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Frederico Bartels

The aim of this Special Report is to bring transparency to comparisons between American and Chinese military expenditures. The challenges posed by the Chinese Communist Party (CCP) and its military will likely only increase in the coming years; the democratic world needs to be aware of those challenges and its build-up in order to effectively respond. The Department of Defense needs to reorient itself fully to face the threats posed by China. The United States should continuously shine a light on the CCP's military activities and its military build-up. The government should also make more of its data on China's military expenditures available to the public in order to build awareness of the challenge.

The U.S. 2018 National Defense Strategy states: "Today, we are emerging from a period of strategic atrophy, aware that our competitive military advantage has been eroding."[1] In order to fully emerge from its strategic atrophy, the United States public needs a better understanding of how much and in what the Chinese Communist Party (CCP) is investing in the People's Liberation Army (PLA)—and how it has closed the resource gap with our own armed forces. While this knowledge may exist within the Pentagon and our intelligence agencies, in order for the Trump Administration to build a consensus for action, the general public also needs this information.

Comparing the military expenditures of two nations is a challenging task under the best of circumstances. Different countries count things differently. Some countries count veteran pensions in their defense budgets; the United States does not. Some countries count para-military forces as part of their defense budgets; the People's Republic of China (PRC) does not. Some countries, such as the U.S., publicize to their legislatures and to the public a substantial amount of detail in their defense budgets; the PRC does not. These challenges must be understood when seeking any comparison

between different countries' military expenditures in order to clarify the terms of the comparison and to highlight where the differences reside.

The goals of this *Special Report* are therefore to advance the understanding of the context in which the CCP funds the PLA, how this funding has changed in recent years, and how this total effort compares to the United States' defense budget. This *Special Report* will outline the differences between the military expenditures of the United States and the People's Republic of China. The different nature of the two governments and how each interacts with its society determines some tangible and measurable costs and some unmeasurable ones that are discussed throughout the paper. It is important to quantify those differences when possible. In the case of the defense budgets, the most impactful difference is in the cost of labor. Adjusting the reported labor costs of the PLA using the Chinese government worker average wage demonstrates that the PRC's armed forces have resources that closely rival the United States.

The ultimate aim of this *Special Report* is to bring more transparency and understanding to the comparison between the United States and the CCP's military expenditures. There is an important military component to the great power competition outlined by the National Defense Strategy and by the National Security Strategy. In order to better understand that component, the public needs to understand the resources that go into the military on both sides of the competition. While this paper only deals with the Chinese defense budget, the same techniques and context must be applied before comparisons can be made between the U.S. and other countries' defense budgets.[2]

Lawmakers have a duty to their constituents to put the U.S. defense budget in its proper context—and not rely on simplistic comparisons that only look at different countries' budgets through a simple market exchange rate comparison.[3] This simplistic comparison is what leads many leaders and institutions to state that the United States spends more on its defense than the next seven countries combined.[4] While technically correct, it is a statement that does not provide much information about the relative position of the United States or its competitors.

While this *Special Report* looks solely at the resources the PRC dedicates to its military, which are important, this should not be the sole metric in understanding the CCP's military power.[5] The resources only represent one input—and do not replace an analysis of what those resources actually buy and how they stack up to each other. When bullets start flying, it is irrelevant if each bullet costs $1 or $1,000. The important thing is that they will work and hit their targets. By the same token, the price of a fifth-generation

fighter is irrelevant in combat. The important thing is which fighter can achieve its mission in a more lethal manner.

U.S. Distraction: A Window of Opportunity for the CCP

The refocus on great power competition comes after close to two decades in which the U.S. armed forces were mostly focused on combating terrorism in the Middle East. This focus created what the Chinese Communist Party's leadership called a "period of strategic opportunity," in which the United States would not be attentive to the Pacific. In this regard, "[i]n November 2002, at the Sixteenth Party Congress, Jiang Zemin [the outgoing Secretary-General of Chinese Communist Party] felt emboldened to declare that the first two decades of the 21st century would be a period of 'strategic opportunity' for China."[6] As outlined by China scholar Jonathan Ward, "[t]hinking on a multi-decade time frame out to 2049, they [the CCP leaders] have called 2000 to 2020 the 'period of strategic opportunity.' During this time, now ending, the Chinese believed 'the international situation' would be favorable to China."[7]

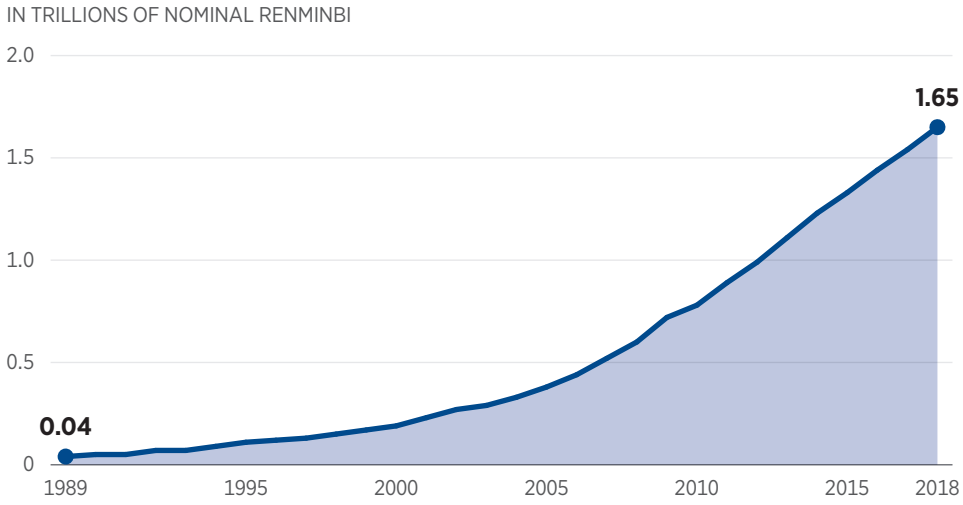
This strategic opportunity allowed the CCP to set very ambitious goals for its military and, as this *Special Report* will show, consistently increase the resources dedicated to the People's Liberation Army (PLA). The ambitions for the period of strategic opportunity were detailed in the CCP's 19th National Congress in October 2017, at which Chinese Secretary-General Xi Jinping "laid out new requirements for a military modernization program seeking to achieve force-wide mechanization and major progress in strategic warfighting domains by 2020, a 'modern' military by 2035, and a 'world-class' military by the middle of the century."[8] According to the U.S.–China Economic and Security Review Commission, this represents a 15-year acceleration of the goal, showing increased confidence in its investments.[9]

The consistent PLA budget growth reflects that emphasis. When looking at the data generated by the Stockholm International Peace Research Institute (SIPRI), which archives defense budget data in local currency, there was not been one year in which the PLA's nominal budget has not increased.[10] The average growth in the 30-year period was of 13.54 percent annually, accumulating an increase of 3,852 percent of nominal growth. It is an impressive sign of dedication and consistency to increasing the resources dedicated to the PLA.

This consistency is a great starting point to show the emphasis placed by the CCP in its military force. However, it does not inform much as to how it compares to the United States, or even how it is different from any

CHART 1

China's Military Spending Has Greatly Increased Over Past 30 Years



SOURCE: Stockholm International Peace Research Institute, "SIPRI Military Expenditure Database," 2019, https://www.sipri.org/sites/default/files/SIPRI-Milex-data-1949-2018_0.xlsx (accessed October 23, 2019).

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other nation's military expenditures. The growth also only represents the budget reported by the CCP leadership, which is not representative of all the resources available to the PLA.

