

# Military Expenditure: Transparency, Defence Inflation and Purchasing Power Parity

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# Introduction

The threat posed by Russia's invasion of Ukraine has placed considerable upward pressure on European defence budgets. In 2022, around 20 countries in Europe pledged to increase defence spending, with varying degrees of size and immediacy. The most notable uplift was the announcement from Germany's Chancellor Olaf Scholz on 27 February that the country would establish a special fund for defence of EUR100 billion (USD106bn) in 2022, to be drawn down over the coming years to enable the budget to reach 2% of GDP.<sup>1</sup> Another significant uplift was enacted in Poland, where the defence budget was raised by almost 70% to PLN98bn (USD20.8bn) in 2023,<sup>2</sup> increasing from 2.1% of GDP to close to 3% of GDP. The increase to 3% of GDP was included in the Defence of the Fatherland Act, passed in March, that also established the Armed Forces Support Fund.<sup>3</sup> This is to be funded through the National Economy Bank, with up to PLN40bn (USD10bn) to be made available to fund foreign acquisitions of weapons systems.<sup>4</sup>

Nonetheless, the difficult global economic environment that will persist in the short term will impose constraints on public expenditure, not least the higher cost of debt financing in light of increased interest rates designed to curb inflation. This may impact the intended uplifts for defence and the priorities of NATO governments announced at the Madrid Summit in June 2022. The political and financial upheaval seen in the United Kingdom over 2022 demonstrates the growing tension between upholding defence spending commitments and support for Ukraine versus sustaining public spending on health, welfare, education and critical infrastructure.<sup>5</sup>

The difficult conditions are not limited to Europe. Amidst mounting economic and fiscal challenges, regional defence budget growth in Asia in 2022 was significantly below trend in real terms compared with the previous decade. This was partially the result of constrained government spending, but it was also due to the impact of inflation on the spending power of

defence budgets. Where significant growth did occur, it was generally the result of the approval of large special budgets for defence, such as in Japan and Taiwan. This suggests that, as in Europe, strategic factors have enabled defence spending trends to overcome wider budgetary constraints.

The re-election of the Liberal Democratic Party in Japan in October 2021 has reinvigorated attempts to raise the country's defence budget towards 2% of GDP. Reports suggest that the practice of raising the country's defence expenditure through the use of supplemental appropriations is likely to be retained over the coming years and become the main method used to raise spending towards 2% of GDP.<sup>6</sup> Taiwan's use of supplemental budgets to bolster defence spending was also expanded in 2022 with the approval of new special appropriations aimed at enhancing navy and air force capabilities.

These extra-budgetary allocations or funds for defence in both Europe and Asia can reduce transparency and accountability while also creating issues for defence economists seeking to accurately track and compare like-for-like international defence budgets. Furthermore, rapid increases to defence investment without a comprehensive plan for the capabilities it will fund and objectives it will achieve raises questions as to the ability of national armed forces and defence-industrial bases to absorb new resources.

While it sounds like a straightforward task determining what countries spend on defence, issues around transparency, defence inflation, and purchasing power parity (PPP) make this in fact a difficult study, both for public discussion of the topic and for analysts seeking to compare data internationally. The IISS–Europe office hosted a workshop in October 2022 entitled 'Military Expenditure: Transparency, Defence Inflation and Purchasing Power Parity', which convened leading defence economists to consider important methodological issues long debated in the field.

The IISS would like to thank all delegates at the IISS workshop, particularly the speakers who presented their impressive research into these difficult topics. This paper draws on these conversations and is informed

by them. It does not represent a shared assessment or a consensus view among the participants, but it hopefully serves to provide some orientation and fuel for constructive debate.

# Economic context

Assessing military expenditure draws on several input factors, not least the economic conditions that not only impact the initial decisions of policymakers on how much to invest but also the effective value of the investment when it is made.

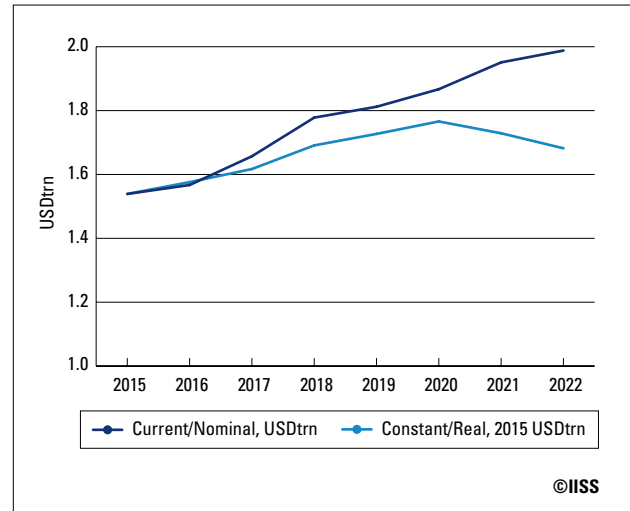
In the wake of the devastating disruption caused by the coronavirus pandemic, the global economic climate is again fraught. Surging inflation, commodity price spikes, supply-chain crises and heightened economic uncertainty resulting from Russia's invasion of Ukraine on 24 February 2022 have derailed an economic recovery that was far from complete in some countries where output was still below pre-pandemic levels. According to the IMF, in 2022 global real GDP growth is set to slump to 3.2%, down from the 6.0% recovery rate achieved in 2021.<sup>7</sup> In 2023, global real GDP is expected to grow by just 2.7%, as disinflationary monetary policy inhibits economic growth.<sup>8</sup>

## Acute inflationary pressure

Inflation rates increased globally in 2021 as a result of higher energy costs, a recovery in energy demand and ongoing pandemic-related supply-chain disruptions. The disruption to energy supply caused by the war in Ukraine has exacerbated the issue in 2022, with the price of Brent crude oil spiking to levels in excess of USD120 a barrel in June. The United States Energy Information Administration expects the price of Brent to average USD102 a barrel over 2022 and remain high at USD95 a barrel in 2023.<sup>9</sup> Surging rates of inflation – reaching 40-year highs in some countries – and slow economic growth are creating conflicting policy priorities, with stagflation – a phenomenon not seen globally since the 1970s – presenting severe downside risks.<sup>10</sup>

Global defence expenditure grew in nominal terms in 2021 and 2022 but higher rates of inflation meant expenditure fell in real terms in both years (see Figure 1). In recent years, high inflation eroded defence spending in real terms in Africa, Latin America, the Middle East and Russia but this trend can now be seen in most

Figure 1: **Global defence expenditure in real and nominal terms, 2015–22 (USDtrn)**



Source: IISS Military Balance+

regions across the world, with Europe and Asia the only regions globally to continue to exhibit defence-spending growth in real terms in 2021 and 2022. This trend was more acute in 2022; a number of countries in Europe, primarily in Eastern Europe, experienced double-digit inflation rates. In September 2022, rates reached 9.9% in the euro area<sup>11</sup>, 10.1% in the UK, and 8.3% in the US.

Countries such as the UK and US have made adjustments within their defence budgets to accommodate for inflation, setting aside funding to cover the uplift in costs, but the spending increases announced this year will become harder to implement as interest rates rise and debt-servicing costs mount. Any further supply-chain disruption and increase in the cost of raw materials and components will create a challenge for as long as high inflation persists. Higher-skilled personnel costs will also push up expenses for industry, which will feed through into higher contract values.

With such acute inflationary risks now pervasive in the global economy, it is becoming increasingly important to consider the difference between economy-wide inflation, or consumer price index (CPI) inflation, and the inflation rates affecting defence in order to more accurately assess the purchasing power of a defence

budget. Using CPI-based or GDP-based deflators that do not reflect actual rates of defence inflation risks miscalculating the real buying power of a defence budget.

