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Russian Military Expenditure in Comparative Perspective: A Purchasing Power Parity Estimate

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Abstract

In this CNA occasional paper, Richard Connolly provides a purchasing power parity (PPP)-based estimate of Russian military expenditure that (a) approximates the real scale of resources allocated to military expenditure in Russia and (b) is readily comparable with PPP-adjusted military expenditure in other countries. Connolly makes several key arguments. First, the use of PPP-based estimates reveals the *level* of Russian military expenditure to be considerably higher than market exchange rate-based estimates. Second, PPP-based estimates show that the *rate of growth* of Russian military expenditure is slower than that suggested by market exchange rate-based estimates. The rate of growth over the last decade was lower than in other "emerging" powers, such as China and India. Third, after adjusting PPP-based estimates of total military expenditure for imported military equipment, Russia has held a steady position as the world's fourth largest military spender behind the United States, China, and India. Fourth, although Russian military expenditure has grown quickly relative to the US and other high-income countries, such as the United Kingdom, France, and Japan, it has grown at a slower rate than other low- and middle-income emerging powers, such as China, India, and Saudi Arabia.

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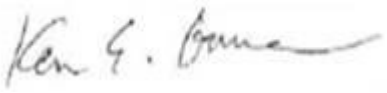

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Introduction

It is now largely accepted that the Russian military enjoyed a significant and, from the Russian perspective, much-needed revival after 2010.[1] Boosted by an ambitious rearmament program that began in 2011, the military received a substantial and sustained injection of funding from the federal government.[2] These extra funds helped improve pay and conditions for those employed in the armed services and its supporting structures, and it helped replenish the armed forces with new or modernized equipment.[3] Increased military expenditure also enabled the armed forces to increase the scale and tempo of training and exercises.[4] As a result, this expanded spending enhanced Russia's overall military capability, which in turn strengthened Russia's position as a geopolitical actor and reinforced its leadership's claims to Russia's status of a "great power."

However, considerable confusion remains over the relative scale of Russian military expenditure. Much of this confusion is explained by differences in *what* analysts choose to measure when examining military expenditure. For example, definitions over what constitutes military spending in Russia vary. Should, for example, spending on paramilitary forces be included? If so, any estimate of expenditure that includes this spending will be higher than those that do not. But confusion is also generated by *how* analysts choose to measure military expenditure. For example, when US dollars (USD) calculated at market exchange rates are used to measure military expenditure across countries, the data can fluctuate wildly over time—typically due to changes in relative exchange rates rather than any significant changes in military expenditure. As a result, when the ruble (RUB) depreciated sharply vis-à-vis the USD in 2014–15, Russia's military expenditure was often presented as having declined, even though its military expenditure was in fact growing in terms of local currency. Taken together, these differences in *what* and *how* we choose to examine Russian military expenditure can result in very different assessments of Russia's present and future military potential. This variation in

[1] Bettina Renz, *Russia's Military Revival*, (Polity Press, 2018).

[2] Julian Cooper, *Russian Military Expenditure: Data, Analysis and Issues*, FOI, 2013, https://www.foi.se/rapportsammanfattning?reportNo=FOI-R--3688--SE; Julian Cooper, *Russia's State Armament Programme to 2020: a Quantitative Assessment of Implementation 2011-2015,* FOI, 2016, https://www.foi.se/rapportsammanfattning?reportNo=FOI-R--4239--SE.

[3] Richard Connolly and Cecilie Sendstad, "Russian Rearmament. An Assessment of Defence-Industrial Performance," *Problems of Post-Communism* 65, no.3 (May-June 2018).

[4] Johan Norberg, *Training to Fight. Russia's Major Military Exercises, 2011-2014*, FOI, 2015.

turn presents problems when comparing Russian military expenditure with that of other countries. All of these issues should concern analysts seeking to understand the scale of the challenge posed by Russia's military revival. After all, an accurate measure of the volume of financial resources allocated to military purposes is a crucial component of any country's military potential.

This paper provides an estimate of Russian military expenditure that (a) approximates the real scale of resources allocated to military expenditure in Russia and (b) is readily comparable with military expenditure in other countries. This estimate should help focus analysts' attention on both the scale and rate of change of Russian military expenditure, and also on whether trends in Russian military expenditure are "normal" compared to other countries. To do so, this paper is structured as follows. It presents the main methods for estimating the scale of the defense "burden" in the first section. It then outlines several estimates of Russia's defense "effort" in the second section, including measures that are based on a purchasing power parity (PPP) calculation of military expenditure.

Russia's Defense Burden

The volume of a country's defense spending (the "defense effort") is determined by the size of that country's economy (i.e., the total available productive resources) and the chosen proportion of total resources that country allocates to defense expenditure (the "defense burden"). Thus, Country A might make a greater defense effort with a smaller economy than Country B with a larger economy if the political leadership in Country A decides to allocate a greater share of government spending to defense expenditure than Country B does. Consequently, the scale of a country's defense "effort" is primarily constrained by the size of that country's economy; by contrast, the scale of the defense "burden" is primarily constrained by political variables, such as the willingness of a country's government and population to tolerate the allocation of scarce resources to military ends rather than other purposes, such as health or education.

Measures of defense effort, which place a monetary value on a country's military expenditure (usually in USD), are subject to confusion over which units of measurement are used, as discussed in the next section. But measuring the defense burden, usually expressed as a proportion of a country's gross domestic product (GDP) or total government spending, is also far from simple. Although the Russian government does not conceal the scale of its military expenditure to the same degree that its Soviet predecessors did, the transparency of federal government spending on the military is still declining.[5] This is compounded by the fact that important items of military expenditure are sometimes funded by chapters of the federal budget outside the chapter (02) of the budget labelled "national defense."

The intricacies of the Russian defense budget are discussed in considerable detail in Cooper (2013); however, for the purposes of simplicity, the three main methods for estimating Russia's defense burden are described here.

1. The narrowest definition includes only expenditure included under the "national defense" chapter of the federal budget.[6] This includes expenditure on procurement, military wages, pensions, housing, training and exercises, and operational expenditure. It also includes personnel costs, operations and maintenance, construction, and the development and production of nuclear weapons by Rosatom. The bulk of spending under this chapter is made up of spending by the Ministry of

[5] This is discussed in greater detail in Cooper, *Russia's State Armament Program to 2020*.

[6] The processes relating to Russia's defense budget are described fully in Julian Cooper, "The Russian Budgetary Process and Defense: Finding the 'Golden Mean,'" *Post-Communist Economies* 29, no. 4 (2017): 476-90, https://www.tandfonline.com/doi/abs/10.1080/14631377.2017.1333793.

Defense (MOD). It also includes some items of expenditure that are not normally included by international organizations such as NATO and SIPRI, such as destroying old weaponry and preparing the economy for mobilization. Military expenditure under the "national defense" chapter represents a lower bound of the scale of Russia's defense burden.

2. A wider definition that corresponds more closely to the definitions employed by NATO and the Stockholm International Peace Research Institute (SIPRI) is also often used. This includes spending by the Ministry of Defense under other chapters of the budget, such as military pensions (under the "social policy" chapter), as well as spending under the "education," "health," "culture," and "mass media" chapters of the budget. The federal budget also finances other forces, such as paramilitary forces that are judged to be trained and equipped for military operations. In Russia, such forces include the Russian National Guard (*Rosgvardiya*) and the Border Service attached to the Federal Security Service (FSB). Taken together, these areas of spending plus the "national defense" chapter represent the wider definition of military expenditure used by SIPRI. Because this definition is used by SIPRI to assess military expenditure across different countries, this definition is most commonly used when comparing the defense burdens of different countries.

