wth rates from the meta- analyses reported in Chapter t hree : 5. 7 percent for China and 5. 6 percent for India. h isto rical GD p for ecasts (Column 3) are based on defense procurement growth at the average annual real growth in GD p bet ween 2000 and 2009 out to 2025: 10. 3 percent for China and 6. 9 percent for India. h isto rical Defense forecasts (Column 4) are based on growth in defense procurement spending at the average annual real growth in defense spending between 2000 and 2009 out to 2025: 12. 1 percent for China and 6. 5 percent for India. h isto rical p rocu rement forecasts (Column 5) are based on a continuation of the average annual real growth in defense procurement spending between 2000

and 2009 out to 2025: 12.8 percent for both China and India. See Chapter three and the tables in Appendix C for additional details on the basis for these alternative real average annual growth rates. We note that the historical procurement forecast is based on our estimate of the real growth rate in the official Chinese estimate of the “equipment” portion of “defense spending,” which, as described above, does not include some other categories of military spending. As noted in the accompanying text, it is highly unlikely—for both economic and political reasons—that real rates of growth shown in historical procurement (Column 5) could be sustained through 2025. 96 China and India, 2025: A Comparative Assessment of Chinese to Indian defense procurement spending in 2025 for each pair of these growth rate assumptions.

As described above, we estimate 263 billion RMB in Chinese defense procurement spending in 2009, which translates to 38.5, or 70.3 billion U.S. dollars (MXR and PPP, respectively), and 444.9 billion INR in Indian defense procurement spending in 2009, translating to 9.2, or 27.0 billion U.S. dollars (MXR and PPP, respectively). The estimated ratio of Chinese to Indian defense procurement spending in 2009 is 2.6 (PPP) or 4.2 (MXR). As noted above, employing PPP conversion rates raises the Indian estimates relative to those of China. As shown in Table 5., because the rates of GDP growth are nearly identical for China and India, in the “GDP Meta-Analysis” and “Historical Procurement” forecasts, pairing them has very little effect on the ratio of Chinese to Indian defense procurement spending by 2025. The remaining two cases—“Historical GDP” and “Historical Defense”—suggest that China’s spending advantage on defense procurement could

widen. In only one case, where Indian defense procurement grows at the unlikely “ Historical Procurement” rate of 12. 8 percent and China’s defense procurement grows at a rate of 5. percent, would India’s defense procurement surpass that of China. Our analysis of these and other cases suggests that, although it is most likely that China will enjoy a continued margin over India in defense procurement spending, it is plausible that China’s margin could either grow or shrink. The results also suggest the implausibility of India surpassing China in its defense procurement spending in 2025. Such an outcome would require a combination of a continued high rate of real Indian growth in defense procurement spending coupled with a low rate of Chinese growth in its defense procurement. Broader Comparisons

Having compared our forecasts of defense and defense procurement spending for India and China from a quantitative perspective, we now turn to a broader comparison between the two countries. Update: The Chinese and Indian 2010 Defense Budgets Since the completion of our analysis, in February 2010 India announced its Union Budget for 2010-2011, including its estimates of defense and defense procurement spending for the year, and in March 2010 China announced its defense spending plans for the year. What do the newest defense budget announcements suggest about future defense and defense procurement levels in each country?

Chinese and Indian Defense and Defense p rocu rement Spending to 2025 97
Chinese Defense Spending in 2010 After 20 years of annual double-digit growth in its official estimate of nominal defense expenditures, in March 2010 China announced that total Chinese defense spending in 2010 would be 532. 1 billion RMB (about 78 billion U. S. dollars) or about 1. 4 percent of
<https://assignbuster.com/comparative-gdp-analysis-essay/>

GDP; this level of spending reflected growth of only 7.5 percent, about half of the preceding year's announced 14.9 percent growth rate.³² The announcement was met with both surprise and puzzlement by most observers of Chinese military spending, and its implications for the longer-term trend in Chinese defense spending remain unclear. At least one implication for the present study is clear, however: Chinese spending in 2010 is, at least in the short term, likely to be closer to our low forecasts of defense and defense procurement spending than to our middle and high estimates.