## Defence inflation

‘Defence inflation is a measure of the average change in pay and prices of goods and services that make up the defence budget, with quality and quantity held constant. This can help estimate how much money would be required for MOD to have the same spending power from one year to the next.’ – UK Ministry of Defence, Defence Inflation Estimates 2020–21

The UK Ministry of Defence (MoD) found that the UK defence inflation rate reached 4.1% in 2020–21, considerably higher than the CPI rate of 0.6%. This meant the average price paid for labour, goods and services was rising at a faster rate for the MoD during that period than for ordinary UK consumers. Defence inflation was lower than the GDP deflator (5.7%), which was used to calculate the real increase in the UK MoD’s budget (somewhat strengthening its spending power).<sup>12</sup>

Keith Hartley and Binyam Solomon found that defence-specific inflation for Canada has exceeded the CPI for the past 30 years, while inflation rates in the US for certain equipment (including trainer, bomber, attack and fighter aircraft) were considerably higher than the CPI but also the US Department of Defense (DoD) procurement deflator in some years.<sup>13</sup>

The causes behind the higher rates of inflation for defence stem from the differences between the basket of goods and weights used for defence and the basket used for the general economy. The market structure of the defence sector as well as defence-specific policies are different to those of other sectors of the economy as well, with decreasing returns to scale in production in some cases. Labour costs can also be higher in defence, given the need for specialised skills and training. But strategic factors, including threats both perceived and real, also raise costs. A government can induce a market failure as the sole buyer through its demands for production. Finally, the need for innovation and maintaining a qualitative edge over adversaries can act as a demand pull that raises

the rate of defence inflation above the rate of inflation for other markets.<sup>14</sup> Defence inflation is therefore partially a symptom, not just a cause, of increased defence spending.<sup>15</sup>

The UK MoD breaks down defence inflation into contract inflation (63% of defence expenditure) and labour cost inflation (36% of defence expenditure). It has far greater influence over contract inflation, which is the increase in prices of purchases of goods and services by the MoD, than over labour cost inflation. Defence contract inflation is estimated by the UK MoD to have increased from 2020–21 to 2021–22 because of the higher costs of inputs, slower rates of production, and a shortage of supply of key components, e.g. metals. The UK MoD has tried to reduce contract inflation by making smarter decisions regarding inflation clauses in contracts, including using fixed contracts (linked to the CPI inflation index) rather than firm contracts (agreed at the start of the contract) to avoid paying a risk premium for the security of price certainty. The MoD is also endeavouring to use industry-specific output price indices from official sources, as these remain the most efficient and the best value for money. The UK MoD has also updated its commercial policy to account for all economic scenarios, aiming to better track price movements, improve value for money and maximise purchasing power.<sup>16</sup>

Hartley and Solomon make the important distinction between defence inflation and cost escalation, but they highlight that the inherent challenge in measuring defence inflation is the lack of an accurate measure or means to place a value on defence output and the associated productivity changes.<sup>17</sup>

While countries have endeavoured to determine and adjust for the difference in the rate of inflation for defence versus the wider economy, approaches and calculations vary. Furthermore, it is difficult to forecast the rate of defence inflation, particularly in times of high volatility (as is currently the case given recent shocks such as the coronavirus pandemic, the war in Ukraine and the subsequent surge in energy prices and supply-chain challenges). There are also variations in the level of data available, which can restrict the ability to use artificial intelligence or machine-learning tools to increase the regularity with which these calculations and assessments can be made. More dialogue is required between countries to share methodologies and reach a consensus as to the most logical approach to determining these indices.

# PPP conversions for defence

As with many aspects of defence activities, obtaining accurate data with which to compare across countries can be difficult. There are several institutions dedicated to analysing the data in terms of values and standardisation and establishing definitions of what counts as defence spending, as opposed to security or police and para-military activities, so that different budgets can be meaningfully compared.

Nevertheless, if the aim is to compare defence budgets across countries to gain an understanding of the real resources, or military inputs, that underlie the budget, the nominal budget needs to be deflated into a real measure by dividing the overall budget by unit costs in each country. This real budget is a measure of the bundle of military goods and services that can be procured, which can then be compared across countries.

Often this can be done relatively easily by converting each country's budget into US dollars using the market exchange rate (MER), which has the advantages of being quick to calculate and even quicker to understand in public debate. However, there are several flaws with this approach.

## International comparisons using MERs

Market volatility saw the dollar reach a 20-year high against other currencies over 2022, as investors looked for a safe haven and were attracted by the swift interest rate rises implemented by the US Federal Reserve.<sup>18</sup> The British pound fell to almost parity with the dollar in September following the poorly received mini-budget from the then-chancellor, Kwasi Kwarteng<sup>19</sup>, with the euro falling below parity with the dollar in the same month.<sup>20</sup>

Conversely, after plummeting in value immediately following the invasion of Ukraine, the Russian rouble has since recovered, jumping 40% against the dollar over the course of 2022. The rouble is now trading at levels last seen in 2015. Anti-crisis measures included the country's central bank increasing the interest rate to 20% (from 9.5%) and unlimited liquidity injections for banks.

Such exchange-rate volatility creates difficulties when comparing military expenditure in US dollar terms year-to-year. The use of MER conversions is flawed even in times of relative stability, with estimates varying depending on the rate used. With free markets and no trade costs, MERs will adjust to ensure that a dollar buys approximately the same amount of the same goods and services in each country. But this parity is only true for traded goods. Even with freely floating exchange rates and free trade, the prices of non-traded goods and labour can differ substantially across countries.

When using MER conversions, consideration is not given to countries' differing cost of inputs – principally personnel or labour costs, equipment and investment – that determine a country's military capabilities. An alternative approach would be to make conversions using PPP exchange rates, which would at least partially take into account these cost differentials.

This principle is well established in economics and applied when comparing things like real incomes and living standards across countries. Economists use GDP PPP exchange rates, which indicate how much a dollar buys in each country and take account of the actual relative prices, or unit costs, in each country. However, relatively limited attention is given to this issue for international comparisons of defence spending, despite the fact that some of the most important initial work in constructing PPP concepts originated from attempts to measure the Soviet Union's defence burden by the Rand Institute in the 1950s<sup>21</sup> and subsequently by the CIA.<sup>22</sup>

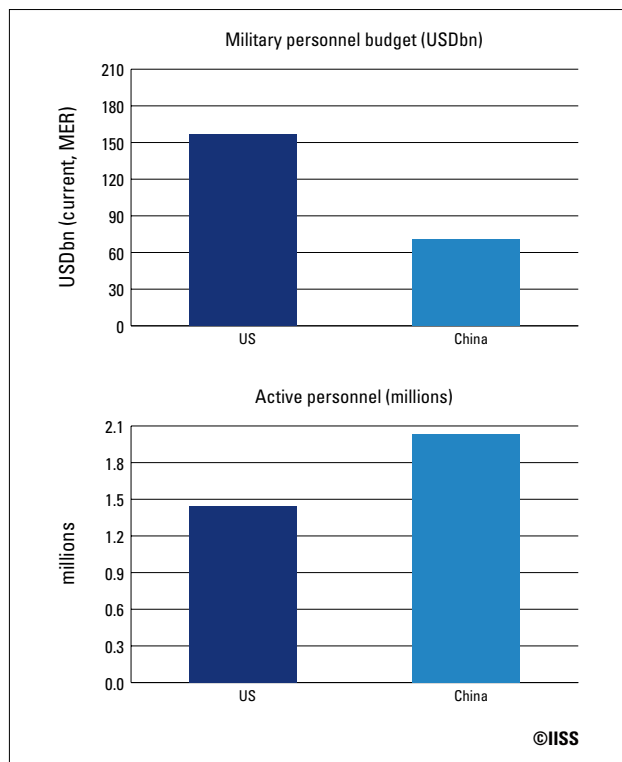
## Case study: US and China's personnel budgets

To appreciate the scope of this problem, Peter Robertson considers the defence spending of China relative to the US.<sup>23</sup> Using 2019 data, China had a budget of CNY1.22 trillion with a total estimated expenditure of CNY1.64trn (see the case study on China in the 'Transparency and measurement issues – China and Russia' section for an explanation of the

difference). China's budget in US dollars, converted using MERs, was USD177bn, while total estimated expenditure converts to USD237bn. The United States' budget was USD746bn. This suggests that the United States' annual military budget is over four times larger than China's core defence budget and over three times larger than China's total expenditure estimate.

Using the total defence expenditure figure, China's military personnel budget is estimated at CNY490bn, approximately 30% of the total.<sup>24</sup> This converts to USD71bn at 2019 MERs. By comparison, the United States' military personnel budget was approximately USD157bn, more than two times larger than China's (see Figure 2). If this MER comparison were deflating each country's expenditure appropriately, the United States' budget should reflect the balance of real personnel resources in each country. But the People's Liberation Army (PLA) has 2 million active personnel compared with the United States' 1.4m. The unit cost of armed services personnel in the US is far higher than in China, but this is not reflected in the exchange rate.

