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# China's Economy Is Not Overtaking America's

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China's economic growth over the past three decades has been spectacular, even miraculous. Yet the veneer of double-digit growth rates has masked gaping liabilities that limit China's ability to close the wealth gap with the United States. China has achieved high growth at high costs, and now the costs are rising while growth is slowing. As I explain in a recent book, data that accounts for these costs reveal that the United States is several times wealthier than China, and the gap appears to be growing by trillions of dollars every year.[1] This conclusion may surprise many people, given that China has a bigger GDP, a higher investment rate, larger trade flows, and a higher economic growth rate than the United States. How can China outproduce, outinvest, and outtrade the United States—and own nearly $1.2 trillion in U.S. debt—yet still have substantially less wealth?

The reason is that China's economy is big but inefficient. It produces vast output but at enormous expense. Chinese businesses suffer from chronically high production costs, and China's 1.4 billion people impose substantial welfare and security burdens. The United States, by contrast, is big and efficient. American businesses are among the most productive in the world; and with four times fewer people than China, the United States has much lower welfare and security costs.

GDP and other standard measures of economic heft ignore these costs and create the false impression that China is overtaking the United States economically. In reality, China's economy is barely keeping pace as the burden of propping up loss-making companies and feeding, policing, protecting, and cleaning up after one-fifth of humanity erodes China's stocks of wealth.

The persistent U.S.-China wealth gap means that the two countries are not destined for hegemonic rivalry, as many scholars argue. China will not be able to afford a full-scale challenge to American primacy, so the greatest risk of a U.S.-China war stems from the reckless escalation of a local crisis in East Asia, not a global power transition. Instead of gearing up for a new Cold War, the United States should take more pragmatic steps to bolster the East Asian balance of power and reinvigorate the U.S. economy.

The persistent U.S.-China wealth gap also undercuts the Trump administration's argument that the United States has been losing economically to China and therefore needs to bypass the WTO, slap tariffs on Chinese goods, and decouple the U.S. and Chinese economies. Yes, China cheats on some of its trade commitments and engages in rampant espionage and intellectual property theft, and the WTO is ill-equipped to punish these actions consistently. But the biggest challenge to American workers and the companies that employ them may well be coming from the U.S. government's failure to make large enough investments in job training (including hiring and wage subsidies), infrastructure, research and development, and support for working families. Boosting investment in these areas would allow the United States to protect American workers and preserve U.S. economic dominance without resorting to ruinous protectionism.

*This essay is adapted from Chapter 3, "Economic Trends," in *Unrivaled: Why America Will Remain the World's Sole Superpower*, by Michael Beckley. Copyright (c) 2018 by Cornell University. Used by permission of the publisher, Cornell University Press. All rights reserved.

1 Michael Beckley, *Unrivaled: Why America Will Remain the World's Sole Superpower. (Ithaca*, N.Y.: Cornell University Press, 2018).

## The Real Wealth of Nations

For decades, economists have measured national wealth in gross rather than net terms, relying primarily on GDP and its components, such as trade and financial flows and investment spending.[2] These gross indicators, however, overstate the wealth of populous countries, because they count the benefits of having a large workforce but not the costs of having many people to feed, police, protect, and serve.

A big population is obviously an important economic asset. Luxembourg, for example, will never be a major economic player, because its economy is a blip in world markets and its workforce is smaller than The Home Depot's. But a big population is no guarantee of great wealth, because people both produce and consume resources. A billion peasants will produce immense output, but they will also consume most of that output on the spot, leaving little wealth left over.

To become an economic superpower, a country needs to amass a large stock of wealth—and to do that it must be big and efficient. It must not only mobilize vast inputs, but also produce significant output per unit of input. In other words, it must produce high output at low costs.

What costs? For starters, there are production costs, which include the raw materials consumed and the negative externalities (notably, pollution) that come with the production process. In addition, there are welfare costs, which are the expenses a nation pays to keep its people from dying in the streets and include outlays on basic items like food, healthcare, education, and social security. Finally, there are security costs, the price a government pays to police and protect its citizens.

Needless to say, these costs add up. In fact, they consume most of the resources in every nation. So analysts must deduct them to provide an accurate assessment of the wealth of nations.

Unfortunately, the GDP and components reported and analyzed by most economists and journalists ignore these costs. For example, GDP counts production costs, including amounts spent on externalities and inputs alike, as output. Spending money always increases GDP, even if the funds are wasted on boondoggles. In fact, the most common method of calculating GDP is called the "expenditure method" and involves simply adding up all of the spending done by the government, consumers, and businesses in a country in a given time period.[3] Hiring workers always increases GDP, even if they spend all day getting drunk in the break room. Boosting production always increases GDP, even if the goods rot on the shelf and tons of toxic waste are released in the process. In fact, a country can increase its GDP by dumping toxic waste in the streets and hiring millions of workers and spending billions of dollars to clean it up.

GDP also does not deduct welfare costs. Money spent feeding people is counted the same as money earned selling supercomputers on world markets. As a consequence, populous countries generate considerable economic activity simply by existing. Even a nation caught in a Malthusian hell, in which all output is immediately devoured and living standards and technological progress are stagnant, will post a large GDP if it has a big population.

GDP also counts many security costs as economic output. A $100 million gulag shows up the same in the national income accounts as a $100 million innovation center. Hence, GDP fails to account fully for the economic costs of internal unrest and international conflict.

The blindspots of GDP are illustrated by the histories of China and Russia.[4] These two countries had the largest GDPs in Asia and Europe respectively during much of the 19th century. But they suffered from severe production, welfare, and security costs that crippled their economies and condemned them to defeat at the hands of smaller but more efficient rivals like Britain, Japan, and Germany.