The goal of this *Special Report*, then, is to explore the differences between how defense budgets are commonly understood and the resources that the CCP dedicates to its military. The broader goals of looking at the resources is to start illuminating an area in which the leadership of the CCP tries to maintain opacity and to understand a little more the shape of the PLA. By design, the leadership of the CCP wants the least transparency possible in its military expenditures.

The Context of the PLA's Budget

The People's Liberation Army exists in a context that is fundamentally different from the United States armed forces or any of the national armies from democratic nations. There are five fundamental characteristics that differentiate the PLA's budget from most other nations' defense budgets, some of them quantifiable and some unquantifiable.

1. The unquantifiable costs of maintaining the instruments of party repression within the military.

2. The transparency of the country when it comes to its military expenditures, an area in which the People's Republic of China is dreadful.

3. The lack of reliability on the little amount of data that is available. The CCP has a history of altering data to fit its narrative, which makes their data less reliable.[11]

4. What is known to be absent from the military expenditures data released by the CCP. Some of those absences are quantifiable, but with differing levels of certainty.

5. The cost differential between the United States and the PRC. Products and services have substantially different costs when comparing the two societies, and those costs heavily impact its armed forces, especially the cost of labor.

It is in this broader context that the International Institute for Strategic Studies (IISS) stated that "the official defence budget, although the best indicator of the overall trend in military spending, does not reflect the true level of resources devoted to the PLA."[12] IISS has also previously described clearly the main limitations that analysis of the PLA's budget faces:

> However, while the Official Budget has become more transparent and is a useful tool for measuring the general trend in Chinese defence expenditure, it is less helpful when making comparisons with other countries for two principle reasons. First, few analysts outside the PRC consider the Official Chinese Defence Budget to include all military-related expenditures and second, is the problem of exchange rates.[13]

Despite these limitations, the official defense budget released by the CCP is the most substantial starting point for any assessment and comparison of their military expenditures. This *Special Report* adopts the CCP's released budget numbers as its starting point—with the caveat that it is an incomplete picture of the level of resources that are dedicated to the PLA. It likewise adjusts the American defense budget to the level of information that is available on the PLA budget to make it a more equitable comparison.

Considering the available data and information on the PLA budget, adjusting the U.S. defense budget to the level of fidelity available on the PLA budget is a fair way to develop a comparison. It will further illustrate different ways of adjusting the PLA budget to fill the information gap, and also the qualitative gaps represented by the different ways that the societies around the military are organized. It is necessary to both adjust the American defense budget and the reported numbers from the CCP in order to get a comparison that is closer to equal footing.

The Repression Instruments of a Party's Army

One unique feature of the People's Liberation Army needs to be taken into consideration when understanding the defense budget of the PRC: The Chinese Communist Party, not the Chinese government, commands the PLA. Because of the unique repressiveness of the CCP and its emphasis on Party discipline within the armed forces, there are multiple organs and commissions that work to assure ideological conformity within the PLA. The mere existence of a Discipline Inspection Commission under the Central Military Commission shows the importance placed on ideology and party discipline.[14]

The CCP's Secretary-General, Xi Jinping, explained the emphasis on the party control of the military and the imposition of party discipline: "Why must we stand firm on the party's leadership over the military?" Xi asked. "Because that's the lesson from the collapse of the Soviet Union. In the Soviet Union, where the military was depoliticized, separated from the party and nationalized, the party was disarmed."[15]

The theory of de-politicization of the Soviet Army holds such sway that "[d]uring the 19th Party Congress, President Xi made it clear that the CMC [Central Military Commission] must remain loyal to the CCP—and by extension to him personally. This demand for absolute loyalty is likely in part a message from President Xi to the PLA that he will not tolerate any opposition to his reorganization and modernization vision."[16] Thus, it is highly likely that while Xi Jinping holds the reins of power in the PRC, the PLA's primary focus will be on the preservation of the CCP and its hold on power.

Since the PLA's main goal is to maintain the CCP in power in the PRC, it will incur costs that the armed forces of legitimate and democratic governments do not face. These costs range from maintaining a party layer at all levels of the command-and-control chain to the inclusion of ideological indoctrination instruction in all blocks of education and to reduced autonomy of the individual soldier due to lack of trust in its population. However, because of the obscure nature of the CCP regime, there is no way to separate the costs of repression and being a Party Army from regular military costs.

China's Low Transparency: A High Barrier to Entry

Because of extremely low levels of transparency in the military expenditures of the PRC, there are too many unknowns to make a detailed projection of all the resources they dedicate to their armed forces. However, there is enough data to develop better informed estimates than simply converting their announced defense budget into dollars using the market exchange rate.

From the outset, any effort to understand the PRC's military expenditures is hindered by extremely low levels of transparency in the PLA's budget. Transparency International, an anti-corruption non-government organization, ranked China as a country with low transparency in its defense budget, scoring 1.5 points on their 12-point scale.[17] According to Transparency International, a country with low transparency is characterized by:

- "Little or no defence-related budget information is provided to citizens. Documents are either not produced or not made available to the public.
- "Budget oversight laws are non-existent or inadequate; in practice, there is no independent and regular defence budget oversight.
- "Poor practices tend to be complemented by unclear or undefined defence budgeting processes and lack of capacity [and]
- "Significant off-budget military expenditure."[18]

This is an apt description of the PLA's budget, which complicates efforts to compare it to the United States with a high degree of fidelity. However, this lack of transparency does not make comparison impossible; it only means that the defense analytic community must endeavor to fill the information gap with reasonable assumptions.

Data Reliability

The Chinese government notoriously closed, which leads to a lack of trustworthiness, and thus, lack of reliability in their released data. In terms of trustworthiness of the available data, there is widespread skepticism of the economic data that the Chinese government makes available.[19]

There is a strong incentive inherent in the regime to provide data that supports the CCP's narrative, regardless of reality, which can lead

to unreliable or unrepresentative data. Economists Michael T. Owyang and Hannah G. Shell from the Federal Reserve Bank of Saint Louis, when discussing Chinese gross domestic product (GDP) data, describe it thus: "Skepticism for Chinese official economic data is widespread, and it should be.... China's economic data system is a work in progress and a hurdle that statisticians have yet to overcome."[20]

Aaron Friedberg, professor at Princeton University, explains the skepticism and reliability of data from the PRC's defense budget and its broader political context:

> In recent years U.S. officials have pressed their Chinese counterparts to be more "transparent" about defense spending, but there is little expectation that these pleas will yield meaningful results. Even if Beijing were suddenly to unleash a flood of information, American analysts would regard it with profound skepticism, scrutinizing it carefully for signs of deception and disinformation. And they would be right to do so; the centralized, tightly controlled Chinese government is far better able to carry off such schemes than its open, divided, and leaky American counterpart.[21]

A high level of skepticism ought to be applied when navigating the defense budget data currently available. The regime will provide data that fits the narrative it is looking to advance, be it of a double-digit increase or of increase below the rate of economic growth. Nonetheless, despite the skepticism, there is value in understanding the available data.

Recent Data on the PRC's Defense Budget

In July 2019, the People's Republic of China released the newest version of its defense white paper titled *China's National Defense in the New Era*.[22] In its appendices, two tables reveal more about the PLA budget than was previously available from PRC reporting to the U.N. The table titled "China's Defense Expenditure Since 2012," provides contextualized data from statistical yearbooks, such as the percentage of gross domestic product spent on defense, growth rate, and inflation index. However, this data does not provide much detail on how the defense budget is allocated.