3. The widest definition of Russian military expenditure includes additional instruments used to finance military spending. For example, between 2011 and 2015, the government employed state guaranteed credits (SGCs), provided via state-owned banks, to augment direct budgetary funding of the annual state defense order (*Gosudarstevennyi oboronnyi zakaz*, or GOZ), which is used to procure new equipment, modernize and repair existing equipment, and carry out research and development (R&D). Between 2011 and 2016, SGCs added an additional 1.2 trillion RUB to direct federal government-funded defense procurement. Military expenditure is also provided through a variety of Federal Targeted Programs (FTsP, or *federalnye tselevye programmy*), which supplement direct procurement spending. For instance, the FTsP for the "Development of the Defense-Industrial Complex" is the largest of these programs.[7] Others include programs to develop the space launch centers and the electronic components industry, both of which are strongly linked to military activities in Russia. Because these other ministries fund these programs (such as the Ministry

[7] For a discussion of dual-use FTsPs, see: Alexei Nikolsky, "Russian Defence and Dual-Use Technology Programs." *Moscow Defence Brief*, no. 5 (2015): 18–20. Further details of all FTsPs can be found at: Департамент государственных целевых программ и капитальных вложений Минэкономразвития России, "Государственные программы," Федеральные целевые программы России, http://fcp.economy.gov.ru/cgi-bin/cis/fcp.cgi/Fcp/GosProgram/View/2014.

for Industry and Trade), and because many programs have at least partial civilian purposes, expenditure on FTsPs is not usually included in calculations of Russian military spending. However, estimates of military expenditure formulated by Vasily Zatsepin from the Gaidar Institute for Economic Policy (IEP) in Moscow include these additional expenditure items. Taken together, these estimates usually represent the upper bound of the scale of Russia's defense burden.[8]

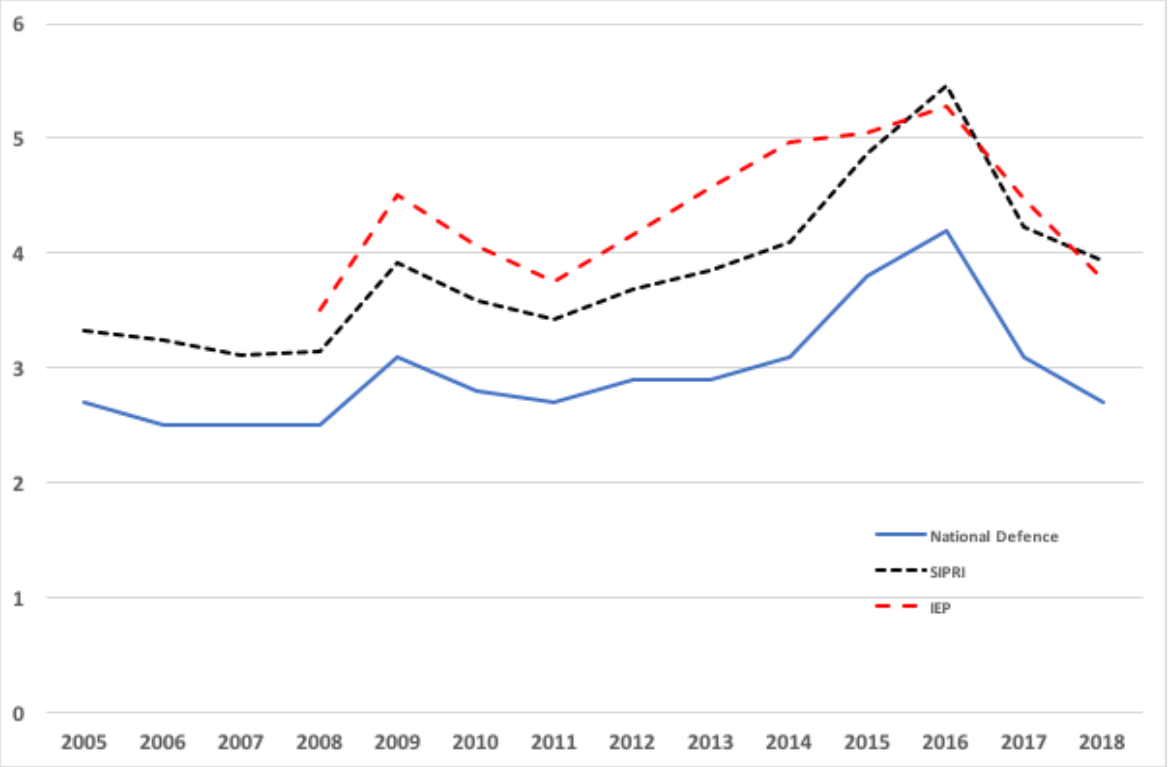
The Russian defense burden over time

As illustrated in Figure 1, all three measures show that Russia's defense burden rose steadily between 2005 and 2016 and then declined. The defense burden—as measured by spending under the national defense chapter of the federal budget—has tended to fluctuate within a band of 2.5–3.5 percent of GDP, with the notable exception of 2016. In fact, the defense burden measured in this way has never dipped below 2.5 percent of GDP since the collapse of the Soviet Union in 1991. This demonstrates that military expenditure in Russia is viewed as relatively inelastic by the political elite, at least on the downside. This suggests that even during times of economic hardship, there is a limit to how low Russia's leaders will allow the defense burden to go.

One important point relates to precisely when Russian defense spending peaked. The data presented in Figure 1 suggest that spending peaked in 2016. However, this data point is distorted by the fact that the government made a lump-sum payment of around 700 billion RUB to reduce the principal outstanding on the SGCs owed by defense-industrial enterprises to state-owned banks. A smaller lump-sum payment was also made in 2017. These SGCs were used to supplement direct funding from the budget for the GOZ between 2011 and 2015. The government decided to intervene before large repayments were due over 2017–18, largely because a number of enterprises would have found the repayment schedule too onerous, raising the prospect of rising non-performing loans affecting the state-owned banks that had provided the loans.

[8] An alternative method using National Accounts data, available for only 2015–2017, is outlined in: Olga Ageeva, Ivan Tkachev, and Yulia Starostina, "The Secret Part of GDP Reached 4.9 Trillion Rubles," (Секретная часть ВВП достигла 4,9 трлн руб.), *RUBK.ru,* Aug. 28, 2019, https://www.RUBc.ru/economics/28/08/2019/5d5ff9129a79472cffd85d1a?from=from_main.

Figure 1. Military spending share of GDP (%)



Source: Russian Ministry of Finance; SIPRI; Gaidar Institute for Economic Policy.[9]

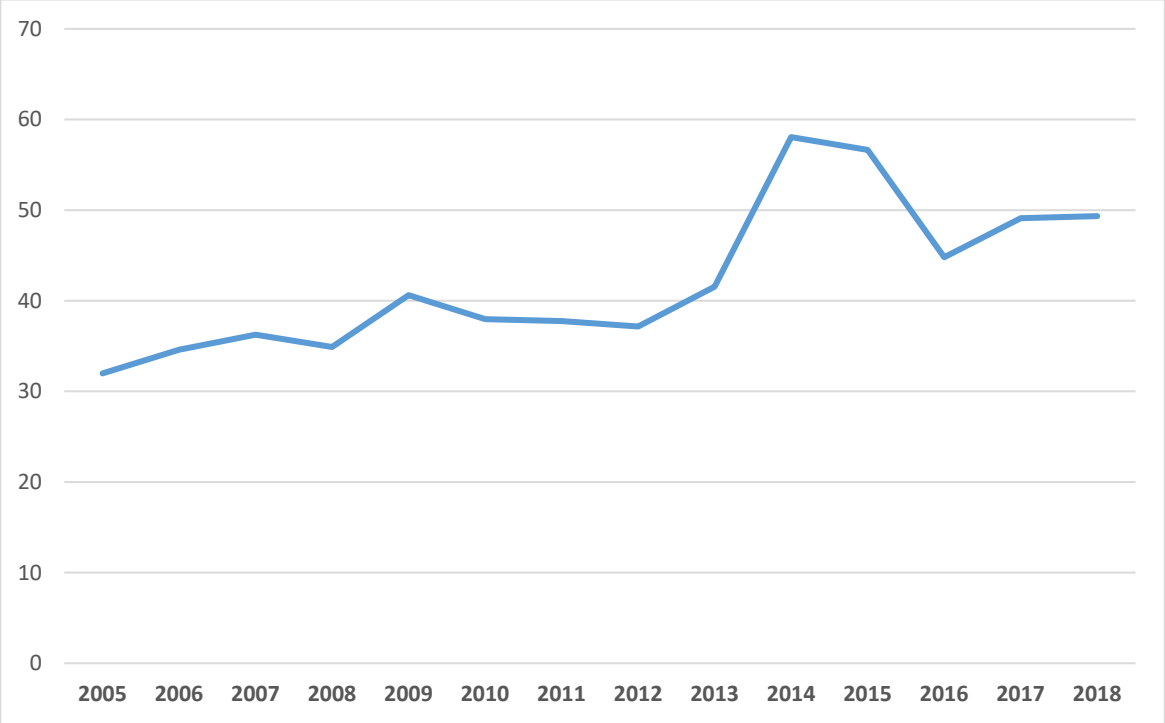
The main driver of the increase in the defense burden between 2010 and 2016 was the expansion of spending on the GOZ, which in turn was carried out as part of the longer term state armament program 2020 (*gosudarstvennaia programma vooruzheniia*, or GPV-2020). This political decision was made in the aftermath of the poor performance of the Russian armed forces during the short war with Georgia in 2008.[10] As a result, the share of the GOZ in annual defense spending rose sharply between 2012 and 2015, reaching nearly 60 percent of

[9] "Statistics," (Статистика), Finance Ministry of Russia, (Минфин России), minfin.ru/statistics; "SIPRI Military Expenditure Database," Stockholm International Peace Research Institute (SIPRI), https://www.sipri.org/databases/milex; Vasily Zatsepin, *The Military Economy and Military Reform in Russia*, (Военная экономика и военная реформа в России), Gaidar Institute for Economic Policy, 2019, 600-625, https://www.iep.ru/files/text/trends/2018/06.pdf.