How can analysts address GDP's shortcomings? The ideal solution would be to create a balance sheet for each country: assets would go on one side of the ledger, liabilities on the other, and net wealth would be calculated by subtracting the latter from the former. For example, if a country cuts down a forest to build a new office park, then the value of the forest would show up as a loss on the country's balance sheet. If a country spends $50 billion imposing martial law in one of its regions—or growing food to feed its people or cleaning up toxic waste or hosting the Olympics—then $50 billion would be deducted from its stock of assets. In short, there would be no free lunch.

The obvious drawback to such an approach is that compiling balance sheets for every country is a painstaking process. Fortunately, the World Bank and the UN have recently taken up the task and published rough estimates of countries' wealth stocks in three areas: *produced capital*, which consists of man-made items such as machinery, buildings, infrastructure, software; *human capital*, which reflects the population's education, skills, and working life span; and *natural capital*, which is a nation's stocks of water, energy resources, and arable land. In addition to the estimates of

2 Karabell 2014.
3 Coyle 2014.
4 Beckley 2018.

## PRODUCTIVITY AND MILITARY POWER: THE CASE OF ENGLAND AND CHINA

In a study published two years ago titled "The Power of Nations: Measuring What Matters," I report the findings of my analysis of every great power rivalry and international conflict during the past 200 years. The historical record shows that net stocks of wealth, not GDP, are the main driver of a country's wealth and international influence. And China's experience in these conflicts is particularly instructive.

In the mid-19th century, China's GDP was the largest in the world and twice the size of Britain's. Yet Britain was able to use economic coercion and military force to impose a series of unequal treaties on Beijing that included massive indemnities, a perpetual lease on Hong Kong, unprecedentedly low Chinese tariffs, immunity from Chinese law for British citizens living in China, and the right to sell opium throughout the country.

China was able to muster little resistance to British coercion because of the enormous costs that eroded the country's real wealth and sapped its international influence and military power. What costs? First, China was far less productive than Britain. The average unskilled worker in London generated three to six times the output of the average laborer in Beijing, and each British industrial worker generated 16 to 33 times the output of each Chinese industrial worker. British workers were not only healthier and better educated than Chinese workers, on average, but also had better technology to do their jobs. British looms, for example, could produce 20 times the output of a Chinese handworker, and British power-driven "mules" (spinning machines) had 200 times the capacity of Chinese spinning wheels.

Second, China's massive population, which was 13 times larger than Britain's, generated substantial welfare costs. China's "welfare ratio"—its economic output divided by the costs of providing its population with food, clothing, and shelter—remained stuck at "bare bones subsistence" levels throughout the 19th century, except during the Taiping Rebellion in the 1850s, when the ratio dipped below subsistence and millions of people starved to death. In Britain, by contrast, economic production has been estimated at four times subsistence in 1820 and more than ten times subsistence by 1900.

Third, domestic instability generated severe security costs for China. In the mid-1800s, the Chinese government faced 25 major uprisings each year, on average, which forced the central government to keep taxes low enough to appease local rulers while keeping military spending high to sustain large internal security forces. These competing demands plunged China into a series of fiscal crises. China's tax revenues in the 19th century were 50% lower than they were in the 17th century, and were five times smaller than Britain's in aggregate and 100 times smaller on a per capita basis. Meanwhile, China's military spending consumed 50% to 70% of government revenues in peacetime and 100% or more during wars. Britain, by contrast, was relatively stable, and thus could devote more of its wealth to power-projection abroad rather than internal security.

With so many costs gutting its wealth, China simply could not compete as a great power with Britain. This process repeated itself in even more brutal fashion in the early 20th century, when a smaller but more efficient Japan brought China to its knees.

Michael Beckley, "The Power of Nations: Measuring What Matters," *International Security*, Vol. 43, No. 2 (Fall 2018), pp. 7-44.

these two international organizations, Credit Suisse has published data on countries' private stocks of wealth.

Using different data and methods, each of these three databases shows a similar and surprising result: the United States is several times wealthier than China, and the absolute gap appears to be growing by trillions of dollars each year.

Is this result believable? A closer look at each country's produced, human, and natural capital suggests that these estimates significantly understate the true U.S.-China wealth gap.