Indian Defense Spending in 2010

In February 2010 India announced its Union Budget for 2010-2011, including a budget estimate for defense of 1,473 billion INR (about 31 billion U.S. dollars), a modest increase of 3.98 percent over the previous year's announced planned spending level of 1,417 billion INR.³³ This reflected a significant reduction in the growth of Indian defense expenditures and also suggests that our low estimates for Indian defense growth may best capture the current trend in Indian defense spending. A diminished Indian appetite for defense spending also appears substantiated by the government of India's acceptance of the Thirteenth Finance Commission's recommendations to reduce defense's share of Indian GDP from 2. percent in 2009-2010 to 1.76 percent in 2014-2015.³⁴ Thus, in India's case as well, recent developments suggest lower rates of growth in defense and defense procurement spending that are closer to our low estimates than to our high ones. Although it is far too early to say with any certainty whether this is the beginning of a new trend of lower defense spending by China and India, it does give greater credence to our low estimates of future defense spending, while also highlighting the challenges of forecasting future defense spending for these two countries.² The

Chinese also announced that the actual level of defense spending in 2009 had been 482, 985 billion ren- minbi, 102. 1 percent of the budgeted figure, and a year-on-year increase of 72, 844 billion renminbi, or 17. 8 per- cent. This was higher than the 14. 9 percent that was announced the previous year. See “ China’s Defense Budget to Grow 7. 5 Percent in 2010: Spokesman” (2010); “ China’s Defense Spending to Increase 7. 5 Pct in 2010: Draft Budget” (2010b); Moss (2010); and He (2010). 33 The base defense budget in 2009–2010 was 1, 473. 44 billion INR.

See Behera (2010). In February 2010, Defence Minister A. K. Antony explicitly pegged future Indian defense spending to India’s economic performance, stating: “ India’s defence expenditure is 2. 5 percent of its GDP and the economy is expected to grow at 8 to 10 percent for the next two decades. The expenditure on defence in absolute terms is also bound to increase in equal proportion. ” See “ Defence Expenditure Increase in Proportion with Growth: India” (2010). 34 See Government of India (2009, pp. 379–380). Conclusions and Implications 105 Ily healthier than India’s, has the benefit of a more developed health care system, and has more experience in containing the effects of communicable diseases. On the other hand, China also has the impending burden imposed by a rising number and propor- tion of older people, so China’s health costs can be expected to rise relative to those of a lesser-burdened India. India’s younger population will be less prone to the costs of communicable and noncommunicable diseases. China’s population has, on average, a higher level of literacy and is better educated than India’s.

The smaller cohorts entering China's labor force in the 2020–2025 period will be more educated than the larger ones in India, providing an advantage for China and a challenge for India. To the extent that India successfully meets this challenge by effectively investing in human capital, it may achieve an advantage through productive employment of its growing pool of younger workers. Furthermore, the enhancement of human capital can be propelled by the allocation and effective use of research and development in government, business, and higher education, as discussed in Chapter Four and later in this chapter under " Science and Technology. Finally, while the data on gender ratios in both China and India are unreliable as well as imperfectly comparable, both countries evidently have large gender imbalances, ranging between 17 percent and 30 percent more males than females in younger age cohorts. In China, the large imbalance is due to the combined effects of its one-child policy as well as gender preference, while India's equally large imbalance is due to the single effect of gender preference. How each of the two countries will manage the potential societal pressures arising from gender imbalance is both important as well as unknown.

Whether India's several demographic advantages—increasing numbers, younger age cohorts, declining dependency ratios, smoother transitional trends, etc. —will add up to a dividend or a drag on future growth depends on the extent to which productive employment opportunities emerge from an open, competitive, innovative Indian economy. A favorable answer to the question implies a substantial demographic dividend; an unfavorable one

would lead to a demographic drag resulting from high unemployment, growing welfare burdens, and perhaps political unrest.