[10] Una Hakvag, "Russian Defence Spending After 2010: The Interplay of Personal, Domestic, and Foreign Policy Interests," *Post-Soviet Affairs* 33, no. 6 (2017), https://www.tandfonline.com/doi/abs/10.1080/1060586X.2017.1388472?journalCode=rpsa20.

national defense spending in 2015 (Figure 2). Procurement spending has since been moderated. Nevertheless, it is worth noting that GOZ expenditure—which includes spending on the procurement of new equipment, the modernization and repair of existing equipment, and R&D—accounts for around half of annual national defense expenditure.

Figure 2. GOZ share of "national defense" expenditure, 2010–2018 (%)



Source: 2005–2012 data from Julian Cooper; 2013–2017 data from Andrei Frolov; public media statements by defense officials.[11]

In comparative terms, this represents a disproportionately large share. For example, procurement of equipment tends to be much lower in India (20–25 percent of total spending), China (30–40 percent), and the US and United Kingdom (UK) (2–25 percent).[12]

[11] Cooper, *Russian Military Expenditure;* Andrei Frolov, "The Implementation of the Russian State Defense Order in 2017" (Исполнение государственного оборонного заказа России в 2017 году), *Arms Export,* (Экспорт вооружений), (Jul.-Aug. 2018).

[12] See, for example, Laxman Kumar Behera, *Defense Budget 2018-19: The Imperative of Controlling Manpower Cost,* Feb. 2, 2018, https://idsa.in/issuebrief/defence-budget-2018-19-controlling-manpower-cost-lkbehera-020218;

To sum up so far: the scale of Russia's defense burden has fluctuated considerably over the past decade or so. All measures indicate that it grew after 2011, peaked around 2015–16, then declined and plateaued. The current three-year federal budget (2019–2021) suggests that the volume of military expenditure will stay at roughly the same level for the foreseeable future. If the economy continues to grow, this should result in the defense burden declining slowly over the next three years, approaching post-Soviet low levels. The fact that the defense burden grew so quickly for around five years explains some of the more alarmist commentary during this period concerning Russia's military expenditure. But as shown above, this sudden and time-limited expansion was caused by the execution of a much-needed program to modernize Russia's stock of military equipment. Public statements from senior Russian officials indicate that procurement plans under the (classified) current state armaments program—GPV-2027—appear to envisage a plateau in the rate of growth of procurement for the foreseeable future.[13]

CSIS, "What Does China Really Spend on Its Military?" China Power, https://chinapower.csis.org/military-spending/; Charles Wolf Jr., Siddhartha Dalal, Julie DaVanzo, Eric V. Larson, Alisher Akhmedjonov, Harun Dogo, Meilinda Huang, and Silvia Montoya, "Chinese and Indian Defense and Defense Procurement Spending to 2025," in *China and India, 2025: A Comparative Assessment,* (RAND Corporation, 2011), https://www.jstor.org/stable/pdf/10.7249/mg1009osd.13.pdf?refreqid=excelsior%3A2200a1b8085ddbac2bb3119349d2b9ab; *Defense Expenditure of NATO Countries (2011-2018)*, NATO Public Diplomacy Division, Mar. 2019, https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_03/190314-pr2018-34-eng.pdf.

[13] Julian Cooper, *The Russian State Armament Programme, 2018-2027*, NATO Defence College, May 2018, http://www.ndc.nato.int/research/research.php?icode=0.

Measuring Defense Effort Across Countries

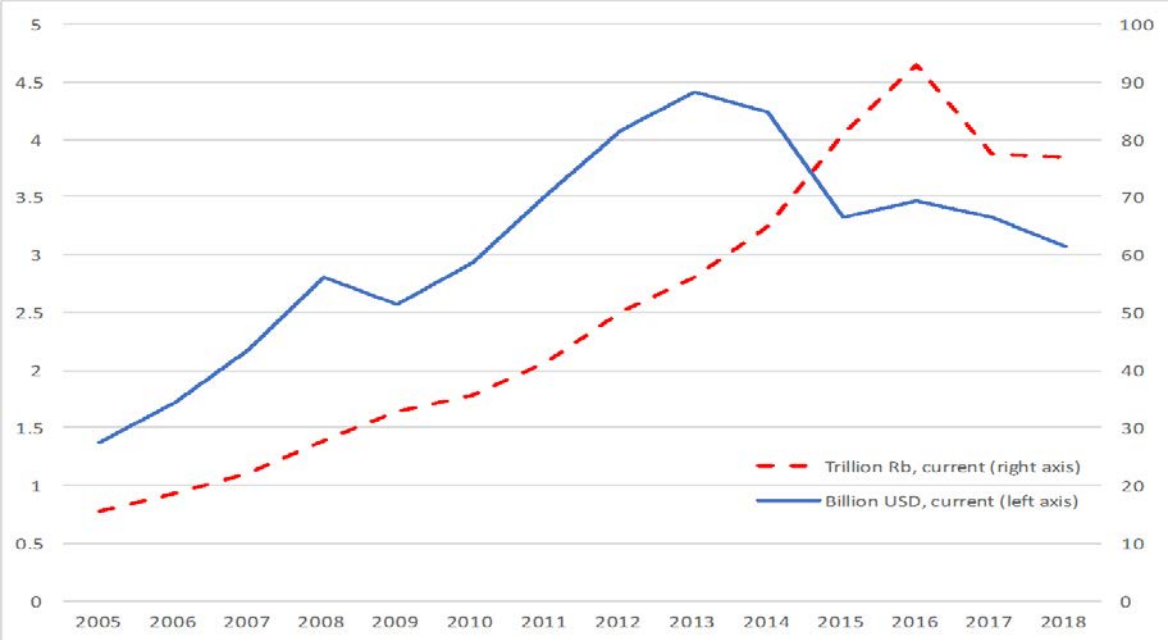
The brief discussion in the first part of this paper highlights the degree to which military expenditure grew and then declined as a share of Russia's GDP. This reveals how the importance of the military to Russia's political leadership, and especially the modernization of military equipment, grew. But it tells us little about Russia's relative level of military expenditure. For military and security specialists, relative expenditure is what matters most. For example, if we were to observe the increase in the defense burden described in the previous section and found that this resulted in the level of military expenditure rising from 5 percent of the US level to 10 percent, most analysts would be unconcerned. By contrast, if we found an increase in expenditure of 10 percent of the US level to 50 percent, it would probably give firmer grounds for concern.

Unfortunately, measuring military expenditure across countries (and across time) is fraught with difficulty for two main reasons. First, comparing calculations made in each country's national currency is difficult. For example, stating that the level of military expenditure in Russia is a trillion rubles in a given year and that the level in Saudi Arabia is a trillion riyals in the same year tells us very little. Second, converting military expenditure measured in national currencies to a common currency—usually the US dollar—at market exchange rates conceals important differences in purchasing power across countries. This is because many goods and services have different relative prices within a country, with non-traded goods and services being relatively less expensive in poorer countries. This can result in military expenditure being understated in countries with lower income levels—and correspondingly lower costs—than the US. Furthermore, measuring changes in military expenditure across time is also complicated by the fact that market exchange rates can be volatile, and this volatility can often be independent of any changes in actual military expenditure.