**Figure 2: Market exchange rates – US and Chinese military personnel budgets versus active personnel, 2019**



Sources: IISS; Peter Robertson presentation to IISS Defence Economics Workshop, October 2022

A common response to this type of comparison is to assume that it reflects some difference in quality, but this is a misunderstanding. The United States' higher salary costs have little to do with quality and much more to do with the economy. The US military faces higher salary costs because soldiers need to be paid at rates that are comparable with the rates paid to workers in other sectors in its high-wage economy. For the same reason, Chinese workers with identical skills receive a far lower salary than an identically skilled American worker. While accepting that there may be some differences in training and skills, which may justify some of the salary difference, the main cause is simply the differences in economic conditions in each country, and particularly differences in wage outcomes in the labour market.

The PLA only has to pay a fraction of the wages endowed to US military personnel, and also spends far less on food, training, accommodation and various operational costs. The salary and sustainment costs required to pay and support 2m personnel in the US, at US wages, is likely to be much larger than the United States' personnel budget. The ratio of each country's unit personnel costs, in local currency, is effectively a PPP exchange rate for military personnel.

The appropriateness of PPP conversions depends on the extent to which a country is self-sufficient in developing and producing the armaments required by its armed forces. To ensure standardised international comparisons, PPP conversions would have to be applied to all countries. In the absence of defence-based PPP rates, the GDP-based PPP rates that are available for all countries – which themselves are statistical estimates and reflect the purchasing power of the wider economy, primarily civilian goods and services – would have to be used.<sup>25</sup>

When comparing the entire defence budget, a defence specific PPP (DS PPP), or military PPP, exchange rate is needed to compare each country's budget. Robertson derived a method of approaching this using available data which is essentially a share-weighted average of all the defence input unit costs.<sup>26</sup> Following this approach, Maria Ädel, Andreas Johnson and Tobias Junerfält determined a DS PPP<sup>27</sup> by assessing all components of defence expenditure (the study focused on Poland,

Sweden and the UK) and applying the most appropriate rate to each component. These components could include personnel, equipment, infrastructure and other spending, which encompasses operations and maintenance (O&M) and R&D. In the case of personnel figures, the study factored in public-sector wage and productivity differences; for equipment figures, MERs were used; for infrastructure, a sub-index of PPP ratios was devised; and for other spending, both PPP for GDP and MERs were used.

The study recognises that it would be helpful to determine a measure for domestic production versus imports for the equipment portion, as this would enable a PPP measure to be used for the domestic production element and MER to be used for imports. Furthermore, the 'other spending' category is too all-encompassing given that it includes both O&M and R&D, which need to be treated differently.

### Real budget reality

Defence budgets need to be deflated appropriately so that they reflect the real underlying resources that the budgets can purchase, i.e., their purchasing power. International comparisons of military spending routinely understate the military budgets of countries other than the US and China that are of regional significance, such as Greece, Turkiye and Ukraine in Europe and India, Indonesia, Pakistan and Vietnam in Asia.<sup>28, 29, 30</sup> DS PPP exchange rates are therefore important for understanding how, for example, India's and Indonesia's defence budgets balance against China's and how the budgets of middle-income countries, such as Turkiye, compare with other NATO countries.

As with assessments of general military expenditure, attempts to use military PPP concepts are sometimes mistakenly interpreted to be assessments of military performance.<sup>31</sup> For example, during the Cold War, the Soviet Union's budget was estimated, using PPP concepts, to be much larger than thought. The fact that the US still won the Cold War does not mean that it was not up against a large military. The Soviet Union's problem was that its military was so large that the Soviet economy could not sustain it. Thus, the PPP estimates that inflated the size of the Soviet Union's Cold War military were probably correct.

Similarly, Russia's poor performance in Ukraine in 2022 does not mean that these estimates exaggerate Russia's potential military capabilities. The Russian army's lack of success has been widely attributed to poor leadership, low morale and high levels of corruption.<sup>32</sup> It has not been criticised for having fewer troops or less equipment than expected. Moreover, military PPP estimates show that Russia's real budget advantage over Ukraine is much smaller than MERs suggest because wages were much lower in Ukraine than in Russia.<sup>33, 34</sup> Using DS PPP conversions, Russia's budget is six to seven times larger than Ukraine's, compared with around 11 times larger when using MER.<sup>35</sup>

Determining a more accurate measure of defence inputs does not ensure a better measure of military strength, since that depends on many other factors. But it does provide a better basis for understanding how inputs might affect capabilities.

### The way forward

Constructing military PPP exchange rates is not straightforward. Robertson finds that there are challenges of devising such a series:<sup>36</sup> it requires data on the unit costs of the various items in the defence budget, which countries are unwilling to share, and defence contracts often lack transparency. Nevertheless, given the demand for comparable defence budget data and its importance in summarising national strategic priorities, it is important that the users of the data are not misled by numbers that reflect differences in prices rather than differences in inputs.

Some progress on constructing military PPP rates has been made using existing publicly available data.<sup>37</sup> Ädel, Johnson and Junerfält found that the results depend largely on the differences in assumptions regarding input prices when devising a DS PPP.<sup>38</sup> But Robertson suggests there is considerable scope to develop these estimates by using more detailed data on military personnel salaries across countries and adjusting the wage component of defence budgets. Even a small amount of effort put into collection of operations costs and comparative equipment-costs data, in addition to salaries, could enable enormous progress on creating more accurate international comparisons of military spending.

Thus, more granularity in the breakdown of defence expenditure needs to be made publicly available to determine the correct rate of conversion for each component. The availability of this data is uneven, depending on the country examined, with a lack of transparency contributing to 'optimal obfuscation'.<sup>39</sup> Furthermore, the drawback of this approach is that the final figure loses some clarity and is open to differences in methodology. Different analysts might consider components differently and may not agree on the rate of conversion. It would also require significant manpower to create such a measure for all countries.

This issue of capacity warrants further discussion. Arguably, the study of DS PPP should be further along than it is, but the resources required to determine such a series internationally is beyond the scope of most institutions. International institutions such as NATO and the European Union's European Defence Agency could play a greater role in determining these assessments, having the resources, expertise and access to data that private institutions or think tanks do not.<sup>40</sup> The obstacles presented by much of the data being classified, or its compilation simply being too time-consuming, will perhaps always stymie any effort to determine this for all countries. While considerable work and time has

understandably been dedicated to the study of Russia and China in this regard, it is unlikely that such attention would be afforded to smaller states or to ones that pose a less considerable strategic threat. In a similar vein, when trying to determine an assessment of defence output; the effectiveness of military spending; and the quality of the capabilities that are procured, perhaps to optimise resources, it is only necessary to do so for a few countries, depending on the main threats to global stability.<sup>41</sup>

Furthermore, efforts to assess the output could be made easier by focusing on the quantitative side. For instance, one could measure levels of defence cooperation and the efficiencies achieved through economies of scale. The capability cost in each country could also be determined and the level of efficiency in different countries compared. This would, in turn, help to determine a level of output that is not simply defined as success in international engagements, e.g., Afghanistan and Syria. It would also go some way to resolving the difficulty of measuring how well a country's armed forces are equipped and trained – i.e., how effective a country's defence spending has been – in peacetime when they are not deployed. Given the fact that deterrence from war is a major output or goal of defence investment, engagement in warfighting could effectively be seen as a failure.

# Transparency and measurement issues – China and Russia

Two countries that exemplify the issues around transparency and appropriate conversion rates are China and Russia. In light of the strategic drivers of uplifts to defence spending in Asia and Europe, assessing the real spending power and motivations of both countries is as important as ever.

## China

China displays a relatively low level of transparency when it comes to disclosing its military spending. Compared with countries that do provide more detailed breakdowns of their defence budget, either by service (army, navy, air force etc.) or by function (procurement, R&D, personnel, operations, maintenance etc.), China only releases a headline figure from its Ministry of National Defense.

This raises two sets of questions. Firstly, does the official number cover all military-related expenditure in other budget lines? The existing literature considers that this single figure does not cover all that China spends to sustain and modernise its armed forces.<sup>42</sup> However, this question is not specific to China. For many countries, the defence headline figure covers just a portion of how the armed forces are funded. For instance, the UK's military-related expenditure originates from several distinct budget lines.<sup>43</sup> In more transparent countries this information is readily available, yet in the case of China the separate budgetary items are more difficult to find, given the overall lack of budgetary transparency.

The second set of questions relates to how the money is spent. China has in the past provided more detailed figures in other settings, such as Defence White Papers or United Nations reports (see Table 1), but the level of detail is limited and only available for certain years, making trends over time impossible to determine.