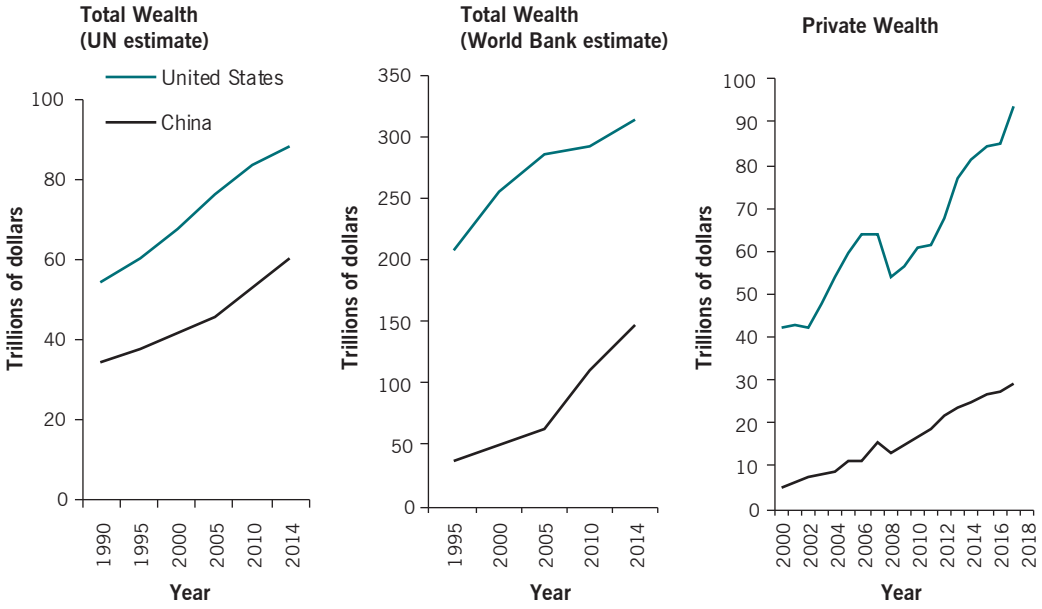
### Produced Capital

China has a larger GDP in purchasing power parity terms and a faster GDP growth rate than the United States, but GDP growth is not necessarily a sign of expanding wealth. If a country spends billions of dollars building bridges to nowhere, its GDP will rise but its stock of wealth will remain unchanged or even decline. To accumulate produced capital, a country needs to increase its productivity, which implies a sustained rise in output produced per unit of input, a metric that economists call "total factor productivity." Mere increases in input, without an increase in the efficiency with which those inputs

*Figure 1*

**Stocks of wealth**

UN estimate in constant 2005 dollars. World Bank estimate in constant 2014 dollars. Private wealth data in current dollars.




Source: UNU-IHDP 2018; Lange and Carey 2018; Credit Suisse 2018.

are used, will lead to diminishing returns and a steadily growing debt burden.

How productive is China's economy? Remarkably, nearly all of China's economic growth since 2007 can be attributed to inputs: hiring workers and spending money. China's productivity growth has not only been unspectacular; it has been virtually nonexistent.[5] By contrast, productivity improvements have accounted for roughly 20% of U.S. economic growth over the past decade, as it has for most of the past 100 years.[6]

Even without visiting China, one could conclude from these productivity figures that much of China's GDP is a mirage based on fruitless investment. It is only when one tours China that the extent of its waste of resources becomes apparent.[7]

China has built more than 50 "ghost cities"—entire metropolises composed of empty office buildings, apartment complexes, shopping malls, and, in some cases, airports.[8] In industry after industry, from refining to ships to aluminum, the picture is the same—supply far outpaces demand—and still expansion continues.[9] As just one example, China's *unused* capacity in steelmaking exceeds the total combined steel production capacity of Japan, the United States, and Germany.[10]

China's private sector is relatively efficient, but it is shackled to a bloated state sector that destroys nearly as much value as it creates.[11] Private firms generate roughly two-thirds of China's wealth and an estimated 80% of its innovations, but the Chinese government prioritizes political control over economic efficiency and thus funnels 80% of loans and subsidies to state-owned enterprises. As a result, state zombie firms are propped up while private companies are starved of capital.

All told, more than one-third of China's industrial capacity goes to waste and nearly two-thirds of China's infrastructure projects cost more to build than they will ever generate in economic returns.[12] Total losses from this waste are difficult to calculate, but the Chinese government estimates that it blew nearly $7 trillion on "ineffective investment" between 2009 and 2014.[13]

5 Conference Board 2019.
6 Jorgenson, Ho, and Samuels 2014.
7 McMahon 2018.
8 Chi et al. 2015; Shepard 2015.
9 European Chamber of Commerce in China 2016.
10 Zhang and Su 2019; *The Economist* 2016a.
11 Economy 2019; Economy 2018; Lardy 2019; Minzer 2018; Magnus 2018; Pei 2016.
12 Ansar et al. 2016; Campanella 2019.
13 Qing 2014.

Chinese officials hope that their Belt and Road initiative, which is expected to invest $1 trillion in infrastructure projects in 69 countries between China and Europe, can mop up excess capacity and spread Chinese "soft power" across Eurasia. Neither result, however, is guaranteed. More than half the countries in the scheme have credit ratings below investment-grade, and the Chinese government estimates that roughly half the loans it has extended will never be paid back.[14] So, when those loans come due next decade, China will either have to write off hundreds of billions of dollars in losses or seize assets in partner nations, as it recently did in Sri Lanka—hardly a great way to win friends or make money.

In addition to being less productive than the United States, China also bears greater welfare and security burdens due to its huge population. For example, China spends around $1 trillion per year on food, which is 30% more than the United States.[15] China has at least $10 trillion in unfunded pension liabilities, a shortfall that is $2.5 trillion greater than in the United States.[16] China spends at least $35 billion more than the United States each year on internal security, and the true gap is likely much larger given that much of China's police state is funded off-book.[17]

On the other hand, the United States outspends China militarily by roughly $350 billion per year, but the United States is militarily involved in most regions by choice and could draw down its forces without jeopardizing its survival. China, by contrast, has to maintain a huge army on guard at home because it suffers from twice the level of domestic unrest as the United States and shares sea or land borders with 19 countries, five of which fought wars against China within the last century, and ten of which still claim parts of Chinese territory.[18]

Unrest in China emanates from multiple sources. In Tibet and Xinjiang, which account for almost one-third of China's landmass, non-Han ethnic groups wage low-level insurgencies against the central government. In Hong Kong, residents maintain a separate political system and have staged sustained protests against Beijing's attempts to dilute their political autonomy. Throughout China, citizens harboring a variety of grievances—notably, pollution, corruption, and government land seizures—stage demonstrations that sometimes turn violent. China is fighting a war on terror on its borders with Central Asian states, where Uighur separatists have established safe havens; and China's borders with India, Vietnam, and North Korea remain heavily militarized.