Figure 3 illustrates the difference in results obtained from measuring Russian military expenditure in rubles and in US dollars at the average market exchange rate for that year. Because the USD measure is sensitive to movements in the exchange rate, military expenditure is shown to have declined in 2009 and then again after 2013, the year in which USD military expenditure peaked in Russia. This is in contrast to military expenditure measured in rubles, which grew every year between 2005 and 2016. The problem is that the ruble-USD exchange rate fluctuated considerably over the period under examination due to changes in the price of oil, Russia's primary export product, as well as changes in the relative rate of inflation and in the Russian authorities' monetary and exchange rate policies. The result is an extremely

volatile military expenditure series that bears little relation to the real volume of government expenditure.

Figure 3. Russian military expenditure RUB vs. USD at market exchange rates



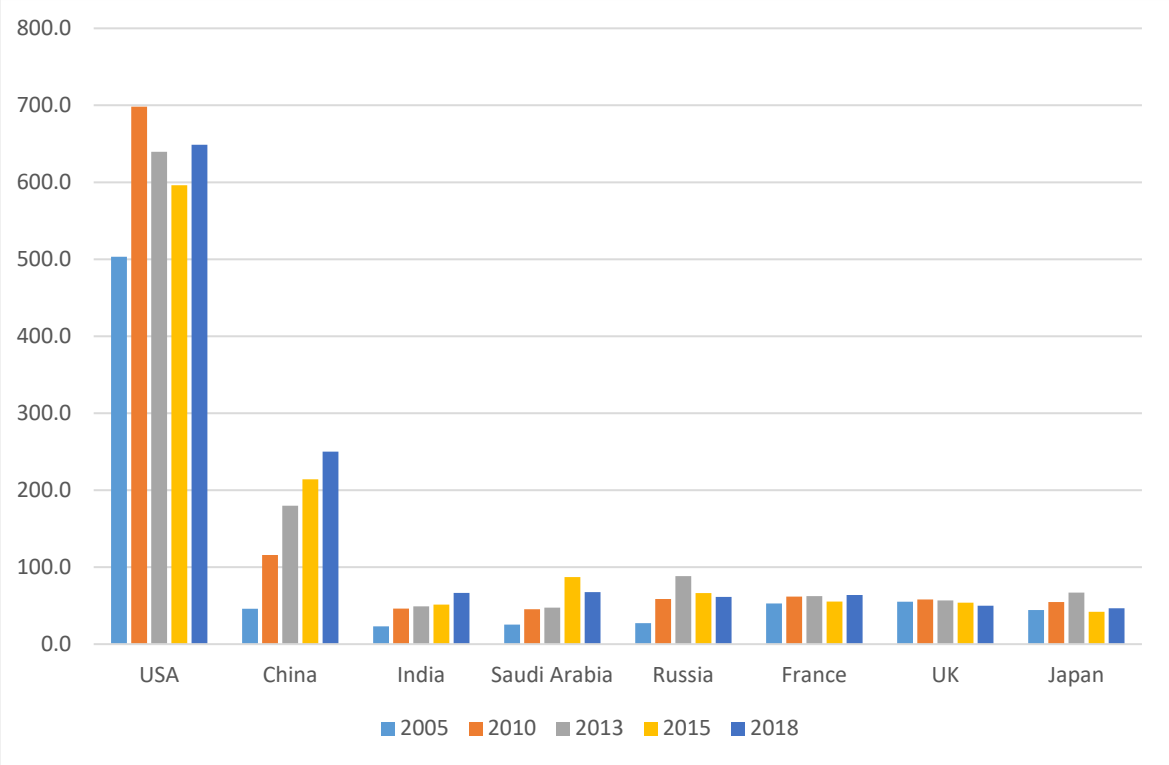
Source: SIPRI.[14]

This volatility in the USD military expenditure series resulted in Russia rising from seventh place in the world by military expenditure in 2005 to third place in 2013, the year before the sharp depreciation of the ruble vis-à-vis the USD (Figure 4). As the ruble depreciated after the collapse in the price of oil in 2014, the USD value of Russian military expenditure declined with it. As a result, Russia slipped to sixth place. Figures 3 and 4 very clearly illustrate the problems associated with using USD at market exchange rates to measure military expenditure across countries and across time. However, exchange rate volatility is not the only or even the most important problem when using market exchange rate-based measures of military expenditure. More important is the fact that many goods and services have different relative prices within a country, with non-traded goods and services being relatively less expensive in poorer countries. This relativity can be very important when calculating relative military expenditure. If the price of goods and services procured by the Russian government for military uses (for

[14] SIPRI, *SIPRI Year Book 2019: Armaments, Disarmament, and International Security,* 2019, https://www.sipri.org/yearbook/2019.

instance, the wages of military personnel or workers in the defense-industrial complex, or the price of military equipment) is lower than analogous US goods and services, the market exchange rate-based measure of military expenditure will understate the size of the basket of military goods and services obtained by the Russian government in any given year.

Figure 4. Military expenditure in Russia and selected countries (USD billion at market exchange rates)



Source SIPRI.[15]

As a result of these problems, the preferred method for inferring real relative economic output across countries is therefore to use a purchasing power parity (PPP) exchange rate. The PPP method of conversion is not always easily grasped by non-economists. To explain PPP, the *Economist* magazine's widely known "Big Mac" index is often used to illustrate how costs vary across the world, even for purchasing near-identical products. The relative cost of a hamburger illustrates the problem. If a Big Mac is sold for 120 RUB in Moscow and 5 USD in Washington,

[15] SIPRI, *SIPRI Year Book 2019.*

DC, this would suggest a PPP exchange rate of 24 RUB to 1 USD. After all, identical products are being sold in both Moscow and Washington.

In practice, the market exchange rate often differs considerably from the rate suggested by a PPP calculation. In September 2019, the RUB-to-USD exchange rate was around 65 RUB to 1 USD. The reason for this variation is usually to do with the differences in costs of inputs required to make the Big Mac: in Russia, input costs (e.g., labor, land, equipment) are lower compared with those in the US, meaning that the ruble can on average buy more goods and services in Russia than might be expected if using the prevailing market exchange rate.

Analysts use PPP "weights" to estimate the value of economic activity in a country that accounts for differences in relative costs. Today the IMF calculates an implied PPP exchange rate of 23.4 RUB to 1 USD. This happens to be nearly identical to the calculation based on the Big Mac index outlined above. Given that the actual market exchange rate is 65 RUB to 1 USD, this would suggest that the value of economic activity in Russia is over 2.5 times larger than the value implied by the prevailing market exchange rate.

In general, market exchange rates are the appropriate choice to measure financial flows across borders. For example, the current account or trade balance represents flows of financial resources across countries. It is appropriate to use the market exchange rate to convert these flows into dollars when aggregating across regions or calculating the global current account discrepancy. But for other variables, it is often more appropriate to use PPP-based exchange rates. For example, although market exchange rates are appropriate for measuring the value of internationally traded goods, non-traded goods and services tend to be cheaper in lower income countries, especially large, populous countries such as Russia. For example, the price of an Uber ride of the same distance is significantly higher in London than in Moscow. The same is true of the relative price of a haircut. This is because wages tend to be lower in relatively poorer countries, and services such as Uber and hairdressers are relatively labor intensive. Any analysis that fails to take these differences into account will underestimate the purchasing power of consumers in lower income countries.

Employing PPP exchange rates yields significantly different estimates of the size of low- and middle-income economies. For Russia, the difference in estimated GDP is substantial. According to IMF data, the Russian GDP was $1.6 trillion in 2018, accounting for just 1.8 percent of global GDP. This would make Russia the 11th largest economy in the world when using market exchange rates, slightly smaller than Italy and Canada and only slightly larger than South Korea and Australia. Russia's per capita income according to this measure was around $11,000, which amounts to around 15 percent of per capita income in the US and just over 30 percent of the European Union (EU) average. Put into wider perspective, this would be lower than Poland and Chile, but higher than Brazil and Turkey.

However, using PPP exchange rates (i.e., accounting for differences in relative costs), the picture is strikingly different. According to this measure, Russian GDP in 2018 was over $4 trillion, accounting for around 3.5 percent of global GDP. This would make Russia the sixth largest economy in the world and the second largest in Europe, only slightly smaller than the German economy. Measured at PPP, per capita income was nearly $28,000, half the US level and nearly three quarters of the EU average. Although Russia is not an economic giant like the US or China, it does belong in the second tier of regional heavyweights, such as Japan, India, Brazil, and Germany.