## Differing methodologies

Both the International Institute for Strategic Studies (IISS)<sup>44</sup> and the Stockholm International Peace Research Institute (SIPRI)<sup>45</sup> have in recent years conducted in-depth studies exploring China's military expenditure. Despite starting from a similar baseline stemming from past research by Shaoguang Wang, published in the mid- to late 1990s,<sup>46</sup> the two institutes diverged over time in their estimates. However, the gap between the two estimates narrowed following the revisions made in 2020 and 2021, from USD20bn to USD7bn on average.

A summary of the similarities and differences in the estimates can be seen in Table 2.

## R&D spending

These discrepancies reveal how difficult it is to generate estimates based on non-transparent budgetary information. The most important challenge is trying to distinguish civilian from military spending in broader budgeting categories, which is a particularly key issue when trying to determine an estimate for R&D. Chinese budget data given in the UN Military Expenditure

Table 1: United Nations Military Expenditure Report, China, 2020

China (CNY, millions)				Fiscal Year: 2020	
	Active Forces	Reserve Forces	Militia and others	Amount	Percentage (%)
Personnel	379,262	3,831		383,093	29.65
Training & Maintenance	397,911	5,775	24,679	428,365	33.16
Equipment	474,526	4,793	1,100	480,419	37.19
<b>Total</b>	<b>1,251,699</b>	<b>14,399</b>	<b>25,779</b>	<b>1,291,877</b>	<b>100</b>

Notes from source: China's GDP was CNY101,356.7 billion in 2020. The share of China's military expenditure in its GDP is 1.3%. Personnel expenses cover salaries, allowances, food, clothing and bedding, insurance, welfare benefits and pensions for officers, enlisted men, non-ranking officers and retired officers supported by the military. Training and maintenance expenses cover training, institutional education, construction and maintenance of installations and facilities, and other expenses on routine consumables. Equipment expenses cover research and experiment, procurement, maintenance, transportation and storage of weaponry and equipment. Source: United Nations Military Expenditure, China, 2020, <https://front.un-arm.org/wp-content/uploads/2022/03/20220211-note-verbale-from-china-mission.pdf>

**Table 2: Comparing line items for inclusion in estimates of Chinese total military expenditure**

	Wang Shaoguang (1999)	IISS (pre-Mar 20)	SIPRI (pre-Jan 21)	IISS (post-Mar 20)	SIPRI (post-Jan 21)
Official defence budget (headline figure)	Official PLA budget	Official PLA budget – central + local	Official PLA budget – central + local	Official PLA budget – central + local	Official PLA budget – central + local
Additional budget items	Defence R&D (estimate)	Defence R&D (estimate)	Defence R&D (estimate)	Defence R&D (estimate)	Defence R&D (estimate)
	PAP	PAP central	PAP central + local	PAP central + local	PAP central + local
	Military construction	/	Military construction	/	Military construction (revised downwards)
	Demobilised personnel	/	Demobilised personnel	/	Demobilised personnel (revised upwards)
	Arms imports	Arms imports	Arms imports	/	/
	Subsidies for DTIB	/	/	/	/
	PLA commercial activities	/	/	/	/
	Profits from arms exports	/	/	/	/

Note: PLA – People's Liberation Army, R&D – Research and Development, PAP – People's Armed Police, DTIB – Defence Technological and Industrial Base  
Sources: IISS; SIPRI

Report for 2020 states that military R&D is included in the official defence budget (see Table 1).

However, in his methodology, Shaoguang considered that there was additional military R&D spending on top of the official budget. Institutions examining this issue since have applied different methodologies to estimate additional Chinese military R&D, which highlights the difficulties in distinguishing between civilian- and military-related R&D expenditure in the context of limited budgetary transparency.

Even assuming that, like arms imports, military R&D has been integrated into the official defence budget over time, the question remains to what extent other funds for science and research could have a military component and so should be considered for inclusion in the overall estimate of Chinese military expenditure. This problem is aggravated by China's Military-Civil Fusion (MCF) policy, which seeks to leverage commercial technologies developed in the civilian domain for military applications by the defence sector. According to Tai Ming Cheung, Barry Naughton and Eric Hagt, MCF is no longer specifically mentioned in Chinese innovation plans, but the goal remains the same, i.e. the development of dual-use technologies.<sup>47</sup>

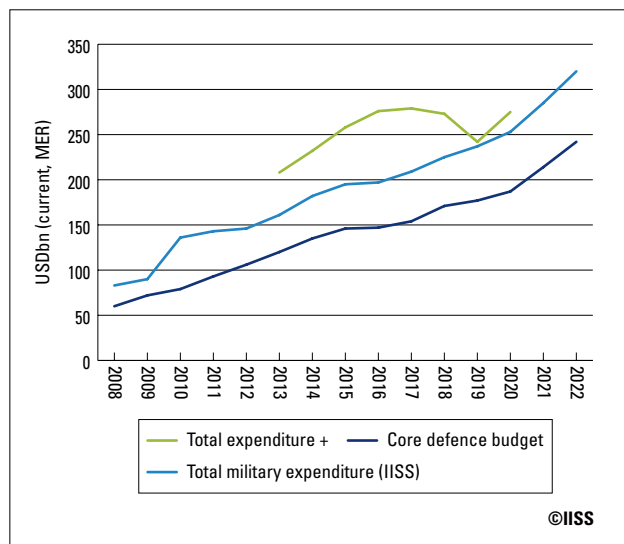
Additional sources of funding identified in Cheung's research could eventually lead to a further revision of estimates. New funding mechanisms for defence investment and R&D in China have emerged in the past one to two decades. These mechanisms include corporate access to capital markets (asset securitisation [AS]);

increasing special investment vehicles (government guidance funds [GGFs]); and the ongoing funding of long-term weapons development. Such sources present substantial real inflows of investment and funding for Chinese defence development. Extensive effort has been made since the early 2010s to develop linkages that would allow China's defence-industrial complex to access lucrative investment capital from financial markets to supplement state funding for techno-security priorities.<sup>48</sup> Cheung identified funding for MCF projects at the local level via GGFs. Such funds provided by local governments are meant to attract private capital.<sup>49</sup> The estimated combined total of AS and GGFs between 2013 and 2020 account for 27% of the official defence budget, although annual totals have fluctuated widely from 3% (2019) to more than 50% (2016).<sup>50</sup>

Since such funds are likely to help support military R&D, adding a proportion to the overall estimate of Chinese military expenditure could be considered. The issue still remains as to how to distinguish between civilian and military research applications. Cheung's latest strand of publications on China's 'techno-security state' provides figures on R&D with military applications.<sup>51</sup>

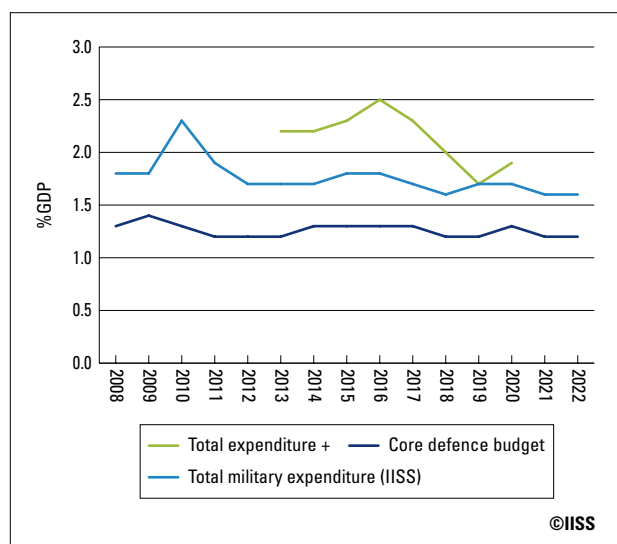
Beyond AS and GGFs, further sources of funding are also worth consideration. Bank loans and debt issues are used by the defence industry to tap into capital markets, while China's defence establishment (both the PLA and the defence science and technology [S&T] system) also receives funding through special medium- and long-term development plans and programmes.<sup>52</sup>

Figure 3: **Chinese military expenditure, 2008–22 (USDbn, current, MER)**



Note: Total expenditure + includes MCF GGFs and defence AS funds  
Sources: IISS Military Balance+; Tai Ming Cheung presentation to IISS Defence Economics Workshop, October 2022

Figure 4: **Chinese military expenditure as a share of GDP, 2008–22 (%)**



Note: Total expenditure + includes MCF GGFs and defence AS funds  
Sources: IISS Military Balance+; Tai Ming Cheung presentation to IISS Defence Economics Workshop, October 2022

Once a figure for the Chinese defence budget has been established, the PPP conversion must again be considered and a DS PPP conversion rate devised.