The unsurprising result of all these burdens, plus the wasted investment highlighted above, has been a dramatic rise in China's debt, from 100% of GDP in the 1990s to greater than 300% in 2019.[19] At $40 trillion and counting, China's debt is not only the largest ever recorded by a developing country, it has risen faster than any country's, nearly quintupling in absolute size between 2007 and 2019.

American debt is massive, too, but it has stabilized at a lower level than China's and is less burdensome. With a per capita income six times greater than China's, the United States not only has more surplus wealth to pay down its debts, but also enjoys lower interest rates. The fact that the dollar is the world's reserve currency further reduces U.S. borrowing costs—an "exorbitant privilege" that saves U.S. debtors an estimated $100 billion in interest payments every year.[20]

Without these privileges, China's household and corporate borrowers have been hit with rising interest rates that now consume 20% of China's GDP.[21] Roughly a quarter of China's thousand biggest firms owe more money in interest than they earn in gross profits; and 45% of all new loans in China are being used to pay interest on old loans, a practice that analysts are calling "Ponzi finance." Writing off these bad loans will cost China somewhere between $1.5 trillion and $10 trillion, with the latter figure nearly equal to China's GDP.[22] To put that number in context, consider that the United States spent 8% of its GDP writing off bad loans after the 2008 financial crisis.[23]

China is sitting on $3 trillion in foreign exchange reserves, but these are not a treasure trove that China can cash in to settle its debts. For one thing, they amount to less than one-tenth of China's total debt. More important, selling off foreign reserves would cause the value of China's currency to surge, crushing China's export sector.

Ultimately, the only way for China to solve its debt problem without gutting social spending is to increase its

14 Miller 2017.

15 Food expenditure data from U.S. Department of Agriculture Economic Research Service. Food consumption data from Food and Agriculture Organization of the United Nations Statistics Division.

16 Marin 2014; Shambaugh 2016, 83; Rothschild 2019.

17 Homeland security spending data from Homeland Security Research Corp 2015. Reproduced courtesy of Homeland Security Research Corp., www.hsrc.biz; Zenz 2018.

18 For examples, see "Political Stability and Absence of Terrorism/Violence," Worldwide Governance Indicators database (Washington, DC: World Bank, 2019); J. J. Messner et al., *The Fragile States Index 2019* (Washington, DC: Fund for Peace, 2019); Monty G. Marshall and Benjamin R. Cole, *Global Report 2019: Conflict, Governance, and State Fragility* (Vienna, VA: Center for Systemic Peace, 2019); Mark Gibney et al., "The Political Terror Scale, 1976-2015," *Political Terror Scale*, 2019, http://www.politicalterrorscale.org/; and *International Country Risk Guide* (East Syracuse, NY: PRS, 2019).

19 Reuters 2019.

20 Dobbs et al. 2015; Eichengreen 2012. On America's economic advantages more broadly, see Norrlof 2010. On the dollar's undisputed status as the world's reserve currency, see Sindreu and Bird 2017.

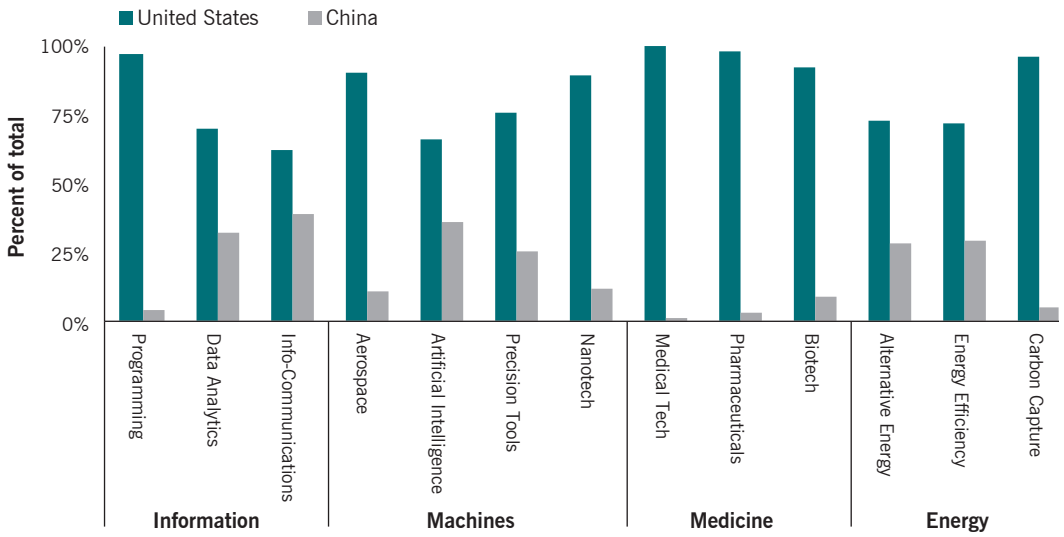
21 *The Economist* 2016b.

22 *The Economist* 2016c.

23 Tham 2017.

*Figure 2*

**U.S. and Chinese relative shares of value added or patents in industries of the future.**




Source: Graphs for programming, data analytics, aerospace, and precision tools use value-added data from the National Science Board 2018. All other industries use patent data from OECD 2017 and *The Economist* 2017.

productivity, which in turn will require innovation. The Chinese government understands this well. Since 2007, it has tripled R&D spending, employed more scientists and engineers than any other country, and mounted the most extensive corporate espionage campaign in history.