For the purposes of this *Special Report*, the table from China's defense white paper titled, "Breakdown of China's Defense Expenditure (2010–2017)," is more revealing. It is a compilation of the budget data submitted to the United Nations Office for Disarmament Affairs from 2010 to 2017 and contains all the reported resources allocated to "personnel," "training and

TABLE 1

Official Chinese Figures on Military Spending

	PERSONNEL		TRAINING AND SUSTAINMENT		EQUIPMENT		TOTAL
Year	**Billions of Renminbi**	**Share of Total**	**Billions of Renminbi**	**Share of Total**	**Billions of Renminbi**	**Share of Total**	**Billions of Renminbi**
2010	185.9	35%	170.0	32%	177.4	33%	533.3
2011	206.5	34%	189.9	32%	206.3	34%	602.8
2012	195.6	29%	233.0	35%	240.6	36%	669.2
2013	200.2	27%	270.0	36%	270.9	37%	741.1
2014	237.2	29%	268.0	32%	323.7	39%	829.0
2015	281.9	31%	261.5	29%	365.4	40%	908.8
2016	306.0	31%	267.0	27%	403.6	41%	976.6
2017	321.1	31%	293.4	28%	428.8	41%	1,043.2

SOURCE: The State Council Information Office of the People's Republic of China, *China's National Defense in the New Era* (Beijing, China: Foreign Languages Press Co. Ltd., 2019), p. 39, http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm (accessed February 12, 2020).

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sustainment," and "equipment." These are reflective of the three categories that are reported in the 2019 white paper.

Both the white paper and the report submitted to the United Nations split the defense budget in three broad categories, listed and described below:

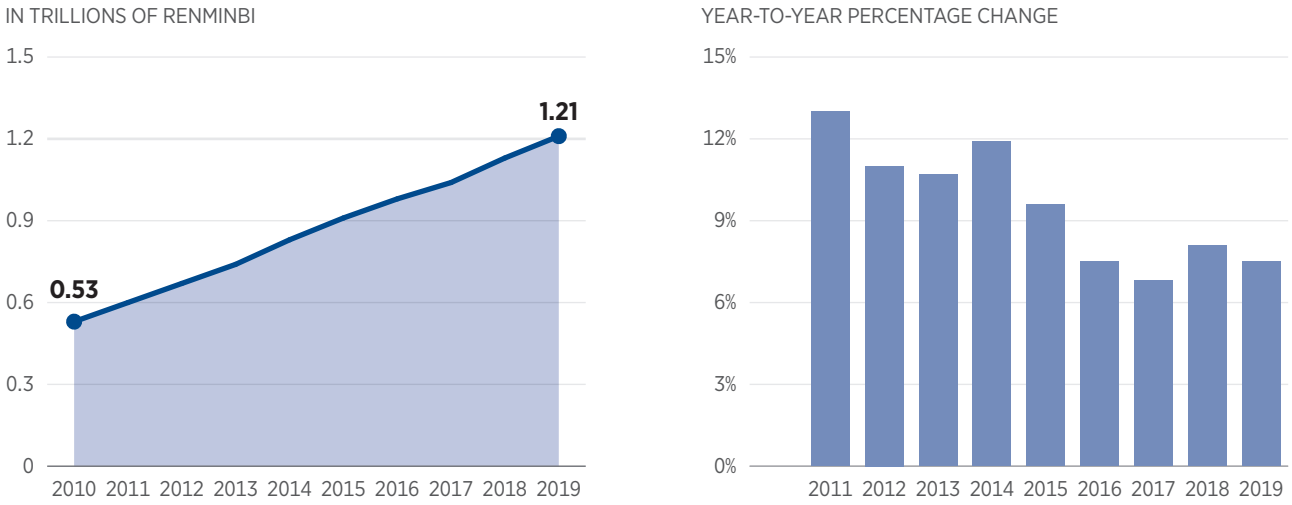
1. **Personnel expenses** for the salaries, allowances, food, bedding, clothing, insurance, subsidies and pensions for officers, non-ranking officers, soldiers, and contracted civilians, as well as retirees supported from the defense budget.

2. **Training and sustainment expenses** mainly cover training of the troops, institutional education, construction and maintenance of installations and facilities, and other expenditures on routine consumables.

3. **Equipment expenses** mainly cover research and development (R&D), testing, procurement, repairs, maintenance, transport, and the storage of weaponry and equipment.[23]

CHART 2

China Has Steadily Increased Funding for Its Military



SOURCES:

- The State Council Information Office of the People's Republic of China, *China's National Defense in the New Era* (Beijing, China: Foreign Languages Press Co. Ltd., 2019), p. 39, http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm (accessed January 24, 2020).
- Author's projections based on data from:
  - Andrew Erickson, "Xi's Strong Military Dream: China's Defense Budget to Grow 8.1% to ~$175 billion This Year, Rate Exceeds ~6.5% Economic Growth Target," March 5, 2018, http://www.andrewerickson.com/2018/03/xis-strong-military-dream-chinas-defense-budget-to-grow-8-1-to-175-billion-this-year-rate-exceeds-6-5-economic-growth-target/ (accessed October 23, 2019).
  - Andrew Erickson, "China's 2019 Defense Spending to Rise 7.5% to 1.19 Trillion Yuan (~177.61 Billion U.S. Dollars)," March 4, 2019, http://www.andrewerickson.com/2019/03/china-set-for-yet-another-big-defense-spending-increase-in-2019/ (accessed October 23, 2019).

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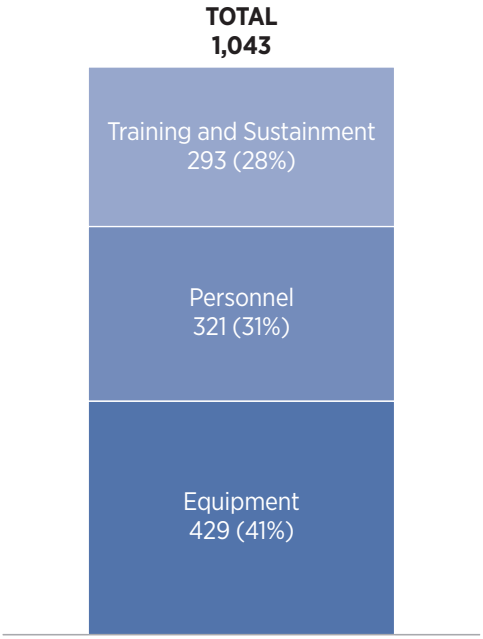
In these categories, the PRC claims that R&D costs are subsumed into the equipment expenses. However, because of the PRC's practices—such as intellectual property theft and ostensibly civilian research organizations performing defense work, which are funded outside the defense budget—it is not realistic to assume that all these costs are reflected in the equipment expenses.

U.N. Reporting Schemes

A large part of the data available on the PRC's military expenditures comes from the reporting requirements established by a United Nations General Assembly resolution,[24] which led to the creation of the United Nations Military Expenditures database.[25] The most recent white paper released by the PRC used the data previously reported to the U.N. to build its table of military

CHART 3

Breakdown of Chinese Military Spending, 2017, in Billions of Renminbi



SOURCE: The State Council Information Office of the People's Republic of China, *China's National Defense in the New Era* (Beijing, China: Foreign Languages Press Co. Ltd., 2019), p. 39, http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm (accessed January 24, 2020).