This has important implications for assessing the relative level of Russian military expenditure. Because a ruble buys relatively more military output in Russia than a dollar does in the US, Russia's real level of military expenditure is likely to be considerably higher than a market exchange rate-based estimate would suggest.

To be sure, the use of PPP exchange rates to measure military expenditure is not without limitations. PPP exchange rates are not necessarily appropriate for comparing military output because they reflect the relative price of an average bundle of all goods and services produced in an economy (usually GDP) and they are not limited to military services. The cost of military goods and services could be higher or lower than the economy-wide average of goods and services. The rate of inflation for military goods and services might also differ from the economy-wide average, which might lead to further calculation errors.

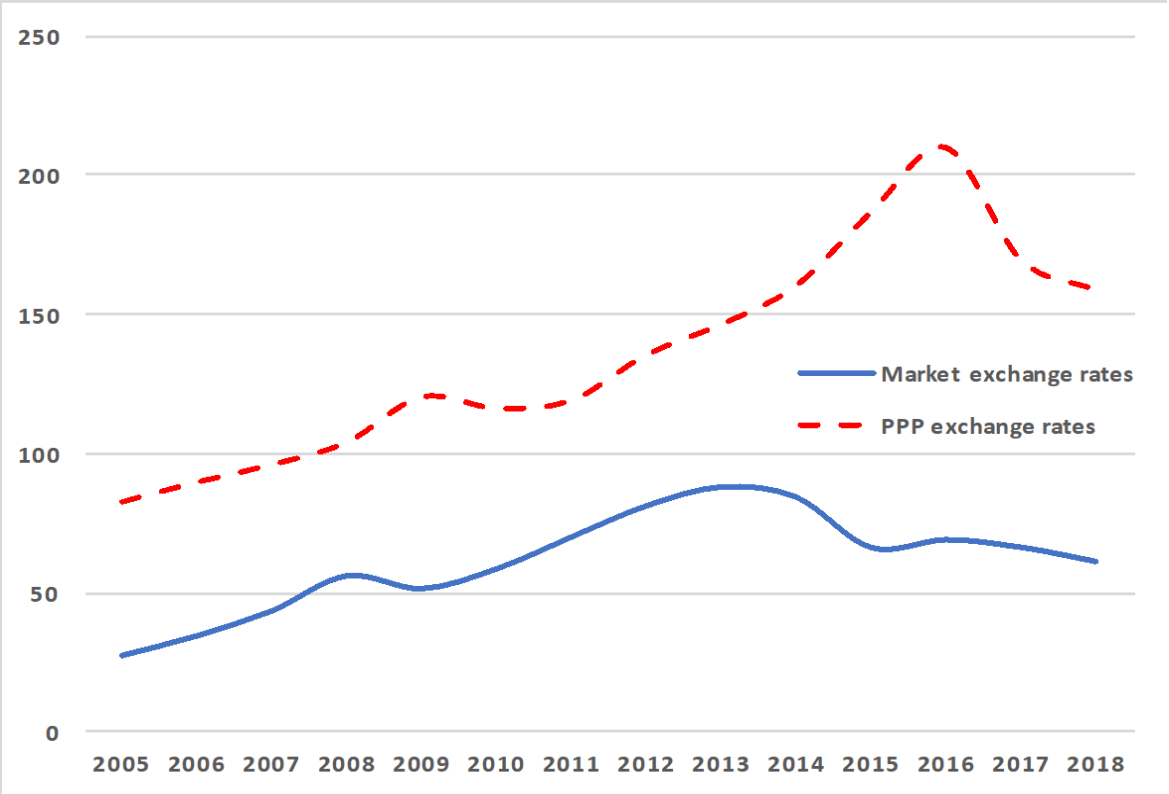
Another weakness in using PPP exchange rates is that a substantial share of military equipment is imported or incorporates components that are manufactured from materials and inputs sold at world market prices, such as electronics, diesel engines, or aircraft frames. This will affect some countries more than others, especially countries such as India that rely on a relatively high share of imported components and equipment from countries with higher costs. By contrast, this is less likely to affect countries with well-developed domestic defense industries, such as the United States and Russia.

Detailed data that are usually publically unavailable would be required to calculate a military expenditure-specific PPP deflator with a high degree of accuracy. In the absence of these data, economy-wide PPP exchange rates are used here to yield an approximate estimate of cross-country military expenditure over time. To account at least partially for differences in the volume of imported military equipment across countries, market exchange rate data for annual arms imports are included in separate calculations to yield a crude arms import-adjusted PPP exchange rate.[16]

[16] These are taken from TsAMTO. Data refer to arms imports not components. So, almost certainly an understatement. See: Center for World Arms Trade Analysis, (Центр анализа мировой торговли оружием), *2018 Yearly Edition*, (2018 Ежегодник*)*, 2018, http://www.armstrade.org/files/yearly_2018_41.pdf.

Notwithstanding the deficiencies noted above, PPP-based estimates are likely to provide a more realistic approximation of the real resource commitment made by Russia in the sphere of military expenditure. The impact of using PPP instead of market exchange rates can be seen in Figures 5–8. Figure 5 shows perhaps the most important difference between Russian military expenditure using market exchange rates and PPP exchange rates: the level of expenditure is around 2.5 times higher using PPP exchange rates.

Figure 5. Russian military expenditure at market exchange rates and PPP exchange rates, 2005–2018 (USD billion)



Source: SIPRI; IMF WEO; author's calculation.[17]

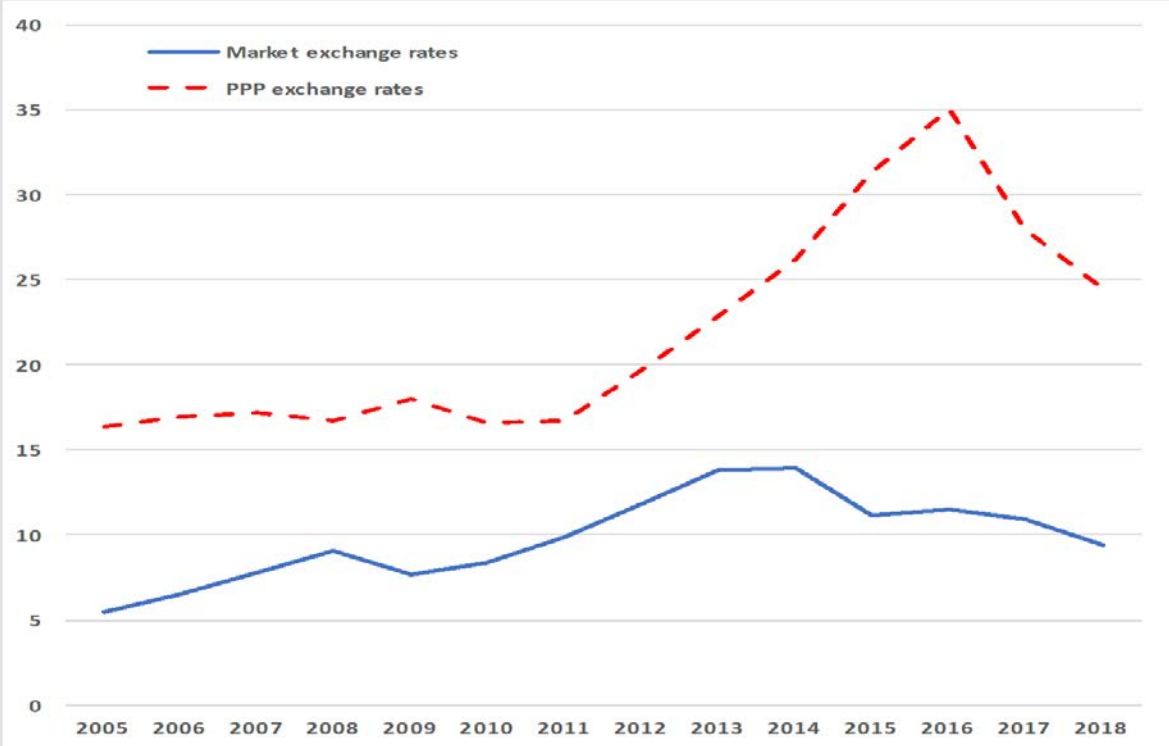
Even in 2005—well before the rearmament program began—Russian military expenditure exceeded $80 billion. By 2016, it exceeded $200 billion, although the lump-sum repayment of debt owed by defense-industrial enterprises explains this peak. Nevertheless, even after the

[17] SIPRI, *SIPRI Year Book 2019;* "World Economic Outlook Database," International Monetary Fund (IMF), https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/index.aspx.

reduction in the defense burden after 2016, the level of military expenditure remained over $150 billion in 2018.