### Known unknowns in China's military spending

In assessing the true value of China's military spending, there are limitations to the additional budget categories that could be added. However, with additional research efforts, more data could be found (see Table 2).

### South China Sea construction

The costs of China's militarisation of South China Sea islands were not included in the official central defence budget. However, it is difficult to source sufficiently reliable data or generate estimates accurate enough to include them in estimates of total Chinese military spending.

### Defence industry subsidies

Shaoguang's initial methodology provided estimates for government subsidies to the Chinese arms companies that operated at a loss at the time of his research. However, as China has undergone economic reforms and its arms industry has gradually modernised, it is now debatable whether such funds need to be included, considering that these companies have become profitable. Yet there are questions as to how much the Chinese government directly funds its defence conglomerates.

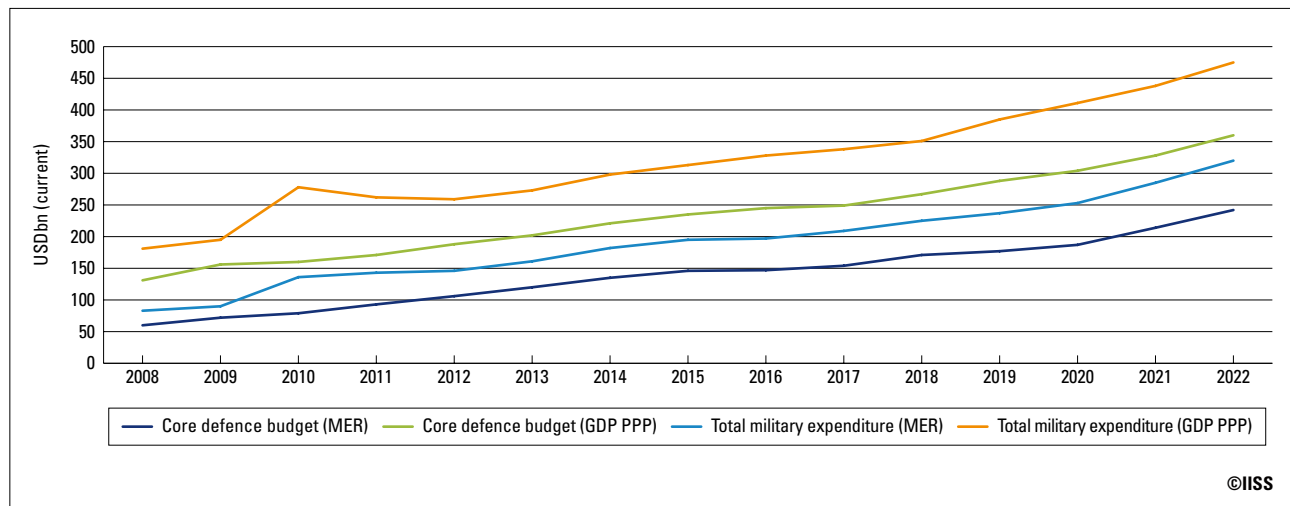
One possible approach is to compare the estimated procurement budget with estimates of the largest Chinese defence conglomerates' defence revenues. The reasoning for this is that, after accounting for arms exports, Chinese defence firms' revenue should not exceed the government's defence procurement spending. However, according to Meia Nouwens and Lucie Béraud-Sudreau, studies have found the difference to be between USD26bn and USD32bn for those years where the data was considered the most complete.<sup>53</sup> The question, therefore, is: where does the additional revenue come from?

Another approach is to examine the auditing reports of Chinese defence state-owned enterprises (SOEs), which show that some government subsidies remain as part of the sources of income reported by the companies. However, it is nearly impossible to distinguish to what extent these subsidies supported civilian versus military activities, given that these SOEs are active in both sectors.<sup>54</sup>

### 'Other expenditure' in Chinese national budget data

Yet another spending category identified by the IISS was the 'other expenditure' line item in China's national budgetary information. The government lists its expenditure by broad categories (defence, education, foreign affairs, etc.). The last line refers to 'central government

Figure 5: Chinese core defence budget and total military expenditure according to different exchange rates, 2008–22 (USDbn, current)



Source: IISS

other expenditure’ and accounted for CNY57.2bn (USD8.3bn) in 2020. Applying the same logic as in other research to Chinese military expenditure<sup>55</sup> this ‘other’ category, or at least a share of it, could be considered as military spending.

### Local R&D spending

Since 2012, local government spending on R&D has overtaken the central government’s spending in this field.<sup>56</sup> However, once again the issue arises that it is not possible to distinguish between civilian and military funding. These funds likely relate to those mentioned in Cheung’s publications (see earlier discussion).

### The way forward: how to improve understanding of Chinese military expenditure

A first recommendation for improving understanding of Chinese military expenditure would be to carry out additional research on the ‘known unknowns’ highlighted above: expenditure on the militarisation of the South China Sea; subsidies to the defence industry; the ‘other expenditure’ line in the overall Chinese defence budget; and local funds dedicated to R&D.

A second recommendation is to intensify efforts to exploit Chinese-language open-source information, including by accessing literature available only in China. From an analyst’s perspective, one potential avenue for further research would be to gain knowledge on budgeting processes in China. This does

not necessarily need to be military-specific. A better understanding of the role and power of the Ministry of Finance in China vis-à-vis the Ministry of National Defense could help to indicate whether the latter would require additional resources from the original budget allocation or whether off-budgeting can still take place in China, if strict budgeting processes are in place for instance. Continuous monitoring of developments in China, specifically changes in economic or military policy, is crucial to keeping the methodology as current and as accurate as possible – not least because some expenses that were considered extra-budgetary in the past may have become part of China’s official budget in recent years.<sup>57</sup>

A third recommendation would be to encourage China, from a policymaker’s perspective, to engage in more transparency. Given that China already participates in the United Nations Military Expenditure report, which is voluntary, diplomats could highlight the importance of using the UN-reporting template for confidence-building purposes – China for now uses its own reporting form. The UN setting could be a good multilateral forum in which to encourage China to increase transparency and participation in confidence-building measures. Others have recommended that the US DoD publicise its estimates of Chinese military spending. Such an initiative could also help to build dialogue on this issue.<sup>58</sup> Even though the current state of relations between the US

and China does not inspire optimism, transparency and confidence-building should continue to be on the agenda of Western–Chinese diplomatic engagements.

## Russia

Russia spends much more on its military than the core defence budget would suggest. The country maintains well over a million personnel in its military, paramilitary and intelligence forces. It carries out R&D on new hypersonic weapons, uninhabited aerial and underwater vehicles (UAVs and UUVs) and even nuclear-powered torpedoes. It has recently modernised its large strategic nuclear deterrent while continuing to possess the world's largest arsenal of tactical nuclear weapons. In the past decade, its armed forces have taken delivery of hundreds of helicopters, combat aircraft and ground-based artillery systems, advanced long-range cruise missiles and dozens of regiments of advanced air-defence systems. Furthermore, it has the world's third-largest warship-construction programme. And all this was before the full-scale attack on Ukraine in February 2022 placed an even greater financial burden on the Russian state.

This is an impressive array of military capabilities by any standard. But the long list of Russian acquisitions and capabilities is at odds with estimates of how much it spends on its military each year. Most confusion is caused by how analysts choose to measure military expenditure. As discussed previously, using MERs to convert defence spending estimates to US dollars can introduce significant fluctuations in the figures, usually because of changes in relative exchange rates rather than because of any meaningful shifts in the resources allocated towards military expenditure.

As a middle-income country that benefits from lower costs, Russia spends considerably less than the UK and its allies on maintaining its military. Around a third of its armed forces is made up of conscripts. Even professional soldiers are paid much less than their British counterparts in dollar terms. The Russian MoD procures large volumes of equipment each year, but it pays for this equipment in Russian roubles, not US dollars. Russian defence-industrial workers are paid less than their American and European counterparts, which is especially important due to Russia being relatively

self-sufficient in the production of most weapons systems. As a result, the Russian MoD is able to buy a lot more capability than MER-based estimates of Russian defence spending would indicate.

### *The defence effort and defence burden*

The amount of money that a country spends on its military – the 'defence effort' – depends on the size of that country's economy and the chosen proportion of total resources that country's government chooses to allocate to defence expenditure – the 'defence burden'. Richard Connolly argues that the scale of a country's defence burden is essentially a political choice.<sup>59</sup> It indicates the willingness of a given country's government and population to allocate scarce financial resources to military ends rather than for other purposes, such as health or education.