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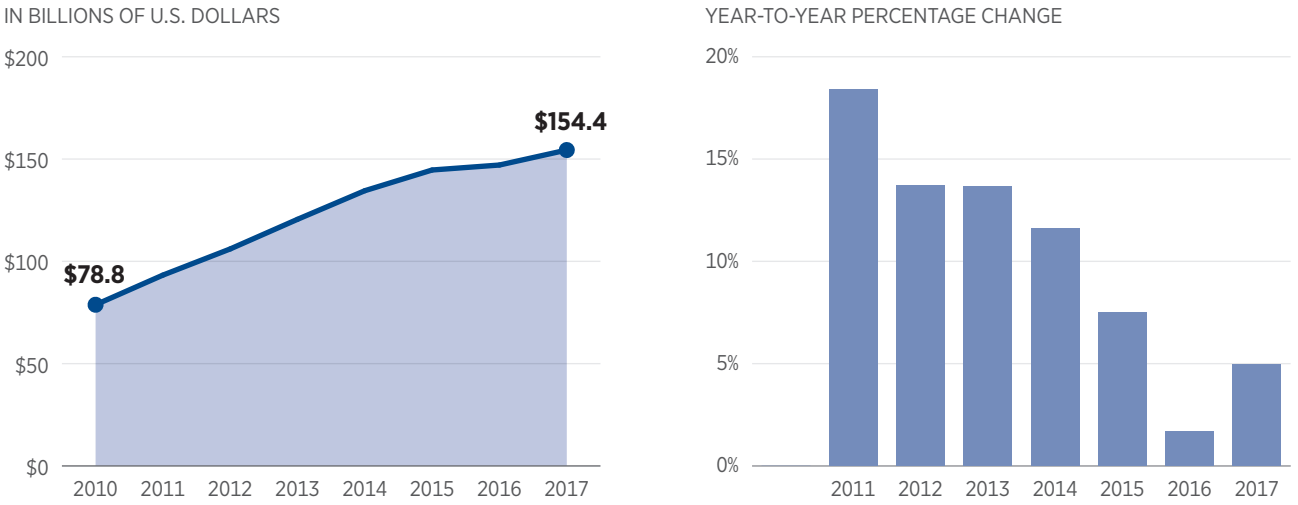
expenditures.[26] There are two important elements requiring discussion in order to have a better understanding of the power and of the limitations of the data—the level of detail in each report and the source of the data.

When it comes to the level of detail, the United Nations has three forms that countries can use to file their data if they have military expenditures: the "single-figure," the simplified reporting, and the standardized reporting form.[27] The People's Republic of China, despite having one of the largest defense budgets in the world, reports its expenditures under the simplified form.[28] The simplified form has four accounts and four forces and activities.[29] However, the Chinese Communist Party does not report *any* divisions between the different services, filling everything under "other" forces.[30] Additionally, it does not report one single dollar spent on research and development, which builds on the argument that military R&D in the PRC is done *outside* the official PLA budget.

CHART 4

Converting Renminbi to U.S. Dollars Suggests Less Robust Chinese Military Spending



SOURCE: Author's calculations based on data from Federal Reserve Bank of St. Louis, "China / U.S. Foreign Exchange Rate," 2019, https://fred.stlouisfed.org/series/DEXCHUS#0 (accessed January 24, 2020), and The State Council Information Office of the People's Republic of China, *China's National Defense in the New Era* (Beijing, China: Foreign Languages Press Co. Ltd., 2019), p. 39, http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm (accessed October 23, 2019).

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The second limiting factor—and biggest caveat of the data available through the U.N. Military Expenditure Database—is that the data are only as good as the national governments are willing to make them. In the case of the PRC, the CCP takes two steps to limit the data provided: It reports under a simplified form that is insufficient for its level of military expenditures, and it withholds data that should be in the form. This opaqueness in its military expenditures data is incompatible with a country that purports to support the U.N. mission and peace.[31]

Regardless of the inherent limitations of the data, this is the most detailed data that China has released on its defense budget in recent years. For 2018 and 2019, no data in this level of detail is yet available. All that is available is an announced topline and the growth percentage that it represents from the previous year.[32] This is why this *Special Report* focuses on 2017 data for its graphics and comparisons.

Market Exchange Rate

The U.N. reporting requirement and the Chinese white paper both report military expenditures in Chinese yuan, which is to be expected, but creates the problem of converting to dollars in order to have any meaningful comparison. The most commonly used way to covert is simply to use the market exchange rate (MER), which is widely available and serves to establish a baseline for the comparison between the military expenditures of the United States and of the People's Republic of China.

However, the MER is subject to two major caveats:

1. The PRC is not fully a market economy, and thus the environment in which the market exchange rate operates is severely limited.

2. There will always be fluctuations in the price of a currency in the market, since it is an international market with multiple actors.

It is also important to note a country's currency depreciation against the dollar, as it will show a decrease in its military expenditures that might not actually have taken place. This was especially acute in the case of the Russian defense budget, which saw a sharp decrease in dollars because of the rubble devaluation, as discussed by Richard Connolly from the University of Birmingham.[33]

Those caveats show substantial limitations in the comparative power of converting the CCP's released budget numbers through the MER. Nonetheless, it is a parameter that helps develop an understanding of their budget.

Estimating a More Complete PLA Budget

There are two main paths to create an understanding of the PLA's budget that allow for a meaningful comparison to the defense budget of the United States: filling the gaps by adding estimates of the portions of the PLA budget not publicized by the CCP and approximating the true purchasing power through indices adjustments such as purchasing power parity (PPP). Both tactics provide different insights into the PLA's budget, which is why this section highlights variations of both methods.

When it comes to filling in the gaps, there are substantial amounts of data unavailable about the budget of the People's Liberation Army, ranging from research and development to state subsidies to their defense industry. Institutions like the IISS[34] and SIPRI[35] have developed their own independent

CHART 5

Breakdown of Chinese Military Spending, 2017, in Billions of U.S. Dollars

SOURCE: Author's calculations based on data from Federal Reserve Bank of St. Louis, "China / U.S. Foreign Exchange Rate," 2019, https://fred.stlouisfed.org/series/DEXCHUS#0 (accessed January 24, 2020), and The State Council Information Office of the People's Republic of China, *China's National Defense in the New Era* (Beijing, China: Foreign Languages Press Co. Ltd., 2019), p. 39, http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm (accessed October 23, 2019).

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estimates in an attempt to account for those gaps. The United States government also maintains its own independent estimate—but discloses very little of how it reaches it.

When it comes to adjusting for differences in the costs of goods and services, unfortunately, the normalizing factors available all rely on data not specific to the military sector of the economy. This necessarily leads to approximation versus precision, for example, both purchasing power parity and labor adjustments are germane to the whole country's economy versus just the defense sector.

Following the lines of recent work from Richard Connolly, professor from the University of Birmingham,[36] this *Special Report* applies PPP adjustments to the PRC's military expenditures. These assumptions are

both reasonable and necessary to provide a more accurate picture of the resources allocated to the People's Liberation Army versus the United States Department of Defense.

Determining the Absences in the PLA Budget

When it comes to the elements that are not counted as part of the PLA's budget, the International Institute for Strategic Studies summarizes it well: "It is widely believed that the official budget takes no account of other military-related expenditures, including weapons purchased from overseas or research and development funding. In addition, attempts to calculate China's true military spending should include funds allocated to the People's Armed Police (PAP)."[37] IISS has begun developing its own estimate for the PLA's budget to fill the gaps that are not filled by the PRC's government announced budget, a project which is still ongoing as of the publication of this *Special Report*.[38]

A RAND study on the modernization efforts being carried out by the People's Republic of China agrees with the fact that there are substantial gaps in the reported defense budget. They state:

> [T]he official Chinese defense budget includes only a portion of the total defense budget. Although it includes most personnel, operations and maintenance, and equipment costs, it excludes: foreign weapons procurement, expenses for paramilitaries (People's Armed Police), nuclear weapons and strategic rocket programs, state subsidies for the defense-industrial complex, some defense-related research and development, and extra-budget revenue.[39]

The case of the Chinese government's paramilitary forces is especially interesting in this discussion. There was a credible argument to be made to exclude the People's Armed Police and the Coast Guard from the calculations of the PRC's military expenditures, since these forces were not under the control of the CCP's Central Military Commission. However, in 2018, the Coast Guard was placed under control of the PAP, which was then placed under the sole control of the CMC.[40] The presence of the military chain of command makes a very compelling argument that a full account of the PRC's military expenditures should include the resources dedicated to the PAP and the Coast Guard. However, estimates of the PAP budget are not available.