Conversely, whether China's several demographic disadvantages—rapid population aging, peaking and then declining population size, rising dependency ratios, increased gender imbalances, etc.—will create a drag or a dividend depends on whether these demographic circumstances trigger compensatory stimuli to improve technology, increase investment in human capital, or develop a more skilled and more productive labor force. If the compensatory effects are sufficient, China's demographic adversities may result in no drag on, and obliquely provide a dividend for, China's sustained economic growth. 06 China and India, 2025: A Comparative Assessment
Macroeconomics In a recent speech in Washington, D. C. , India's prime minister, Manmohan Singh, observed, There is no doubt that the Chinese growth performance is superior to Indian performance. . . . But . . . there are other values which are more important than the growth of the gross domestic product . . . the respect for fundamental human rights, the respect for the rule of law, the respect for multicultural, multi-ethnic, and multi-religious rights. (Singh, 2009)

Notwithstanding the prime minister's delineation of relative importance, the focus of our macroeconomic assessment is GDP and its growth: past, present, and prospective. Chapter Three occasionally touched on the "more important" values mentioned by Singh, such as the rule of law, but the assessment has largely neglected them. Moreover, our assessment of the economic growth performance of India and China through the 2020–2025

period is moderately more favorable toward India than the prime minister's valid assessment of their respective performance up to the present.

The meta-analysis described in Chapter Three focused on forecasted growth of GDP, capital, employed labor, and total factor productivity in the two countries through 2025. What is striking about these results is the remarkably narrow margins between all of the paired China-India comparisons. The forecasted average GDP annual growth rates for 2020-2025 are 5.7 percent for China and 5.6 percent for India. The corresponding maximum GDP growth rates are 9.0 percent and 8.0 percent, respectively, and their paired minimum growth rates are 3.8 percent and 2.8 percent. While our estimates for the Indian and Chinese growth rates are surprisingly close to one another, the absolute size of the GDP gap in China's favor would increase by 2025 because of the three-to-one greater size of China's initial GDP in 2010. Using the mean growth rates from the meta-analysis results in GDP estimates of \$6.5 trillion for China and of \$2.1 trillion for India in 2025, in constant 2000 prices at market exchange rates.

In a further effort to reflect as well as to bound the uncertainties of the meta-analysis forecasts, our assessment shows the GDP comparisons between India and China that result from five differing paired scenarios of their respective high, low, and average growth rates. As shown in Figures 3.5 and 3.6 of Chapter Three, only in the high-growth India/low-growth China scenario does India's GDP in 2025 approach China's. Using PPP conversion rates, in this scenario India's GDP reaches \$12.3 trillion in 2025, while China's reaches \$13.8 trillion.

In the four other paired comparisons, China's GDP exceeds India's by factors that range between two and six! In a further effort to glean information from the 27 studies included in the meta-analysis, we grouped them into three separate clusters reflecting their different organizational sponsorships: academic, business, and international agencies. Conclusions and Implications 107 As discussed in Chapter Three, the business cluster is distinctly bullish (optimistic) about India's growth prospects and, relatively, bearish (pessimistic) about China's.

The average annual growth rates projected in the business cluster for the 2020–2025 period for China and India are 4.7 percent, and 6.3 percent, respectively. By contrast, the two other clusters reverse this order. The academic cluster yields average growth rates of 5.5 percent for China and 4.3 percent for India, while the international-agencies cluster shows average growth rate estimates of 6.8 percent and 6.2 percent for China and India, respectively. Chapter Three presents several conjectures (hypotheses) to explain the sharp differences among the clusters.