Before examining measures of the defence effort, which seek to place a monetary value on a country's military expenditure (usually in US dollars), it is first necessary to establish the size of the Russian defence burden. This is usually expressed as a proportion of GDP, although it can also be expressed as a share of total government spending.

Determining the precise share of GDP that the Russian government allocates to defence expenditure is far from simple. Substantial portions of military expenditure are funded by parts of the federal budget located outside the 'national defence' section (chapter 02 in budget documentation) in which most military expenditure is funded. Furthermore, the transparency of federal government spending on the military has declined in recent years, as an increasing share of the federal budget is classified. A large portion of these classified sections of the budget will undoubtedly cover items of military expenditure. There is also evidence that efforts have been made to conceal the true scale of expenditure, with military spending boosted by resorting to unconventional means of funnelling resources, as outlined below, to the armed forces. Finally, the availability of detailed budget data has declined since Russia's invasion of Ukraine in February 2022.

For the purposes of simplicity, it is possible to identify three main methods for estimating Russia's defence burden:

- The narrowest definition includes only that expenditure that is included under the 'national defence' chapter of the federal budget.<sup>60</sup> This includes expenditure on procurement of weaponry and equipment, personnel, pensions, housing, training and exercises, O&M, construction and development and production of nuclear weapons by Rosatom. Most of this expenditure is carried out by the MoD. It also includes some items of expenditure that are not normally classed as military expenditure by NATO, such as the destruction of old weaponry and preparing the economy for mobilisation. Military expenditure under the 'national defence' chapter represents a lower bound of the scale of Russia's defence burden.
- Given that the first method excludes a significant volume of military spending that takes place under different chapters of the federal budget, it is preferable to use the wider definition employed by NATO.<sup>61</sup> Applying this definition to Russia would result in the inclusion of spending by the Russian MoD 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 often trained and equipped for military operations. These forces include the Russian National Guard (Rosgvardiya), and the Border Service attached to the Federal Security Service (FSB). Taken together, these areas of spending, in addition to the 'national defence' section of the budget, represent the wider definition of military expenditure used by NATO and several think tanks.

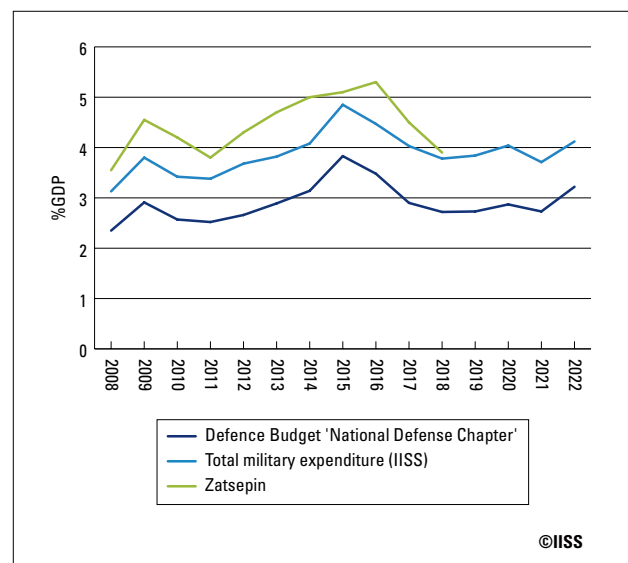
- The widest definition of Russian military expenditure includes additional instruments used to finance military spending. For example, between 2011 and 2015 the government used state-guaranteed credits (SGCs), provided via state-owned banks, to bolster direct budgetary funding of the annual state defence order (GOZ, or *Gosudarstvennyi oboronnyi zakaz*). These SGCs were used to procure new equipment, modernise

and repair existing equipment and carry out R&D on weaponry. Between 2011 and 2016, SGCs added an additional RUB1.2trn (USD18bn) to federal government-funded defence procurement.

Military expenditure is also boosted through a variety of Federal Targeted Programs (FTsP, or *federal'nye tselevye programmy*), which supplement direct procurement spending. Other programmes include developing space launch centres and the electronic components industry, both of which are strongly linked to military activities in Russia. Because other non-MoD ministries fund these programmes (such as the Ministry for Industry and Trade), and because many programmes 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 Zatsëpin include these additional items of expenditure.<sup>62</sup> Taken together, estimates that employ this method approximate to the upper bound of Russia's defence burden.<sup>63</sup>

The methods described above are based on the analysis of publicly available budgetary data. There may, however, be other forms of hidden spending that are not easy to capture through an analysis of the federal budget. For example, in October 2019, a senior manager for Promsvyazbank – which

Figure 6: Russian military expenditure as a share of GDP, 2008–22 (%)



Sources: Russian Federal Budget (various years); IISS Military Balance+; Zatsëpin (various years)

conducts financial operations for the defence industry – revealed that income for the defence industry from the GOZ in 2018 amounted to RUB2.4trn (USD38bn).<sup>64</sup> This figure was RUB900bn (USD14bn) higher than the sum revealed by official statements in that year, suggesting that a substantial volume of procurement funding remains hidden.

### The Russian defence burden over time

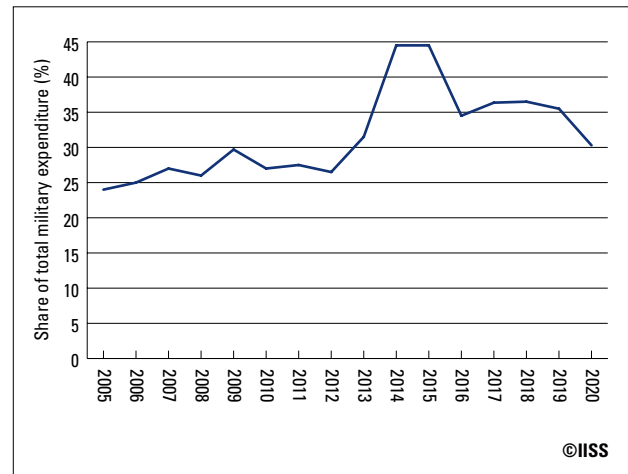
As illustrated in Figure 6, Russia’s defence burden rose sharply between 2008 and 2015. From 2016, the defence burden declined to a level corresponding to the historic average. Expenditure (using the narrowest definition of the defence burden, i.e., spending in the national defence chapter of the federal budget) has tended to fluctuate within a band of 2.5–3.5% of GDP. Using broader definitions of the defence burden reveals that it peaked at levels of just under 5% of GDP in 2015 before declining to around 4% of GDP.

Zatsepin determined that defence spending peaked in 2016. However, this data point is distorted by the fact that a lump-sum payment of around RUB700bn (USD13.5bn) was made by the government to defence-industrial enterprises that year. This payment was made to reduce the debt owed by these enterprises to state-owned banks that was accrued through the SGC scheme between 2011 and 2015. A smaller, additional lump-sum payment was also made in 2017.

Because these SGCs were used to finance defence-industrial production, they should technically be included in any estimate of overall military expenditure. However, analysts differ over whether to include the annual disbursements of SGCs for 2011–15 in the expenditure figure for each of those years or whether to instead include the lump-sum payments made by the government in 2016 and 2017. The Zatsepin data in Figure 6 employs the latter method of calculation. While this created the impression that military expenditure peaked in 2016, it was in fact a statistical artefact. In practice, the defence burden peaked in 2015, as shown by the estimated national defence and total defence expenditure figure.

The rise in the defence burden between 2010 and 2015 was primarily caused by the expansion of spending on the GOZ, which in turn was carried out as part

Figure 7: Procurement (state defence order, GOZ) share of Russian military expenditure, 2005–20 (%)



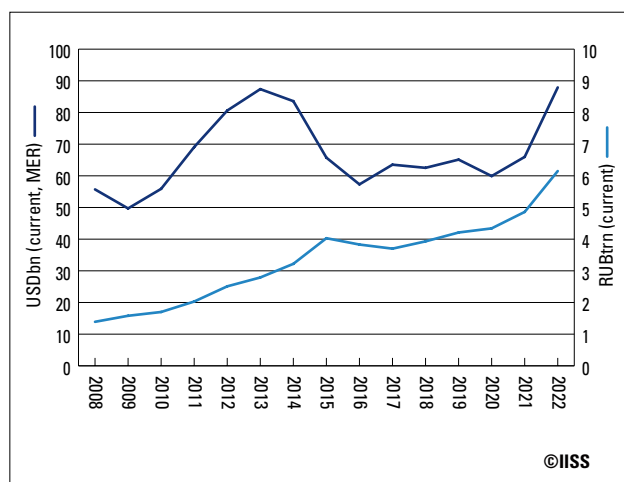
Sources: Russian Federal Budget (various years); IISS

of the longer-term state armament programme to 2020 (*gosudarstvennaia programma vooruzheniia*, or GPV 2020).<sup>65</sup> The share of the GOZ in annual defence spending rose between 2012 and 2015, reaching nearly 45% of all defence expenditure in 2014–15. Procurement spending has since moderated, although at around a third of total military expenditure it accounts for a larger share than in countries such as the UK (20–25%).