Another element missing in the reported defense budget of the People's Republic of China is research and development. In the United Nations

Report on Military Expenditures submitted by the PRC, there is an explicit account area for R&D that has been reported as zero for every year there has been an available report.[41] David Shambaugh, professor at George Washington University, discussed the absence of R&D funds under the announced defense budget, stating:

> The second area of defense expenditure not fully covered in the official budget is research and development (R&D). Estimating the channels and amounts of funding for this sector is a real conundrum. Funds appear to be derived from four sources—the General Armaments Department (GAD), COSTIND [Commission for Science, Technology and Industry for National Defense], the Ministry of State Science and Technology, and the defense industries themselves—although the division of labor and investment among them is unclear. Of the three, COSTIND has clearly been the principal source of R&D funds, although this is apparently changing with the creation of the GAD.[42]

The defense industrial base of the People's Republic of China has been reorganized since Shambaugh's description; however, the outline of the picture is still valid. There have been multiple reforms aimed at diversifying the companies involved in the Chinese defense industrial base and reducing the dependence on military-exclusive work.[43] Even through the multiple reorganizations, it has remained a constant that the resources for military research and development projects were largely absent from the released PLA budget.

Tai Ming Cheung, professor at the University of California, San Diego, explains: "Funding for defense-related research and development, for example, comes primarily from other areas of the central government budget, most notably those allocated to the State Administration for Science, Technology, and Industry for National Defense (SASTIND), which is not included in the official defense budget."[44] In the current scenario of competition for high technology military developments, the absence of R&D funds in the announced PLA budget is extremely important—especially considering that around 15 percent of the United States' defense budget is dedicated to research and development.

The absence of R&D funds in the reported Chinese military expenditures is made even more pronounced by its civil–military fusion strategy.[45] This strategy makes it harder to quantify the resources dedicated to R&D, since it will necessarily leverage resources initially spent for civilian R&D. The PRC is pursuing a strategy of leveraging developments in the civilian economy for military uses. In a country in which the distinction between private

and public is blurred, this guarantees that the CCP will be able to obtain the benefits the technological innovations developed under its auspices, regardless of the source.

As put by a study on the civil–military fusion's effect in the Chinese defense industry, "[Civil–military fusion] also obfuscates an accurate estimation of China's defense expenditures and degree of PLA influence within the civilian state sector."[46] Thus, by design, civil–military fusion makes defense research and development less transparent.

Additionally, the PRC has a bureaucracy that is not funded through the PLA budget, but through the SASTIND, which serves to advance civil–military fusion.[47] This is further evidence that military R&D is not funded through the reported defense budget.

Further complicating the projection of the PLA's R&D budget is the fact that the PRC is notorious for its theft of intellectual property, which can be used to propel defense R&D efforts. As Kevin Carroll, former Counselor to the U.S. Secretary of Homeland Security, stated, "America's defense industrial base is a primary target of China's campaign of theft, which presents a special danger."[48] The PRC's theft of intellectual property has focused on the Western defense industry and American universities that are working on technology that could be of interest.[49]

Additionally, when it comes to some defense developments that are not on the bleeding edge of technology, the PRC can count on a late-mover advantage, relying on the experiences of early adopter countries for the current generation of its equipment.[50] For instance, the PLA has had the opportunity to observe multiple naval forces incorporate aircraft carriers in their force structure and understand how they are utilized before launching one of their own. Whereas the United States had to develop its aircraft carrier battlegroup concept through trial and error, the PLA will be able to leverage American military experience for its benefit. The PLA leveraged this type of secondhand knowledge to modify its operating doctrine—and undoubtedly does the same for military technology.[51]

Unfortunately, all of these combined factors make the level of military R&D allocated by the PRC currently unquantifiable. There should be more research and scholarly work done to determine the amount of money dedicated by the PRC to military R&D.[52]

Filling the Gaps

Because of the lack of transparency in many areas of the PLA's budget, many analysts have endeavored to fill the knowledge gaps to create better

approximations of what the CCP actually spends on its military. As explained by the Stockholm International Peace Research Institute when discussing its methodology:

> In its estimates of Chinese military expenditure, SIPRI seeks to take into account a number of sources of military expenditure outside the official defence budget. Such sources of military expenditure include funding from other central government ministries (some of which is publicly available, some of which is not), funding from local government and funding from internal People's Liberation Army (PLA) sources—the latter probably represents a much smaller share of the total than in the past.[53]

The International Institute for Strategic Studies also started to develop estimates that fills the gaps between the reported PLA budget and actual expenditures. IISS is still in the process of further developing its estimates and the data displayed is currently preliminary.[54] As discussed in the 2010 edition of their Military Balance:

> It is widely believed that the official budget takes no account of other military-related expenditures, including weapons purchased from overseas or research and development (R&D) funding. In addition, attempts to calculate China's true military spending should include funds allocated to the People's Armed Police (PAP).[55]

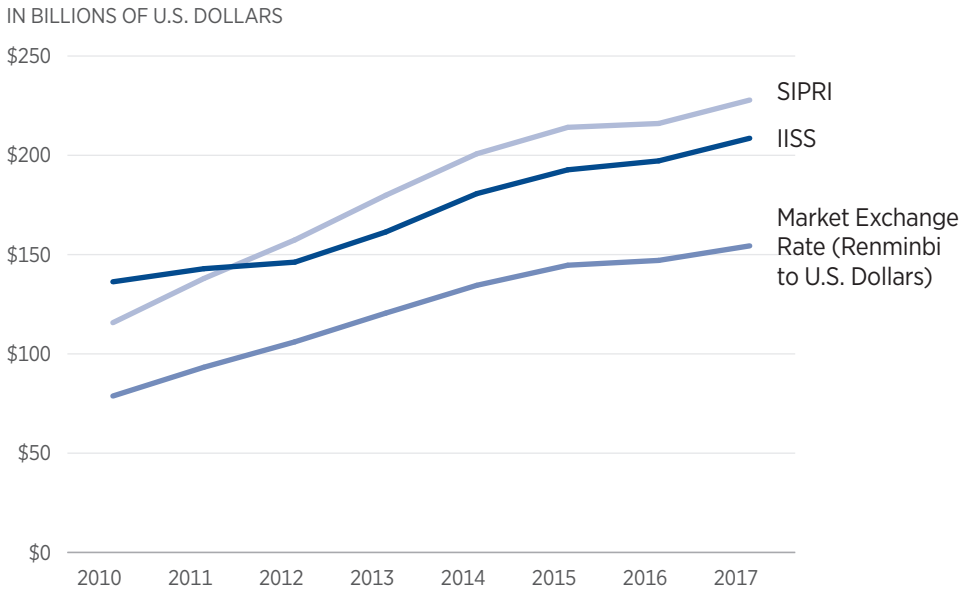
SIPRI and IISS both project their own estimates of the PLA budget by adding the elements that would be part of a regular defense budget. In Chart 6, there are three different sets of data on the PLA budget. The first one is the reported PLA budget in thousands of dollars, using the market exchange rate provided by the Federal Reserve for each year represented. Its main purpose is to show the gap between the reported budget and the estimated ones, which can be seen as fully burdened as the current transparency levels allow.