Figure 6 shows the ratio of military expenditure to GDP in Russia and the USA using both market exchange rates and PPP exchange rates. The difference between the two measures is considerable.

Figure 6. Russia's military spending relative to the USA (%)



Source: SIPRI; IMF WEO; author's calculations.[18]

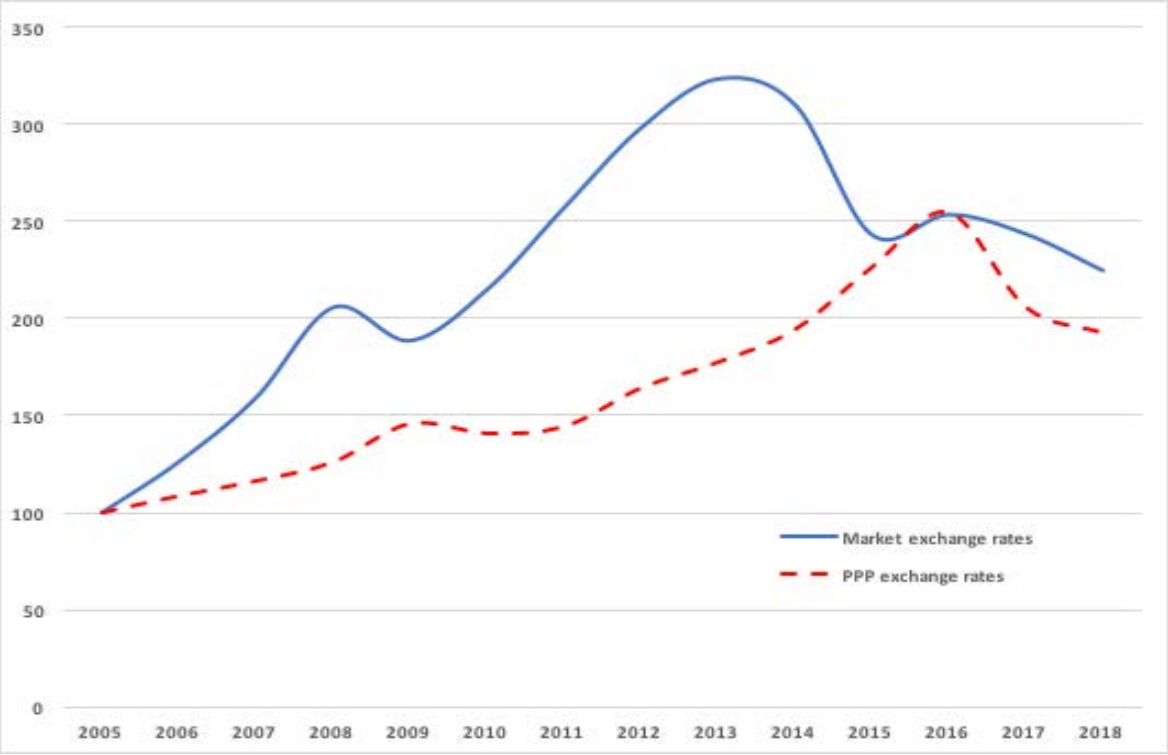
At market exchange rates, Russian military expenditure did not exceed 14 percent of the US level, even when Russian expenditure peaked in USD terms in 2013. After the ruble depreciated in the aftermath of the collapse in the price of oil in 2014–15, and after the Russian government reduced the defense burden from 2016 onwards, Russian military spending declined to less than 10 percent of the US level by 2018. PPP exchange rates, however, reveal a different picture. Even before the rearmament program began in 2011, military expenditure hovered at a level close to 20 percent of the US level. As procurement accelerated between 2012 and 2016,

[18] SIPRI, *SIPRI Year Book 2019;* "World Economic Outlook Database," IMF.

the level of Russian expenditure reached as high as 35 percent of the US level before declining to 25 percent in 2018.

There are also differences between the two exchange rates in the rate of growth in military expenditure recorded in Russia after 2005, as shown in Figure 7.

Figure 7. Growth in Russian military expenditure, market exchange rates vs. PPP exchange rates (2005 = 100)



Source: SIPRI; IMF WEO; author's calculations.[19]

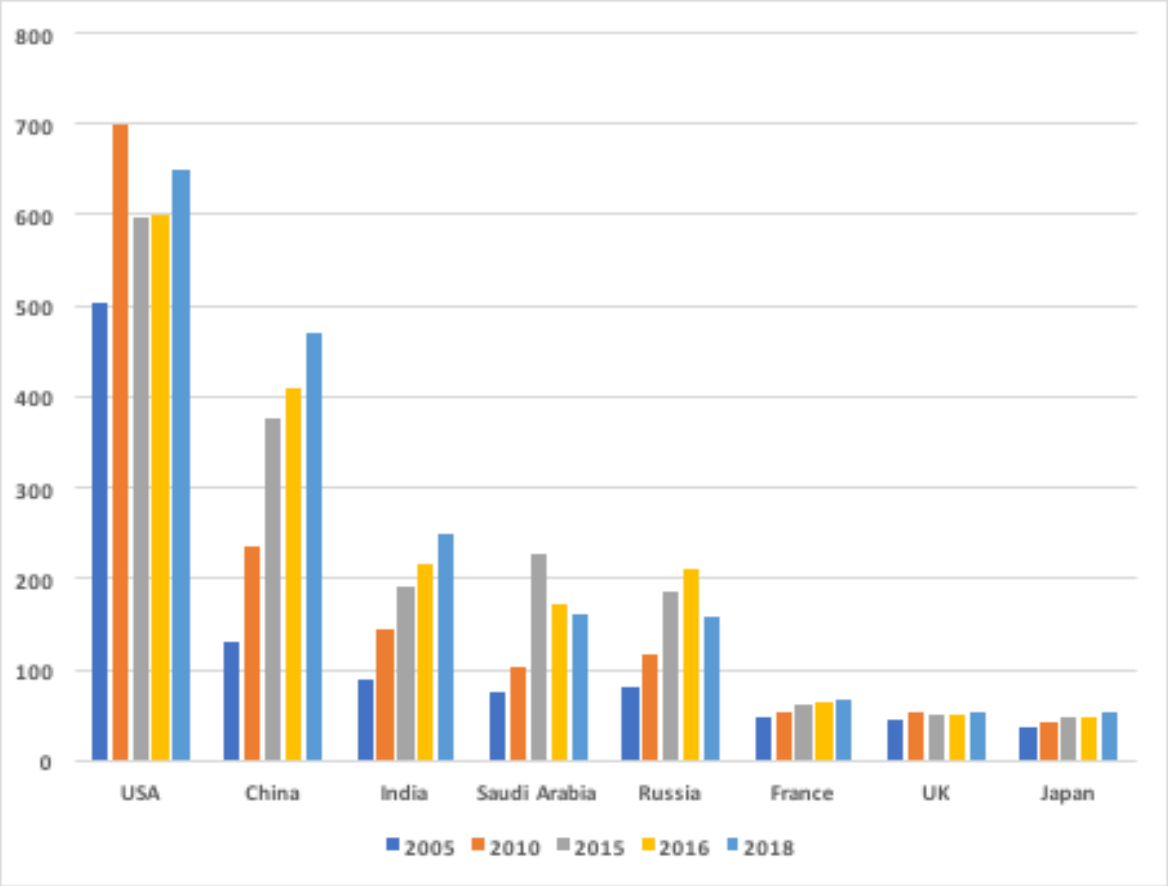
Using market exchange rates tends to provide a higher estimate of the rate of growth. Between 2005 and 2013, military expenditure grew by 223 percent. The sensitivity to the depreciation of the ruble also amplifies the decline in spending observed after 2013. By 2018, military expenditure was only 125 percent higher than it was in 2005. By contrast, expenditure measured using PPP exchange rates reveals a slower and steadier rate of growth between 2005

[19] Ibid.

and 2016. By 2016, military expenditure was around 150 percent higher than in 2005. By 2018 it was only 92 percent higher than it was in 2005.

Due to the impact that using PPP exchange rates has upon the level of Russian military expenditure, Russia's position relative to other large military spenders is also somewhat different, as shown in Figure 8.