The issues with using MER conversions for defence budget figures, primarily exchange-rate fluctuations and differences in the relative prices for non-traded goods and services (e.g. labour costs, raw materials and components), are as acute for Russia as for China. Fluctuation in the price of oil as well as changes in the relative rate of inflation and in the Russian authorities’ monetary and exchange-rate policy created significant volatility in the rouble-dollar exchange rate. This has a dramatic effect on Russian defence expenditure trends over time.

Figure 8 illustrates this issue. Military expenditure measured in roubles grew every year between 2008 and 2015, but the same series shows a decline in 2009 and between 2013 and 2016 when converted to US dollars using the average in-year exchange rate. This domestic rise in spending allowed the Russian government to buy more military capability each year, a trend that is not reflected by the figures converted using MERs. Using one exchange rate (e.g. 2022) would remove these fluctuations but not reflect the value of the budget in US dollar terms in a given year.

Figure 8: **Russian military expenditure, 2008–22**  
(RUBtrn and USDbn USD at market exchange rates)



Sources: Russian Federal Budget (various years); IISS Military Balance+

### PPP-based measures of Russian military expenditure

As discussed above, due to the problems associated with using MERs to measure economic activity across countries, it is important to consider a method that takes into account differences in relative costs. PPP-based estimates of defence spending provide a more realistic approximation of the real resource commitment made by Russia (and other countries) to military expenditure. After all, the Russian government pays for its soldiers and equipment using roubles, not US dollars. Given that a rouble buys relatively more military output in Russia than a dollar does in the US, Russia’s real level of military expenditure is significantly higher than a MER-based estimate would suggest.

The impact of measuring defence spending using a GDP-based PPP exchange rate instead of MERs can be seen in Figure 9. Using PPP exchange rates, Russian military expenditure is between 1.6 and 2.8 times higher than when using MERs. A PPP exchange rate is also less prone to fluctuations. The use of simple PPP exchange rates to measure military expenditure across countries is not, however, without its own limitations. The rates are not necessarily appropriate for comparing military output because they reflect the relative price of an average bundle of a wide range of goods and services produced in an economy and not only military services.<sup>66</sup> To gauge the real scale of Russian military expenditure, an index that is based on costs for military expenditure

is more desirable. If well-designed, such an index might allow a more accurate estimate of the scale of Russian defence spending.

### A military-specific measure of Russian purchasing power

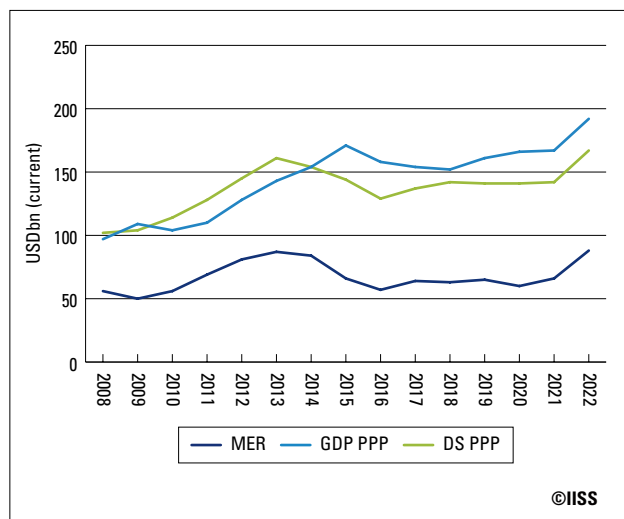
Conceptually, the most appropriate measure to use is a military-sector exchange rate that measures the ratio of the price of defence goods and services across countries. This ratio would allow analysts to compare defence budgets in terms of their real purchasing power, i.e. the real quantity of military goods and services that defence expenditure can buy. A problem here, however, is that detailed data of this nature is not usually publicly available.

As a result of these data limitations, the next-best solution is to construct an approximate military exchange rate based on data that is widely available. To do this, it is necessary to compare the prices of the three main components of military expenditure – personnel, O&M and procurement – to construct an index of relative military input costs (or ratio of military costs).<sup>67</sup> This approach yields a useful military PPP, or DS PPP, exchange rate that should provide a more accurate estimate of Russian military expenditure than that obtained from using a general PPP exchange rate.

There are considerable differences between the various estimates of Russian military expenditure. In recent years, both PPP exchange rate-based measures have been at least twice as high as the MER-based measure. The disparity between the two PPP measures and the MER measure shows how traditional and commonly used measures underestimate the scale of resources allocated by the Russian government to defence.

The difference between the two PPP-based measures is less dramatic. The variation is caused by the greater proportion of defence spending between 2009 and 2014 that was allocated towards personnel. As the share of spending on procurement rose after 2015, the component of the military PPP estimate that is based on MERs grew, pushing down the military PPP estimate relative to the standard PPP estimate. What is most important is that the military PPP exchange rate reveals that Russia spent over USD140bn on defence in 2020 and 2021 before surging to USD167bn in 2022 following the

Figure 9: Russian military expenditure according to different exchange rates, 2008–22 (USDbn)



Note: Assumes annual disbursement of SGCs between 2011–15 rather than lump payment in 2016–17

Sources: IISS; Peter Robertson (2019), Richard Connolly paper contribution following IISS Defence Economics Workshop, October 2022

invasion of Ukraine. This brings estimated funding in DS PPP terms closer to the level seen in 2013, when total expenditure reached USD161bn.

Connolly finds that the use of PPP-based measures to estimate military expenditure in Russia also has the advantage of fitting the other available evidence more closely: after 2009 and 2014, for example, more weaponry was acquired for the armed forces, more training and exercises took place and more military operations were carried out abroad.<sup>68</sup> It is very difficult to explain these developments using MER-based estimates of Russian defence spending.

However, the choice over which exchange rate to use is now of secondary importance. More important is the rise in secrecy that has accompanied Russia’s ‘special military operation’ in Ukraine, which has reduced the ability of analysts to measure Russian military expenditure. Transparency in Russian defence spending has waned over the course of 2022. The Ministry of Finance has limited the publication of data on the implementation of the federal budget; since April it has only revealed total income and expenditure. The Federal Treasury initially followed suit but later resumed publication of data, issuing a detailed report online of spending during the first half of the year and then another that covered to the end of July; the reports were removed from the Treasury’s website in September.<sup>69</sup> Therefore, it is difficult to determine the progress of the budget’s execution in 2022 and whether, as would be expected, there has been a surge in funding for defence. Minister of Finance Anton Siluanov announced on 17 February that the 2022–24 budget plan would likely be amended in light of high oil prices but also to account for far higher rates of inflation.<sup>70</sup> Funding for defence in 2022 was much higher than initially budgeted, as the war in Ukraine has lasted longer than expected. The original core 2022 budget of RUB3.50trn<sup>71</sup> was revised upward in October to RUB4.98trn<sup>72</sup> with corresponding total military expenditure increasing from an estimated RUB4.98trn to RUB6.65trn. Beyond equipment and operational costs, Russia is also reportedly seeking to increase the size of its military by 137,000 to 1.15m.<sup>73</sup>

# Defence budgets and military capability

A central issue that arises when assessing military expenditure is that even when these methodological nuances are taken into account, there are limitations as to what the figure reveals about that country's military effectiveness or ability. Military expenditure is an identifiable measure of resources dedicated to the military by a country and helps analysts to determine national priorities. They can better ascertain, for instance, whether military expenditure is growing faster than the overall economy and what portion of total GDP or total government spending is allocated to military spending. These numbers reveal political priorities and intent. Finally, military expenditure allows for international comparison.<sup>74</sup>

A defence budget provides a very natural way of aggregating defence inputs into a single figure, where various inputs are weighted by their values. Since the chosen mix of inputs reflects strategic decisions that in turn reflect local prices and local security risks, the value of each asset or service will reflect its strategic significance. If defence spending is aligned with defence priorities, it therefore provides an economically and strategically meaningful way to obtain an overview of the size of a country's annual defence commitment. Spending data allows analysts, defence economists and statisticians to put the military modernisation of countries such as China into context.<sup>75</sup>

However, this data does not assess military capability nor indicate how effectively a country's spending is achieving strategic goals. It is an input measure only.