Both projections are substantially above the reported budget, the lowest being 33.2 percent above the reported numbers, while the highest is 73 percent. SIPRI's budget estimates add, on average, 47.8 percent to the reported budget. IISS, on the other hand, averages a 41.8 percent increase.

Taken as whole, the difference between the reported defense budget and the estimated defense budget amounts to 45 percent, on average. Considering that the reported PLA budget was around $180 billion in 2019, a 45 percent increment is a huge amount of resources.

CHART 6

Various Metrics Show Steady Growth in Chinese Military Spending



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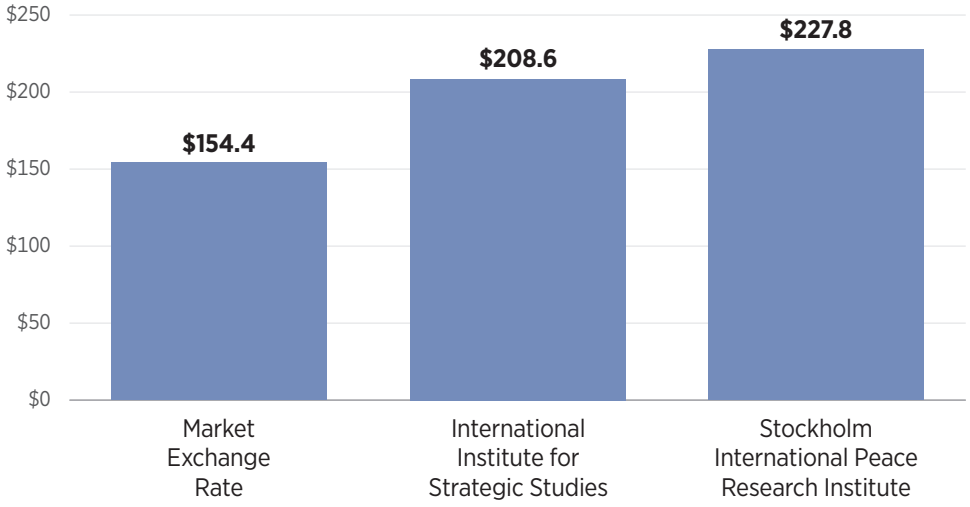
Purchasing Power Parity Adjustments

Anyone who has traveled has experienced differences in costs between localities. Across nations, the differences are even more pronounced. This is why the World Bank, under its International Comparison Program, developed the measure of purchasing power parity in 1970.[56] PPP provides a way to equalize cost across different economies. As described by the World Bank, "PPPs are price relatives that show the ratio of the prices in national currencies of the same good or service in different economies."[57] The concept is

CHART 7

How Different Measures of China's Current Military Spending Compare

IN BILLIONS OF U.S. DOLLARS, 2017



SOURCES:

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- Author's calculations based on data from:
  - Federal Reserve Bank of St. Louis, "China / U.S. Foreign Exchange Rate," 2019, https://fred.stlouisfed.org/series/DEXCHUS#0 (accessed January 24, 2020).
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meant to express a ratio that represents the same services or goods in different locations to understand better the relative power of the local currency.

As exemplified by its creators, "if the PPP for GDP between France and the United States is €0.95 to the dollar, it can be inferred that for every dollar spent on GDP in the United States, €0.95 would have to be spent in France to purchase the same volume of goods and services."[58]

When it comes to countries as disparate as the United States and the People's Republic of China, it is very relevant to have an equalizing factor such as PPP when comparing the resources dedicated to any activity. As of 2018, the PPP rate for China was 3.55, meaning that $1 would purchase the equivalent of $3.55 of goods and services in China.

PPP has limitations that are inherent in an index designed to compare the whole of the economy, not just a specific sliver of the economy in which the government has monopsony power like the defense budget. When it comes to goods and services in a defense budget, goods that are widely available in the civilian market would be the most impacted by PPP, for example, maintenance supplies, software, IT equipment, food, clothing, and all items that are not exclusive to the military. These items represent a big portion of a nation's defense budget, since any bureaucracy will require the same ordinary items to operate, from pens to printers to staplers.

Professor Peter Robertson of the University of Western Australia recently used PPP to provide a more accurate understanding of the CCP's military expenditures. Robertson assessed that

> [u]sing these rates allows us to see how much the spending in each country actually buys—allowing for price differences between countries as well as how defence planners might react to these different prices given their defence priorities. Looking at these differences, my analysis suggests China's military spending is equivalent to the US spending about $US 455 billion.[59]

PPP has, however, a few important shortcomings.

1. It depends on the law of one price, which postulates that goods will have the same price internationally because markets will eliminate any arbitrage. This is not going to be the case for military goods, since those goods tend to be heavily regulated and not easily tradable across national borders.

   Military services are also very far from being tradable across national borders. By their very nature, military goods and services are not going to be directly representative of the broader economy.

2. The PPP index from the World Bank was last produced in 2011.[60] Since producing the data, the World Bank has updated the index, but it has not re-measured its basket of goods and services.[61] Even if the PPP data targeted military goods, the years that have passed have made the data less reliable.

3. Because the People's Republic of China is not an open economy and its government is quite opaque, the initial data is going to be less reliable, which will necessarily compromise the output. As explained by the

CHART 8

When Adjusting for Purchasing Power Parity, China's Current Military Spending Rises Significantly

IN BILLIONS OF U.S. DOLLARS, 2017

SOURCES:

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World Bank, "The reliability of PPPs depends on the quality of the underlying price and expenditure data reported by the participating economies, as well as the extent to which the goods and services priced reflect the consumption patterns and price levels of participating countries."[62]

Thus, because of the unusual veil of secrecy that surrounds the Chinese government and its interference in the economy, it is fair to assume that the reliability of the underlining data is going to be questionable.

Despite these three shortcomings, PPP currently is the best index available to compare prices across economies and provides a good approximation of the value purchased in that economy. It is not a perfect measure by any means, but it is a better approximation than simply using the market exchange rate.

Adjusting for Labor Costs

When assessing the publicized data on the CCP's military expenditures, personnel is the one that has the most room for the development of an index to adjust it to something analogous to American personnel expenditures. The index was developed comparing data on the "average Wage of Employed Persons in State-owned Units" in yuan from the National Bureau of Statistics of China,[63] converted into U.S. dollars through the PPP index of the World Bank,[64] to the average wage of a government worker in the United States from the U.S. Bureau of Economic Analysis at the Department of Commerce.[65] The result is a multiplier that indicates that the American government labor force is between 2.7 times to four times more expensive than the government labor force in China. This index has been consistently declining in the past six years, likely reflecting a more expensive labor force consistent with a country that is becoming richer and its workforce more qualified (and thus more expensive).