These moves, however, have yet to turn China into an innovation powerhouse. China produces only half the high-technology output and highly-cited scientific studies as the United States, holds five times fewer international patents, and pays more royalties for technology than it takes in.[24] The U.S. lead is especially pronounced in the "industries of the future," which include information industries that harness big data; machine industries that design advanced tools and robots; medical industries that create new drugs and healthcare technologies; and energy industries that produce alternatives to fossil fuels (Figure 2).[25]

To be sure, China has developed pockets of economic excellence. China leads the world in some manufacturing industries—especially household appliances, textiles, steel, solar panels, and simple drones—because its huge population of poor workers and generous government subsidies enable it to function as the "workshop of the world," churning out commodified goods at low prices.[26] China also has the world's largest e-commerce market and mobile payments system and commands respectable shares of global markets for Internet software and communications equipment—mainly because the Chinese government restricts foreign Internet and telecommunications firms from operating in China, thereby giving Chinese firms, such as Alibaba, Baidu, and Tencent, a captive market of a billion people.[27] Finally, China is conducting cutting-edge research in supercomputing and quantum communications—two areas where China outspends the United States in R&D[28]—and is becoming a world leader in some information and artificial intelligence (AI) industries, including digital payments and speech and facial recognition, in part because China's huge population generates an abundance of data, the vital input to these industries.[29]

Yet in most high-technology industries, meaning those that involve the commercial application of scientific research (such as pharmaceuticals, biotechnology, and semiconductors) or the engineering and integration of complex parts (such as aviation, medical devices, and system software), China generally accounts for small shares of global markets compared to

24 National Science Board 2018.

25 The OECD defines these industries as "knowledge- and technology-intensive industries" that are capable of "altering lifestyles and the way business is conducted across a wide range of sectors."

26 Woetzel et al. 2016.

27 Ibid.

28 U.S.-China Economic and Security Review Commission 2017b, Chap. 4.

29 *The Economist* 2017b.

the United States.[30] China is a major player in high-technology supply chains, but Chinese firms mainly focus on low-tech activities, such as manufacturing and component supply, whereas American firms tend to focus on product design, development, and branding—the activities in which profits and proprietary knowledge are greatest.[31] As manufacturing has become increasingly automated with the development of 3D-printing and artificial intelligence, and as China's labor costs have risen, American companies have started "reshoring" manufacturing plants in the United States to take advantage of low energy prices, high-skilled labor, and direct access to the world's largest consumer market.[32] For those reasons, Deloitte and Boston Consulting Group both argue that the United States increasingly rivals China as the world's most cost-competitive manufacturing nation.[33]

China's government has ordered its scientists to make China the world leader in science and technology by 2050. But rather than spurring innovation, this mandate has fostered a publish-or-perish climate in which scientists, under enormous pressure to produce, are incentivized to fake results and hoard grant money.[34] China now leads the world in retractions of scientific studies due to fraud, one-third of Chinese scientists have admitted to plagiarizing or falsifying results (versus 2% of U.S. scientists), and nearly two-thirds of China's R&D spending has been lost to corruption.[35]

This culture of fraud extends throughout China's economy. Dozens of studies have shown that Chinese officials systematically inflate China's economic output numbers; and top Chinese leaders, including the premier and the head of China's National Bureau for Statistics, have admitted as much.[36] Many economists believe that China's true economic growth rate is roughly half the government-listed rate, and some analysts argue that China's economy has not grown since the 2008 financial crisis.[37]

## Human Capital

According to the World Bank and the UN, human capital—the knowledge, skills, and labor embodied in a nation's population—constitutes more than half of the wealth of most countries. Both organizations estimate that the U.S. stock of human capital is several times greater than China's.[38] China has four times the population of the United States, but the average American worker generates seven times the output of the average Chinese worker.[39]

One reason is that Americans are better educated, receiving twice as many years of schooling as Chinese citizens on average.[40] Whereas public education is free through high school in the United States, China's government covers the costs of only elementary and middle school. At many Chinese high schools, families have to pay tuition and other expenses, and these outlays are among the highest in the world.[41] Many students drop out to avoid these fees. In fact, roughly 75% of China's working-age population has not completed high school, and roughly one-third of the children currently enter the workforce with an IQ below 90 and are barely literate or numerate.[42]

China is trying to narrow the gap in educational attainment by expanding access to higher education. Since 2000, China has doubled its number of universities and increased its tertiary enrollment rate (the share of high school graduates that enroll in college) from 8% to 30%.[43] Nevertheless, only 10% of China's workforce has a college degree, as compared to 44% of the U.S. workforce, and the quality of Chinese universities has not kept pace with the surge in quantity.[44] Many Chinese college students describe their schools as "diploma factories," where student-teacher ratios are double the average in U.S. universities, cheating is rampant, students spend a quarter of their time studying "Mao Zedong thought," and students and professors are denied access to basic sources of information, such as Google Scholar and certain academic journal repositories.[45]

For these reasons, China still has only four of the world's top 100 universities and only 20 of the top 200, despite spending hundreds of billions of dollars trying to create a Chinese "Ivy League."[46] The United States, by contrast, accounts for 45 of the top 100 universities and 66 of the top 200.[47] Detailed studies find that many graduates of Chinese universities lack basic reading and writing skills and less than 10% of Chinese