Figure 8. Military expenditure of selected powers at PPP exchange rates, 2005–2018 (USD billion)



Source: SIPRI; IMF WEO; author's calculations.[20]

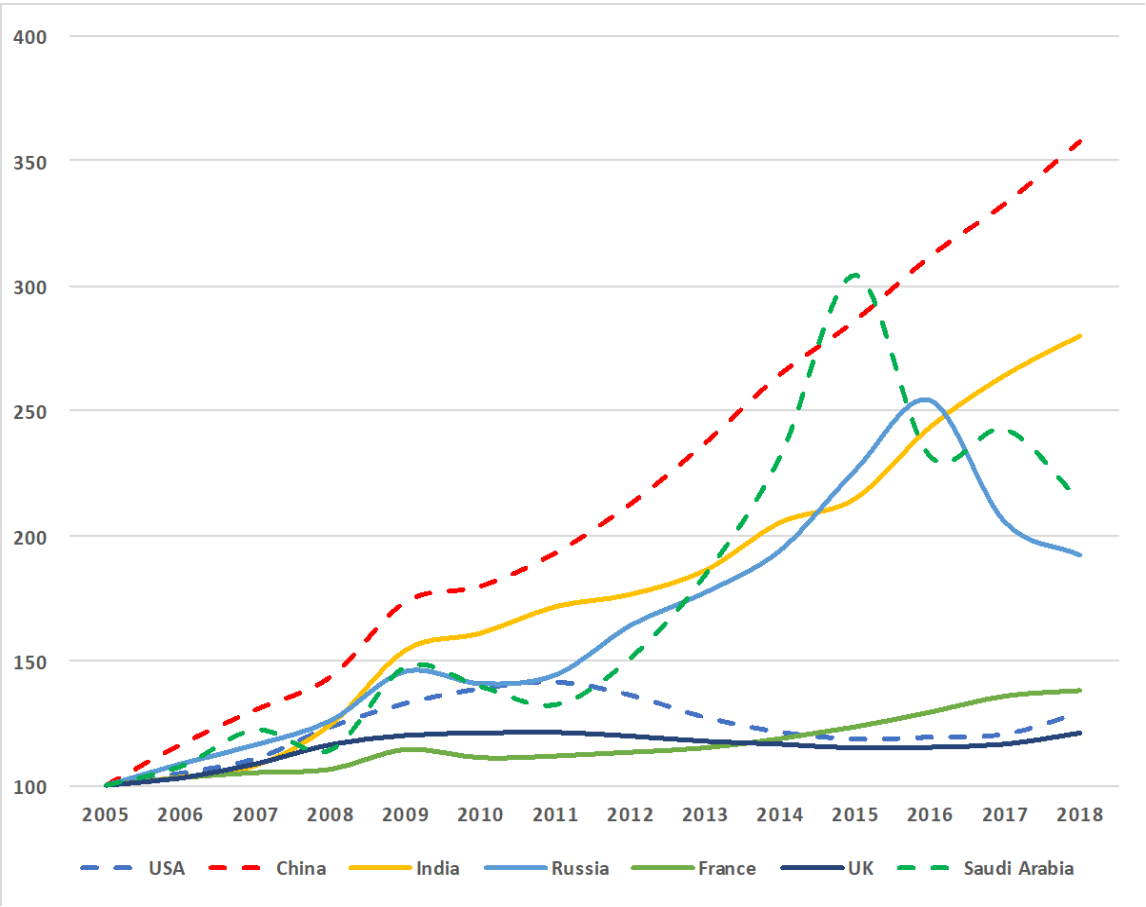
Even in 2005, Russia was the world's fourth largest power by PPP-adjusted military expenditure. The spending boost after 2011 pushed Russia into third place in 2016, although

[20] Ibid.

the subsequent reduction in the defense burden left Russia in fifth place in 2018 ($159 billion), slightly behind Saudi Arabia ($160 billion). The most notable difference between using market exchange rates and PPP exchange rates is seen in the position of India, which in 2018 was comfortably the third largest military spender in the world ($250 billion). Although the USA remains the largest military spender, its lead over other countries has clearly been eroded. For example, in 2005 the ratio of Chinese military expenditure to US spending was just over 25 percent; by 2018, it was 73 percent. Indeed, the sum of Russian and Chinese military spending amounted to 43 percent in 2005; by 2018, it was 97 percent.

Looking at comparative rates of growth in military spending (Figure 9), it is also clear that the rate of growth in Russian expenditure since 2005 has not been especially fast, at least when compared with other low- and middle-income "emerging" powers. Even when Russian expenditure reached its peak in 2016, it remained well behind the rate of growth observed in China. Indeed, in 2016 military expenditure in Russia was roughly comparable with that recorded in both Saudi Arabia and India. By 2018 Russia was only the fourth fastest growing military spender in the period under examination. It is perhaps more accurate to state that trends in relative spending indicate that the powers outside the US-led alliance system are making rapid progress in closing the gap in military expenditure. It might be only a matter of time before this trend results in a reduction of the gap in military capabilities.

Figure 9. Growth in military expenditure of selected powers at PPP exchange rates, 2005–2018 (2005 = 100)



Source: SIPRI; IMF WEO; author's calculations.[21]

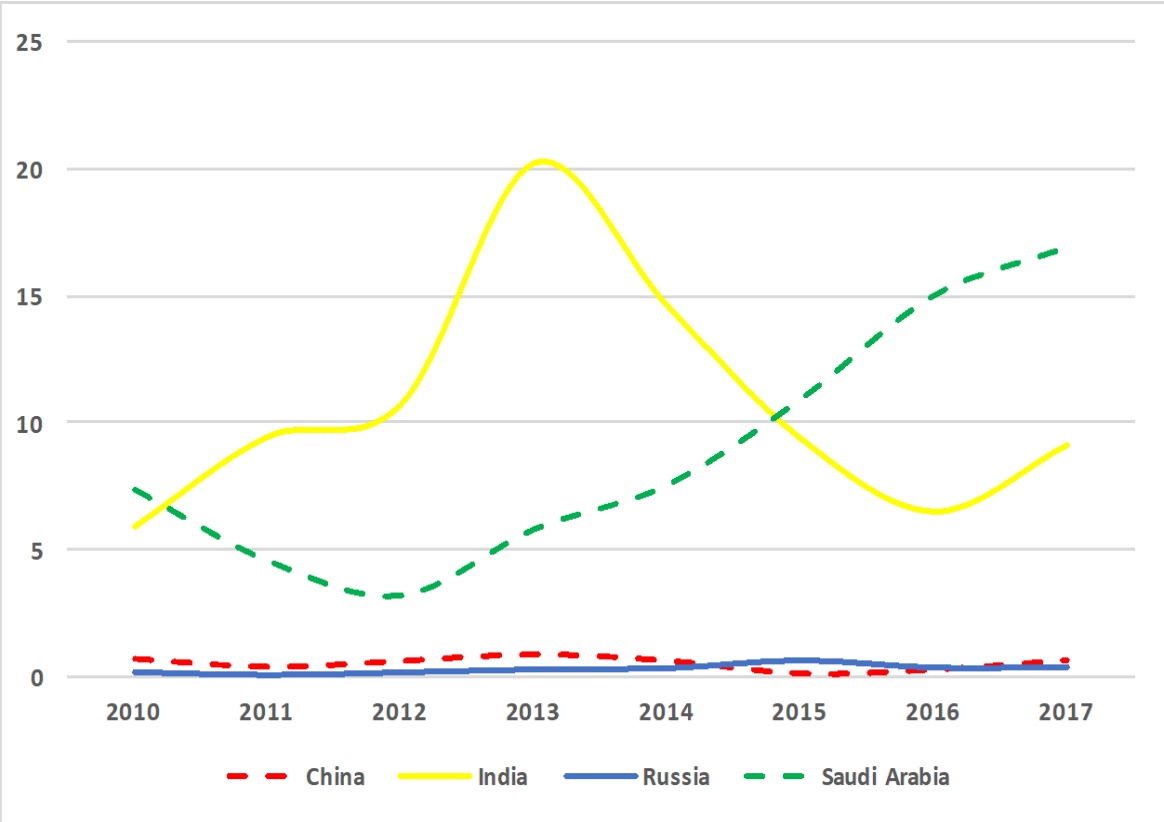
Finally, it is worth considering the impact that imported military equipment might have on PPP-based measures of military expenditure. If relatively poor countries import high-cost equipment, this should be taken into account when calculating overall PPP military expenditure. This should particularly affect both Saudi Arabia and India which have consistently been the two largest importers of military equipment in the world.[22] As Figure 10 shows, the share of imports in total military expenditure (at market exchange rates) can reach as much as 15–20 percent in any given year for Saudi Arabia and India. By contrast, the share

[21] Ibid.