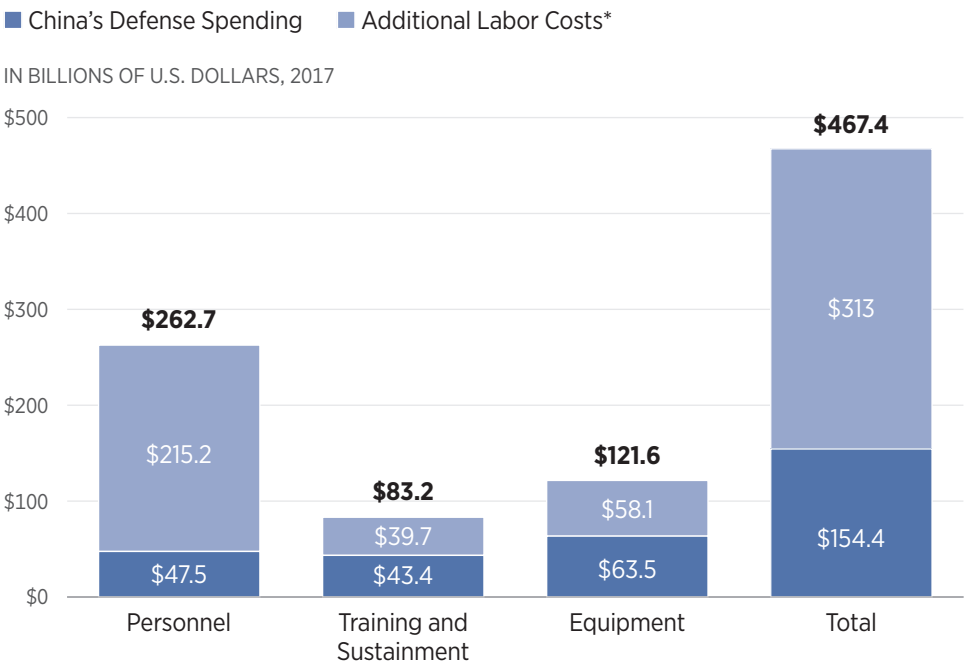
This index is not going to yield a high level of data fidelity because it considers all government workers in both the United States and in the People's Republic of China, from city-level service providers to the highest levels of the bureaucracy. However, it is the most detailed equivalent data that is widely available at this time.

Chart 9 adjusts the personnel costs of the PLA using the index described above. It uses PPP to adjust both the equipment and training and sustainment accounts. Because of the outsized impact that labor costs, it shows an impressive purchasing power in the PLA budget—hitting the equivalent for at least $450 billion in the years 2015 through 2017.

Chart 10 stacks the five possible ways to adjust the military expenditures of the CCP, showing how the adjustments go from the low end (simply using the market exchange rate) to PPP projections to adjustment to government wages. Each of those methods highlights and tries to address a gap in the public knowledge of the resources that are available to the PLA.

CHART 9

Factoring in Labor Costs Reveals Higher Chinese Military Spending



* Additional costs for Personnel are based on government labor costs. Additional costs for Training and Sustainment and Equipment are based on Purchasing Power Parity.

SOURCE: Author's calculations based on data from:

- Federal Reserve Bank of St. Louis, "China / U.S. Foreign Exchange Rate," 2019, https://fred.stlouisfed.org/series/DEXCHUS#0 (accessed January 24, 2020), and The State Council Information Office of the People's Republic of China, China's National Defense in the New Era (Beijing, China: Foreign Languages Press Co. Ltd, 2019), p. 39, http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm (accessed January 24, 2020).
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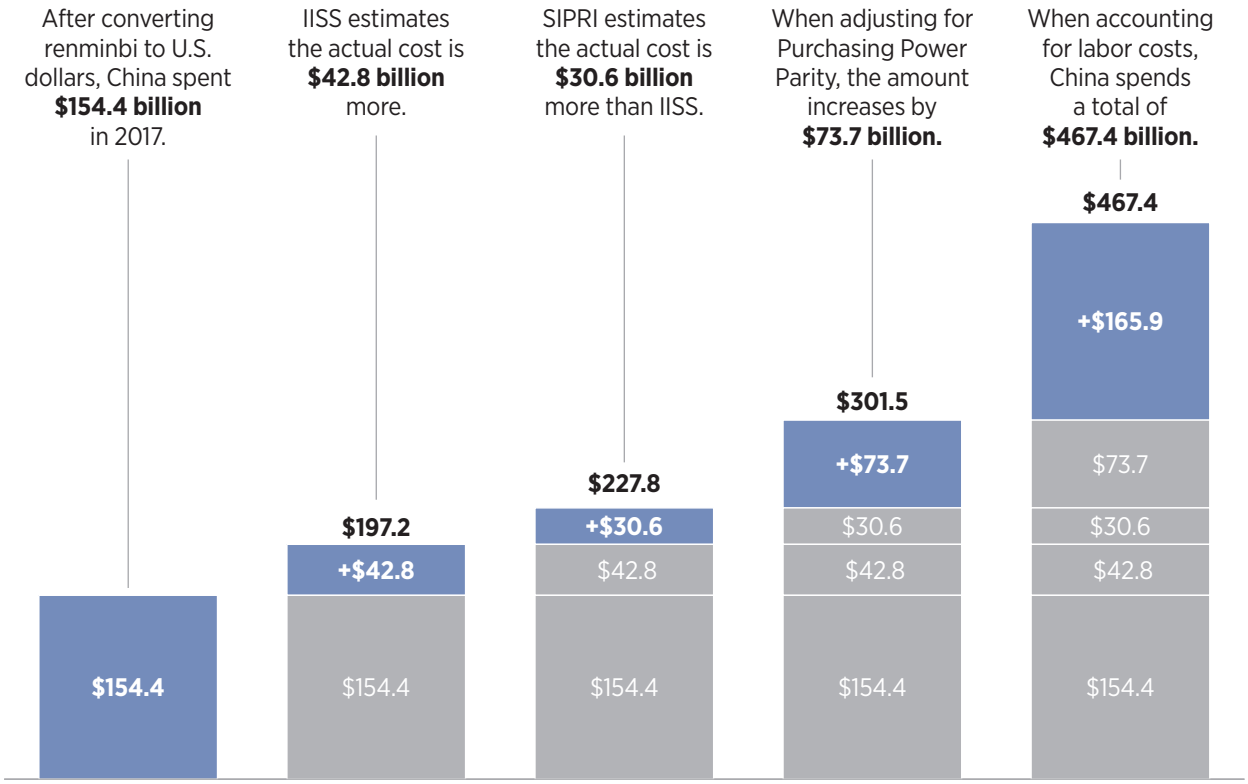
CHART 10

How Much Does China Really Spend on Its Military?



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Comparing to the United States Defense Budget

In order to build a comparison of the PLA's budget to the United States, this section reduces the level of fidelity in the data available on the American defense budget and reorganizes it to match the organization of the data available on the PLA. This analysis organizes American military expenditures under the simplified PRC categories (personnel, training and sustainment, and equipment) and excludes expenditures in research, development, test, and evaluation (RDTE) to paint a picture that emulates Chinese reporting standards. Under the United Nations' simplified report, there is a fourth category for defense research expenditures, under which the PRC does not report any expenditures for research in the United Nations report or in their white papers.

Because of the knowledge gap that currently exists in determining Chinese military R&D and in order to get the most fidelity in a comparison with the American defense budget, it is better to exclude American RDTE funding, which is known. Taking this route will result in a substantial decrease in the U.S. defense budget, since RDTE was 12.2 percent of the defense budget in 2017.

The other large distortion in the American defense budget in Chart 11 is the amount dedicated to personnel. The simplified U.N. reporting considers all personnel expenditures in its category, while the United States considers civilian salaries under operations and maintenance. For this comparison, civilian salaries were removed from operations and maintenance and merged into personnel, as was family housing. The training and sustainment account is the traditional operations and maintenance account without civilian salaries, but with military construction and management funds merged into it.