30 Ibid.
31 Wubbeke et al. 2016; Enright 2016; Xing 2014.
32 D'Aveni 2018.
33 BCG 2014; Deloitte 2016.
34 "Science Friction," Business Week, May 29, 2006. See also Qin 2017; MacDonald 2016; Barbash 2015; Jacobs 2010; *Wall Street Journal* 2015.
35 Wu 2011; *The Economist* 2013a; Yang and Zhang 2017.
36 Chen, Chen, Hsieh, and Song 2019; Wallace 2016; Nakamura, Steinsson, and Liu 2015; Magnier 2016.
37 Babones 2016; Balding 2019; Pettis 2017.
38 UNU-IHDP 2014; Lange and Carey 2018.
39 Conference Board 2019.
40 Mossavar-Rahmani 2016, 53-54.
41 *The Economist* 2016d.
42 Ibid; Normile 2017.
43 Bradsher 2013.
44 Organisation for Economic Co-operation and Development (OECD) 2017; National Bureau of Statistics of China 2010.
45 World Bank, World Development Indicators, pupils per teacher in tertiary education; Phillips and Elkington 2016; Bland 2017.
46 Ferrara 2015; Institute of Higher Education of Shanghai Jiao Tong University, "Academic Ranking of World Universities," http://www.shanghairanking.com.
47 Institute of Higher Education of Shanghai Jiao Tong University, "Academic Ranking of World Universities," http://www.shanghairanking.com.

engineering graduates are fit to work for a foreign multinational company.[48]

According to some surveys of CEOs, the United States has a "skills gap" of roughly four million workers, supposedly because too many American students major in subjects like art history and philosophy instead of business, engineering, or computer science.[49] However, there are good reasons to doubt these findings: four million job vacancies are hardly unusual in an economy the size of America's; college enrollments in science, engineering, and business programs are actually at all-time highs; the liberal arts are quite useful for jobs in an information economy that runs on creativity and critical thinking; and careful studies suggest that CEOs may be hyping the idea of a skills gap to get the government to pay for job training programs that companies otherwise would have to pay for themselves.[50] Regardless, if CEO surveys are valid measures of human capital, then China is in trouble, because such surveys find that China has a skills gap of 24 million workers and is projected to have a skills gap of 40 million workers by 2030.[51]

China also loses 400,000 of its most highly educated workers every year to foreign countries in net terms, including thousands of scientists, engineers, and "inventors" (people that have registered at least one patent).[52] The United States, by contrast, nets one million workers annually from all foreign countries, including roughly 20,000 inventors and 15,000 scientists and engineers, 5,000 of whom come from China.

The U.S. workforce is not only better educated but also healthier than China's. China loses 40% more years of productive life per capita on average from major ailments.[53] Part of the reason is that Chinese healthcare is abysmal for all but the elite. Premiums under China's national healthcare scheme average only $24, a sum far from sufficient to cover a basic checkup, let alone a major procedure.[54] As a result, one-third of Chinese citizens who are told to go to a hospital decide not to because of the cost, and 80% of rural residents diagnosed with serious illnesses die at home.[55] The United States has one of the most expensive and inefficient healthcare systems in the world, spending $3 trillion a year versus China's $1 trillion, but it provides far greater access and better care than China's system, resulting in a much healthier and more productive workforce.

In addition to receiving better care, Americans enjoy a less toxic environment than Chinese citizens. Air pollution is seven times worse in China than in the United States—breathing the air in China's major cities is equivalent to smoking a pack of cigarettes a day—and kills 1.6 million Chinese citizens each year versus 200,000 Americans.[56] Whereas nearly all Americans enjoy clean water out of the tap, 80 percent of China's groundwater is polluted.[57] Every year, 190 million Chinese fall ill and 60,000 die because of water pollution.[58] All told, air and water pollution are estimated to cost China 7.5% of GDP annually—roughly $1 trillion dollars—in lost productivity and medical expenses.[59]

Americans also generally have healthier habits than Chinese citizens. China's smoking rate, for example, is 50% higher than America's and projected to be 70% higher by 2025; and China now has a higher incidence of diabetes and prediabetes than the United States, mainly because of poorer nutrition.[60] Americans consume 50% more alcohol per capita than Chinese citizens and are ten times more likely to die of a drug overdose, but the toll taken by America's substance abuse problem does not compare to the collective toll taken by China's multiple health crises.[61] For example, the United States loses six more years of productive life per thousand people from substance abuse, but China loses 16 more years from heart disease and another eight from cancer.[62]

The Chinese government is working hard to solve these health problems, but the health gap between China and the United States will expand in the years ahead for a simple reason: China is aging more rapidly than any society in history. The number of Chinese aged 65 and older will more than triple by midcentury, from 130 million in 2015 to 400 million by 2050.[63] Meanwhile China's workforce will shrink by 212 million—about one-third of the current total. At that point, senior citizens will account for more than 30% of China's population versus only 20% of the U.S. population. Given that most health problems get worse with age, the aging of China's society essentially guarantees a decline in the productivity of China's workforce and further erosion of China's stock of human capital.

A final reason the United States has a larger stock of human capital than China is that the United States can feed its population with only 1% of its workforce in agriculture

48 Chen, Mourshed, and Grant 2013; Woetzel et al. 2016; Farrell and Grant 2005.
49 Laboissiere and Mourshed 2017.
50 Zakaria 2016; Cappelli 2015.
51 Woetzel 2016, 101.
52 Miguelez and Fink 2013; NSF 2018.
53 WHO Mortality Database 2019.
54 Yu 2015, 1148.
55 Wee 2018; Huang 2011, 124; Beardson 2013, 149.
56 World Bank 2019.
57 Buckley and Piao 2016
58 Qiu 2011, 745.
59 Gustke 2016; Crane 2015; *The Economist* 2013a.
60 Chen et al. 2015; Volodzko 2016.
61 WHO Mortality Database 2019.
62 Ibid.
63 UN Population Database 2019.

whereas China devotes 30% of its workforce to farming—and still depends on food imports to feed its population.[64] China suffers a massive opportunity cost from having so many workers in the fields—the productivity level of Chinese agriculture is one-fourth that of the rest of the economy, and most of China's agricultural output is immediately consumed and therefore does not add to China's stock of wealth.[65] Economic development is, at its core, a process of structural change from agriculture to industry; the fewer farmers a nation uses to feed itself, the more workers it can mobilize to produce wealth in modern industries. The United States has 99% of its workforce potentially available for wealth creation whereas China only has 70%.