[22] SIPRI, *SIPRI Year Book 2019.*

of imported equipment for the likes of Russia and China—countries with large defense industries—is much lower. To derive a crude arms import-adjusted PPP exchange rate, the annual value of arms imports is calculated at market exchange rates, while the remaining expenditure is calculated at PPP exchange rates.

Figure 10. Share of imports in total military expenditure of China, India, Russia, and Saudi Arabia at market exchange rates, 2005–2017



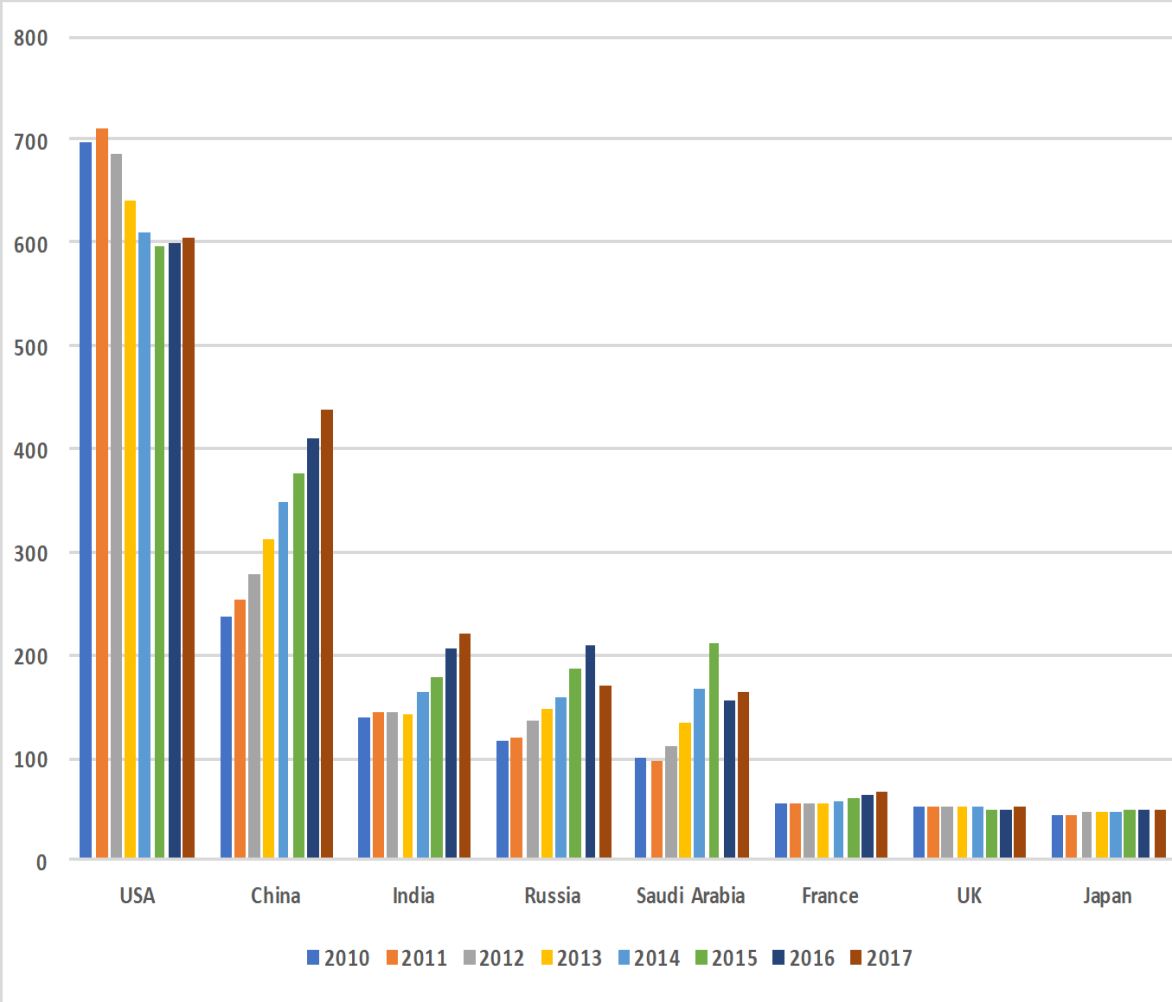
Source: SIPRI; IMF WEO; TsAMTO; author's calculation.[23]

Adjusting the calculations to take the share of imported equipment into account results in reduced PPP exchange rate-based levels of expenditure for both India and Saudi Arabia (Figure 11). For India, this adjustment affected its overall level of military expenditure between 2010 and 2015. For Saudi Arabia, this adjustment was highest between 2015 and 2017. As a result,

[23] SIPRI, *SIPRI Year Book 2019*; "World Economic Outlook Database," IMF; Center for World Arms Trade Analysis, *2018 Yearly Edition.*

Russia and India exchanged third and fourth place in the global military expenditure rankings between 2012 and 2016. However, after Russian defense spending declined in 2017, and as the share of imports in total Indian expenditure declined, a clear gap between India and Russia emerged. However, as Saudi arms imports rose at this point, Russia remained the fourth largest military spender in the world.

Figure 11. Arms import-adjusted in military expenditure of selected powers at PPP exchange rates, 2005–2017 (2005 = 100)



Source: SIPRI; IMF WEO; TsAMTO, author's calculation.[24]

[24] Ibid.

Conclusion

Despite extensive discussion of the re-emergence of Russia as a military power, there is considerable confusion over the precise nature of the challenge. Much of this confusion is rooted in a lack of clarity over the scale of resources that the Russian state is allocating towards the maintenance and development of its military. This confusion is usually caused either by divergent methods of measuring Russia's defense burden, or by the use of market exchange rates to convert ruble military expenditure into a common currency, usually the USD. The latter in particular can result in highly volatile estimates of Russia's military expenditure, which in turn contributes to uncertainty over whether Russia is spending comparatively more or less than other major military powers. This uncertainty can contribute to widely different perspectives on Russia's military capabilities.

This paper presented a PPP-based estimate of Russian military expenditure based on publically available information, alongside comparable estimates for other major military powers. It also presented several key findings. First, the use of PPP-based estimates reveals the *level* of Russian military expenditure to be considerably higher than market exchange rate-based estimates. While market exchange rate-based measures suggest that Russian military expenditure was $61 billion in 2018, a PPP-based estimate suggests expenditure was $159 billion in the same year. Second, PPP-based estimates show that the *rate of growth* of Russian military expenditure was slower than that suggested by market exchange rate-based estimates. Market exchange rate-based estimates indicate that annual military expenditure grew by 125 percent between 2005 and 2018, but the PPP-based estimate reveals growth to have been closer to 90 percent. Third, the rate of growth in military expenditure since 2005 was also lower than in other "emerging" powers, such as China and India. This is partially because Russia started from a higher base, but it also reflects the fact that China, India, Saudi Arabia, and many other non-Western powers have been engaged in a robust expansion of military spending. Fourth, after adjusting PPP-based estimates of total military expenditure for imported military equipment, Russia has held a steady position as the world's fourth largest military spender, behind the United States, China, and India.

Although the level of Russian military expenditure is clearly much higher than indicated by previous market exchange rate-based estimates, this should not necessarily be cause for serious alarm. Russia has to spread its military budget far and wide across a range of different claimants. These range from R&D on new hypersonic weapons to maintaining a large strategic nuclear deterrent and the world's largest arsenal of tactical nuclear weapons. It must also be used to maintain, equip, and train one of the world's largest conventional militaries, tasked with dealing with threats spanning vast borders and oceans.

A final point is also necessary. An important technical issue that was beyond the scope of this paper concerns the construction of a "basket" of defense goods and services construct that might provide a better basis for the PPP-based conversion of local currency units to US dollars, both for Russia and for other military powers. This is an important methodological issue for consideration in future research and would bring much greater clarity to debates over trends in military spending across the world.

Figures

This report was written by CNA's Strategy, Policy, Plans, and Programs Division (SP3).

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