For example, the business cluster's strong growth estimates for India relative to China perhaps derive from greater emphasis on a favorable business environment resulting from the rule of law, protection of property rights, and a democratic political system (this recalls the previously cited observations of Prime Minister Singh about other, "more important" values). Other hypotheses are presented in Chapter Three to account for the wider variance in estimates from the academic cluster studies and the more favorable estimates for China's growth from the business cluster studies.

Chapter Three concludes with our judgments about the India-China comparison pertaining to seven qualitative factors touched on in the 27 pooled studies: democracy and rule of law; IT and service skills, institutional stability; property rights; productivity growth; foreign investments in and by each country; and infrastructure. We conjecture that India has advantages in the first four of these, China in the next three. Whether this will enable India to catch up to or exceed China's "superior economic performance"—to use Prime Minister Singh's words—is arguable, as well as worthy of further study.

Science and Technology

In comparing the status and prospects of science and technology in China and India, we have focused on input indicators comprising both finance and human resources, as well as two output indicators. The financial inputs consist of gross domestic expenditures on R&D (GERD) as a percentage of GDP and its four components: R&D spending by higher education (HERD), by business (BERD), by government (GOVERD), and by private nonprofit institutions (PNPERD). The human resource inputs are doctoral degrees in science and engineering, including engineering, life sciences, physical sciences, computer science, mathematics, and agriculture.

The output measures used are publications (i. e. , articles published in refereed scientific journals) and patents (especially triadic patents registered in the United States, the European Union, and Japan). These outputs are, at best, incomplete and imperfect. Many of the major effects of S&T inputs result in innovations, improvements in production and management processes, and

more effective service delivery that are reflected in operational efficiency but not in either patents or publications.

While recognizing the limitations of these metrics, the assessment in Chapter Four uses them to compare India's and China's recent accomplishments and to develop a simulation model for projecting each country's future trajectory. China is currently the world's third-largest R&D spender, with an annual growth rate of 18 percent since 2000. According to the OECD, China follows the United States and Japan in total R&D outlays (GERD). The business component (BERD), which may have the greatest early effects on productivity among the four components, has increased from 0.5 percent of China's GDP in 1996 to over 1 percent in 2006. Since then, China's GERD has increased in both absolute amounts and as a share of the country's GDP. India's GERD represents 0.8 percent of its GDP, which is between one-third and one-half that of China (depending, respectively, on whether market exchange or PPP conversion rates are employed in comparing outlays in rupees and renminbi). India plans to raise its R&D to 2.5 percent of GDP in the next several years, perhaps stabilizing or slightly raising it still further through the 2025 period.

As described in Chapter Four, China currently graduates 70 percent more engineers than India annually (600,000 versus 350,000, respectively), although the two countries' data are imperfectly comparable. Apart from the reliability and comparability of these numbers, it is also difficult to assess the quality of ostensibly similarly credentialed engineers in the two countries. In a McKinsey Institute survey of 83 global multinational businesses (McKinsey Global Institute, 2005), the companies expressed their

<https://assignbuster.com/comparative-gdp-analysis-essay/>

judgments of relative quality by saying they would hire only one in ten graduate engineers from China, but one in four from India.

The substantial difference in inferred quality was ascribed to the Indian graduates' greater hands-on experience, as well as their better English-language and communication abilities. To forecast the trajectories of China's and India's S&T growth, the assessment develops and applies a simulation model with the input variables mentioned above, along with parameters for costs and outputs (in credentialed S&T graduates, as well as publications and triadic patents per researcher). The model has been run with different values for these parameters, sometimes basing them on current levels prevailing in India and China and sometimes basing their values on current levels in South Korea on the plausible, but uncertain, assumption that the cost and productivity parameters realized by India and China during the next 15 years will converge toward those prevailing in South Korea in 2008.

The several scenarios covered by the assessment include different combinations of these parameter values. Chapter Four describes a wide range of results from these scenarios. Whether the bottom-line estimates for 2025 are represented by total numbers of full-time science and engineering researchers, holders of doctoral S&E degrees, or numbers of triadic patents or publications, the estimates for China exceed those for India by wide