## Natural Capital

The main elements of natural capital are water, energy resources, and arable land, all of which are necessary to sustain life and power agriculture and industry. The U.S. stock of natural capital is larger than China's not only because of the size of U.S. resource endowments, but also because the United States uses its resources more efficiently and has fewer people to support with them.

The United States has 10% more renewable freshwater than China overall, and the actual gap is much larger, because half of China's river water and 90% of its groundwater is unfit to drink, and 25% of China's river water and 60% of its groundwater is so polluted that the Chinese government has deemed it "unfit for human contact" and unusable even for agriculture or industry.[66] China's per capita availability of water is less than one-quarter of the United States' and less than one-third the world's average, and roughly one-third of China's provinces and two-thirds of its major cities suffer from extreme water scarcity.[67] Beijing, for example, has roughly the same amount of water per person (145 cubic meters) as Saudi Arabia.

The United States generates more than three times as much wealth from each gallon of water as China.[68] In agriculture, only 45% of the water China withdraws actually makes it to crops, and in industry only 40% of water is recycled, as compared to 85% in the United States.[69] Geography further drags down the efficiency of China's water use: more than 80% of China's water is located in the south, but half of China's people and two-thirds of its farms are in the North, so China is spending tens of billions of dollars to divert water from the Yangtze River in the south to the Yellow River in the north.[70] Dealing with water scarcity costs China roughly $140 billion per year in government expenditures and reduced productivity versus $12 billion for the United States.[71]

The United States has three times as much oil and natural gas as China and twice as much coal.[72] China heavily subsidizes its renewable energy and nuclear power industries, but both combined still account for less than 5% of China's energy use compared to 12% for the United States.[73] China has large reserves of shale oil and natural gas, but it has not been able to tap them and may never do so.[74] One reason is that China's shale deposits were left behind by prehistoric lakes and, as a consequence, have rock layers that are more ductile and less amenable to hydraulic fracturing than the brittle marine shales in North America.[75] Another reason is that China lacks the water necessary for fracking. Each shale-gas well requires 15,000 tons of water a year to run, and China would need to drill thousands of wells a year to launch a successful industry. China has nowhere near that amount of water located close to its major shale basins, which are concentrated in Jilin and Liaoning, two of China's driest provinces.

The United States generates roughly 40% more wealth per unit of energy than China.[76] China's energy efficiency has risen steadily since the 1970s, but it still lags behind that of the United States because China's economy is dominated by heavy industries and manufacturing plants that consume vast amounts of energy to make low-profit products.[77] Consequently, China depletes $400 billion of its energy resources per year and pays foreign countries another $500 billion in energy imports whereas U.S. annual depletion and net import costs are currently $140 billion and $120 billion, respectively.[78] This divergence in energy fortunes is likely to expand in the decades ahead, because the United States has become a net energy exporter whereas China, already the world's largest net energy importer, will import 80% of its oil and 45% of its natural gas.[79]

Finally, the United States has 45% more arable land than China, and again the true size of the gap is probably much larger because large chunks of China's farmland are too

64 U.S. Department of Agriculture, U.S. Agricultural Trade Data; Gale, Hansen, and Jewison 2015.
65 Woetzel et al. 2016, 22.
66 CIA World Factbook 2020; Jing 2016; Albert and Xu 2016; *The Economist* 2013a.
67 Parton 2018; Zhao et al 2015; *The Economist* 2013e.
68 World Bank 2019.
69 *The Economist* 2013e.
70 Zhao et al. 2015.
71 Parton 2018; Economy 2014. On U.S. costs, see Raasch 2012.
72 BP 2019.
73 International Energy Agency 2016.
74 Lingke and Kirton 2018.
75 Zeihan 2015, 132.
76 World Bank 2019.
77 British Petroleum 2016, 44; Stocking 2015, 2-3.
78 International Energy Agency 2016.
79 Paraskova 2017.

polluted, desiccated, or both to support agriculture. According to a recent Chinese government study, water pollution has destroyed nearly 20% of China's arable land, an area the size of Belgium.[80] An additional one million square miles of China's farmland has become desert, forcing the resettlement of 24,000 villages and pushing the edge of the Gobi Desert to within 150 miles of Beijing.[81]

American farmers produce 30% more food per hectare than Chinese farmers. Part of the U.S. agricultural advantage stems from better soil and more plentiful water. Another reason is that most of China's farmers are poor peasants, roughly 40% of whom lack motorized equipment of any kind and have to plow and seed their fields using animals or their own muscle.[82]

China's food consumption is outstripping the agricultural capacity of its land. In 2008, China became a net importer of grain, breaking its traditional policy of self-sufficiency, and in 2011, China became the world's largest importer of agricultural products.[83] Since then, China has increased its reliance on food imports, especially from the United States, which is China's top supplier of agricultural products and earns roughly $25 billion per year selling food to China.[84] China is trying to regain food self-sufficiency by heavily subsidizing farmers. As a consequence, however, China is rapidly depleting its supply of agricultural land; according to an analysis by Xinhua, more than 40% of China's arable land is suffering some form of "degradation" from overuse, including reduced fertility, erosion, changes in acidity, pollution, or all of the above.[85]

## Conclusion

China lags far behind the United States economically; and even though the gap appears to be growing larger, the conventional wisdom among scholars, pundits, and the public is that China is an economic juggernaut set to overtake America as the world's dominant power. This conventional wisdom is not only wrong, but dangerous.