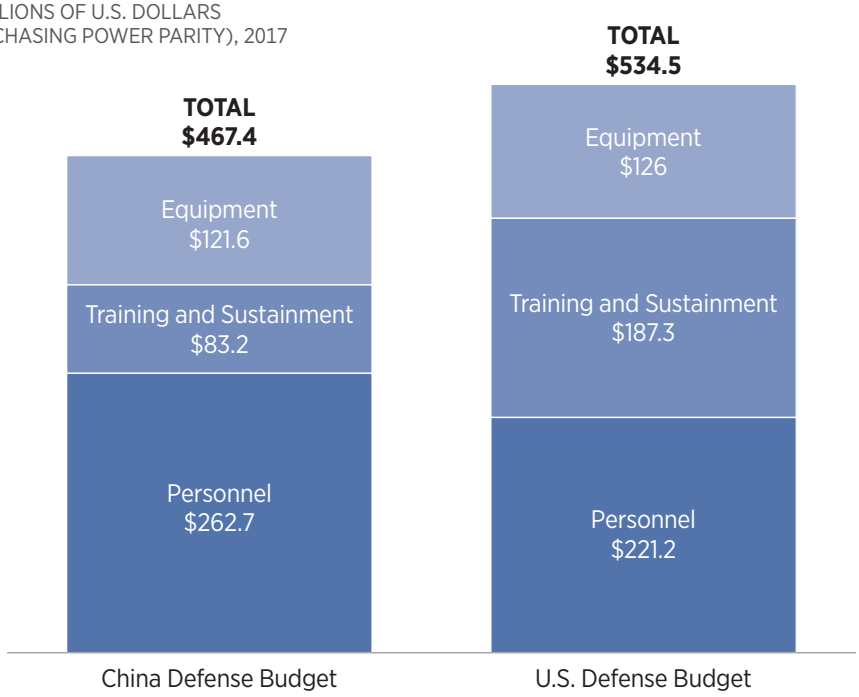
When compared in terms that are closer to equal, two different things jump to mind: costs of operations and the amount dedicated to equipment. It is expected that the United States would allocate multiple times more resources for "training and sustainment" than the PRC, since that is the account that pays for using its armed forces—something that the United States has been doing substantially, while the PRC has not. However, with increased military activity of the PLA abroad,[66] it is likely that the Chinese account has seen an increase since 2017, the most recent year of available data.

On equipment, the PLA has increased the amount of resources that it dedicates to equipment every year according to the white paper dataset.[67] When converting for PPP, the level of resources dedicated to equipment is

CHART 11

Properly Measured, China's Defense Budget Is 87 Percent the Size of the U.S.'s

IN BILLIONS OF U.S. DOLLARS
(PURCHASING POWER PARITY), 2017



SOURCE: Author's calculations based on data from:

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only $4 billion shy of the United States—$121 billion for the PRC against $125 billion for the U.S. This shows that the CCP leadership is serious in its investments for new military equipment.

Recommendations

The publicly released budget profile of the People's Liberation Army fits the narrative of a nation that is modernizing its armed forces while growing in wealth. Those combined characteristics have permitted the CCP to increase the resources available to the PLA while maintaining a low percentage of the Chinese GDP as marked for military expenditures.

The increased expenditure, combined with the recent reforms of the PLA, have substantially changed the profile of the military available to the CCP to project power. Dennis Blasko, an authority on the PLA, aptly describes the current situation:

> Whatever the true numbers may be, the Chinese military has a much larger pot of cash to spend on fewer troops than it did ten years ago. At the same time, personnel, equipment, and training costs for a more modern, technologically advanced military are also significantly higher than in previous decades.[68]

Blasko's description holds even more sway in the context of the 2015 reforms of the PLA, which are described at length in a recent volume from the National Defense University's Center for the Study of Chinese Military Affairs.[69] These reforms are enabling the CCP to have better control over its armed forces and to modernize them.

Regardless of the level of opacity that the CCP imposes on their military expenditures, it is quite clear that the PLA has been going through a serious modernization and reorganization effort fueled by increased resources in the past 30 years. With the 2015 reforms and modernizations, the CCP is developing the ability of the PLA to project power outside its surroundings, while maintaining its main mission of assuring the continuance of the CCP's hold on power.

To ensure that the U.S. can respond and, when necessary, balance against the CCP's actions abroad, the United States needs to recognize that the PLA is increasingly equipped to project power and change its policies accordingly. In order to be better equipped to respond to the CCP's actions, Congress should:

- **Provide consistent and predictable defense budgets.** The United States is involved in a long-term competition with the People's Republic of China and Russia, which will take consistent and predictable budgets to allow the Department of Defense to develop strategies to respond to the PLA's advances to erode international norms and rules.

The era of great power competition will require consistency, predictability, and sustainability of effort.

- **Include a budgetary discussion in the U.S.–China Economic and Security Review Commission Annual Report to Congress.** The annual report already highlights and showcases future actions for the United States in its relationship with the PRC. It ought to include American projections of the PLA's budget and its methodologies.

The United States Mission at the United Nations should:

- **Push and lead on transparency in military expenditures.** The Mission at the United Nations should leverage the U.N. military expenditures report as a way to shame the People's Republic of China into being more transparent in the resources dedicated to the PLA. The United States leads by example in this area—anyone can access the American defense budget online. It needs to leverage this leadership into calls for further transparency. In the case of the PRC, merely reporting using the standard form instead of the simplified one would be a substantial step forward.

The United States government should:

- **Publicize American estimates of the PLA's budget.** The Department of Defense and the Intelligence Community, in particular, the Defense Intelligence Agency, have their own estimates of the People's Liberation Army budget and how much the PRC spends on military research and development. However, the data and the methodology of how the numbers are calculated have not been widely available to the public. The CCP regime wants to keep all possible military data opaque; the U.S. intelligence services should not make it easier for them to do so. The U.S. government should do everything it can to provide some sunlight and data on how the CCP is building its military power. Further, the government should encourage allies to share their own estimates on the PLA's financial resources.

- **Highlight the importance of transparency in military expenditures.** As the PRC increases its military expenditures, it needs to become more transparent in how it allocates resources. By not having a detailed and periodically publicized defense budget, the CCP is

creating more instability in the world by creating doubts about its intentions and military capabilities. This should be stressed by the United States whenever discussing the PLA's military capabilities.

The United States ought to continue pressuring for increased military expenditures transparency and, at the same time, publicize the data that the U.S. government has developed on the PLA's budget. The combination of those two actions will help provide a modicum of sunlight on such an opaque field of knowledge.

Conclusion

The National Defense Strategy's determination of an era of great power competition represents an important step in combating the destructive influence of the CCP for world norms and stability.[70] However, now the Department of Defense needs to reorient itself fully to face the threats posed by the PRC. The National Defense Strategy outlined and identified the threat, and now it needs to be implemented in a sustainable manner.

The challenge of great power competition resides in maintaining the focus and the effort in the long term. The CCP's plans are long term and largely incremental in their nature, from their challenges in the Arctic[71] to their methodical military budget build-out illustrated in this *Special Report*. The United States needs to sustain its focus on great power competition and building the proper military tools through many electoral cycles and multiple presidents. It is a not a challenge that will be solved before the next presidential election.

The United States will have to continuously shine a light on the CCP's military activities and on the PLA's military build-up. The U.S. government should make more of its data on the PRC's military expenditures available to the public in order to build awareness of the challenge and to garner public support in addressing the rise of the PRC's significant across-the-board increases in military spending. The challenges posed by the CCP and its military will likely only increase in the coming years: The democratic world needs to be aware of those challenges in order to effectively respond.

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