One danger is that policymakers may come to believe that the United States and China are destined for war because they are locked in Thucydides's Trap, in which a rising power challenges a ruling one for primacy. This misguided notion is already widespread on both sides and has driven a spiral of hostility. Emboldened by the global hype about its rise, China has embarked on the greatest territorial expansion of any nation since World War II, staking claim to roughly 80% of the East and South China Seas and pouring resources into its air, naval, and missile forces. The United States has responded by labeling China a rival, gutting the State Department to free up funds for the U.S. military, inserting U.S. forces into East Asian territorial disputes, and making plans to hit China early and hard in the event of war.

Halting this spiral requires both sides to take a clear-eyed look at the balance of wealth and power. China must recognize that its economic engine is not strong enough to support grand ambitions for territorial conquest and regional hegemony. Its best option, therefore, is to become a responsible stakeholder in the existing international order. The United States, on the other hand, must recognize that China is nowhere close to dominating East Asia, let alone challenging the United States for global primacy. And so instead of preparing for preventive war, the United States should reinforce the existing East Asian balance of power by helping China's maritime neighbors develop their defensive military capabilities and diversify their economies away from China's market.

The second danger is that an exaggerated sense of China's rise could fuel trade wars. The Trump administration has crafted a powerful but misleading narrative that holds that free trade hobbles the U.S. economy while fueling China's rise. To rectify this supposed imbalance, the administration has pulled out of the Trans-Pacific Partnership, kneecapped the WTO by blocking appointments to the organization's appellate body, and imposed unilateral tariffs on China and U.S. allies alike. Many analysts expect more protectionist measures to come.

The United States should aggressively punish unfair Chinese trade practices, but do so through a reformed WTO, regional free trade pacts, and targeted investment restrictions and economic decoupling—not with unilateral tariffs. The 1930s showed how unbridled trade wars can destroy the world economy and trigger violent conflict. The United States does not need to revive such a world just to "win" on trade, given that it already wins roughly 80% of the cases it brings before the WTO and 40% of the cases other countries bring against it. By contrast, China wins only 41% of the cases it brings and 23% of cases brought against it.

The Trump administration says tariffs are crucial to protect American workers and U.S. economic competitiveness. Working-class families, however, bear the brunt of trade wars because they depend most on cheap imported food, clothing, and household items. A recent study found that, in a world of no trade, the poorest tenth of consumers would

80 Mossavar-Rahmani et al. 2016, 37; Roberts 2014.
81 Cho 2011; Hornby 2015.
82 Woetzel et al. 2016, 21-22.
83 *The Economist* 2015.
84 Gale, Hansen, and Jewison 2015, 3-5.
85 Patton 2014.

lose a staggering 63% of their purchasing power, more than double what the richest consumers would lose. Tariffs on raw materials and basic goods also hurt downstream industries that employ many more American workers than do upstream industries. For example, although tariffs on Chinese steel might help the 147,000 Americans employed in the steel industry, they harm the 6.5 million Americans employed in steel-using industries.

A better way to protect American workers, entrepreneurs, and inventors would be to invest directly in them. The U.S. government currently spends six times less as a percentage of its GDP than other rich nations on job training, job-search assistance, and hiring and wage subsidies; three times less on family benefits like childcare support and early education programs; and less on infrastructure and scientific research than at any point in the past six decades. If the Trump administration is serious about helping American workers and preserving U.S. competitiveness, it should focus on closing this investment gap, not on shredding the liberal order that generations of Americans have worked so hard to build.

A third danger is that an excessive fear of China's rise and America's decline will spur U.S. retrenchment—the divestment of all foreign policy obligations save those linked to vital interests, defined in a narrow and national manner. Advocates of retrenchment assume, or hope, that the world will sort itself out on its own—and that whatever replaces American hegemony, whether it be a return to balance-of-power politics or a transition to a post-power paradise, will naturally maintain international order and prosperity.

As any student of history knows, however, order and prosperity are not natural. They should never be presumed, or taken for granted. When achieved, they are the result of determined action by powerful actors and, in particular, by the most powerful actor—which is, and will be for some time, the United States. Arms buildups, insecure sea lanes, and closed markets are only the most obvious risks of U.S. retrenchment. Less obvious are transnational problems, such as global warming and disease pandemics, which are likely to fester without a leader to rally collective action.

Advocates of an "America First" foreign policy are probably right that the United States could improve its *relative* position by ditching allies and international institutions and letting the world burn. But one of the benefits of unrivaled wealth and power is that the United States can afford to pursue *absolute* gains, sacrificing a bit of relative advantage to make the United States *and* the world better off overall. As the most secure and powerful country in history, the United States can and should do more than ceaselessly struggle for power. Would other countries suffer more than the United States from a U.S. pullback and the collapse of the liberal order? Probably, but that strikes me as cold comfort if it means living in a nasty and brutish world of rigid trade blocs, closed borders, a splintered Internet, militarized sea lanes, fewer democracies, more nuclear proliferation, a greater likelihood of major war, and sharply reduced prospects for international cooperation.

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