Spending is the flow of resources devoted to the military in a certain time period.<sup>76</sup> How effectively the money is spent to generate military capabilities depends on a wider range of factors, such as the wages of soldiers and the cost of weapons, and military capabilities themselves depend on even more input measures.<sup>77</sup>

A defence budget is not a measure of defence outputs or military strength. Military strength depends on the defence inputs available but also upon command structures, operational efficiency, quality of training, morale, experience, supply lines, tactics and strategy.<sup>78</sup> Assessments of these capabilities also matter for deterrence, which is another key objective of national defence. This limitation, however, is true of all defence-sector or military comparisons. No matter how detailed lists of military assets and personnel are, they are still just measures of inputs. They can be used to inform assessments of capabilities but there are always issues of comparability of asset classes, quality and serviceability. The output of the defence sector – whether conceived as the ability to win a war, achieve geopolitical objectives, or deter rivals – cannot be measured with precision, even though assessments are of course possible.

In terms of observable data, therefore, it is far more straightforward to measure the inputs. This must always then be complemented with assessments of how the inputs might contribute to output through judgements about strategy, efficiency and morale.

# Alternative measurements – NATO burden-sharing

The difficulties in accurately assessing military expenditure are not unique to China or Russia. Several countries in Europe also require additional analysis and assessment of elements to augment the core defence budget and bring figures into line with the NATO definition of defence. The issues of transparency and input versus output are well exemplified by the problem of how to assess burden-sharing among NATO members.

The 2014 Defence Investment Pledge (DIP) made during the NATO summit in Wales included two easily understood quantitative metrics targeting how much allies were expected to spend on defence, i.e. two agreed input metrics:

- All allies promised to maintain or ‘aim to move towards’ spending a minimum of 2% of their GDP on defence ‘within a decade’ (i.e., by 2024); and
- Allies promised to allocate a minimum of 20% of their annual defence spending on major new equipment (including related R&D).

The two input metrics were clearly described in the Wales Summit communiqué. Since the summit, it has been possible to track the progress that allies have made towards the two input goals through their public submissions to the NATO secretary-general, which are then published in NATO’s Annual Report and readily allow for direct statistical comparisons between them.

Furthermore, as noted in the Wales communiqué, all allies committed to ‘ensure that their land, air and maritime forces meet NATO agreed guidelines for deployability and sustainability and other agreed output metrics’.<sup>79</sup> The ‘output metrics package’ that was eventually agreed comprised nine measures that assess factors including the deployability of a country’s armed forces, how sustained that deployability could be, contributions to NATO operations and missions abroad or response forces, and fulfilment of NATO responsibilities in terms of personnel requirements.

## The DIP in practice, 2014–2021

By 2021, seven years after Wales but still prior to President Vladimir Putin’s full-scale invasion of Ukraine the following February, the DIP had in many respects been highly successful. Total non-US NATO defence spending had increased every year while the defence spending of seven allies was at or above 2% of GDP, with 20 allies expected to reach this level by 2024. 21 allies had achieved or surpassed the goal of allocating at least 20% of annual defence spending to major new equipment, with 27 of 30 expected to do so by 2024.

Unfortunately, while public reporting provided some transparency regarding the two ‘input’ metrics, the rest of the 2014 DIP – the nine output metrics that indicate how wisely and fully each ally is spending its defence resources – had proven to be invisible, largely for national security reasons. Only Denmark had chosen to publicly release its submissions, and the data received by NATO had remained classified. Since the only reporting seen by the public each year was the statistical information concerning the 2% and 20% goals, this had created an overriding focus on the input metrics as opposed to a true measure of the contributions each NATO member brings to the Alliance. That, in turn, had led to a perception among many defence experts that the DIP had been a ‘one size fits all’ quantitative goal uninformed by crucial qualitative considerations that had a bearing on each ally’s performance, as measured by the types of capabilities they deploy and the degree to which they are making such capabilities available to NATO in furtherance of its agreed operations and missions. Allies who may have been lagging in meeting the 2% goal but were excelling at fielding and contributing needed capabilities had come to feel aggrieved.

## The DIP in 2022

Putin’s decision at the beginning of 2022 to launch a full-scale invasion of Ukraine served as a catalyst to reassess the security environment in Europe. In his remarkable *Zeitenwende* (‘turning point’) speech to the German

Bundestag on 27 February 2022, Chancellor Scholz said, 'The twenty-fourth of February 2022 marks a watershed in the history of our continent', emphasising that Putin was 'not just seeking to wipe an independent country off the map. He is demolishing the European security order that had prevailed for almost half a century since the Helsinki Final Act.'<sup>80</sup> One month later, the new EU Strategic Compass declared that the invasion constituted 'a tectonic shift in European history'. EU High Representative for Foreign Affairs and Vice President of the European Commission Josep Borrell warned in the Strategic Compass foreword that it had proven 'that Europe is even more in danger than we thought'.<sup>81 82</sup> Three months after that, the NATO Heads of State and Government meeting in Madrid agreed its own strategic guidance for the decade ahead. In the face of Russia's 'brutal and unlawful invasion', Alliance leaders warned in their 2022 Strategic Concept, 'We cannot discount the possibility of an attack against Allies' sovereignty and territorial integrity.'<sup>83</sup>

The implications of these stark assessments for the DIP were immediate and significant. What had seemed the DIP's main liability – the blunt macro simplicity of the 2% of GDP commitment – became its most important if not invaluable symbolic value. As stated in the Strategic Concept, 'nations [will] meet the commitments under the Defence Investment Pledge, in its entirety, to provide the full range of required capabilities ... commensurate with the challenges of a more contested security order.' The accompanying Summit Declaration issued by NATO Heads of State and Government vowed to 'build on that pledge and decide [in 2023] on subsequent commitments beyond 2024'.<sup>84</sup>

A further point made in the Strategic Concept was the need for effective coordination in the aims of the EU and NATO through 'initiatives to increase defence spending and develop coherent, mutually reinforcing capabilities, while avoiding unnecessary duplications'. In light of economic constraints, efficient spending is key. While there is pressure on countries to protect their domestic defence industry, particularly in times of economic difficulty, there has undoubtedly been increasing clarity among NATO members as to which capabilities are to be protected domestically and which are open to international competition. This clarity does help the aim of

coordination, but transparency is vital. Amidst the wave of defence-spending increases announced in 2022, countries should ideally coordinate their increases and areas of focus to ensure the most effective use of this funding.

## **A proposed framework for a post-2024 'DIP 2.0'**

A more equitable and effective Alliance burden-sharing assessment would consider the specific objectives, partners and political constraints of the Alliance's strategic environment. This requires utilising qualitative frameworks, such as battlefield-coalition organisational structures and non-combat contributions, and quantitative methods.<sup>85</sup>

To ensure that an updated DIP appropriately addresses the underlying challenges and more fairly assesses burden-sharing, it is possible to build on the frameworks already in place. Robert G. Bell argues that a new DIP or 'DIP 2.0' could be based on the three pillars of the agreed and already operationalised NATO fair burden-sharing assessment baseline that NATO Secretary-General Jens Stoltenberg calls the '3 Cs' (cash, capabilities and commitments). As Stoltenberg has said, cash can be used to procure tomorrow's capabilities, which in turn support allies' commitments. For each of the 3 Cs, there are formal mechanisms in place that allow allies to monitor, measure and, if appropriate, challenge each other's performance.

NATO would need to translate each ally's existing annual reporting with respect to the two current input metrics and nine output metrics into a simple, readily understood and publicly released equation with a 'score' for cash, for capabilities and for contributions ('x/y/z'). Each coefficient could be depicted on a scale of 0–10, with a total of 30 points thus possible. Thus, for example, the US might receive a 10/10/10, while Germany might receive, say, a 6/8/7 and Denmark a 7/10/10. This would make clear to all allies that the main emphasis in the pledge is on generating agreed capabilities and delivering them to NATO, while also preserving the necessary, but not sufficient, catalyst represented by the two existing input metrics. It would also readily allow for comparisons between each ally's performance.

The consolidation of these three complex variables into a simplified, public 'NATO Commitments Report'

will enable NATO allies to hold each other, and themselves, accountable across a broader range of requirements than the current burden-sharing arrangement encourages and lead to a more capable Alliance.<sup>86</sup> In the long run, NATO can develop more fair, effective and efficient burden-sharing arrangements by encouraging weapons and capability specialisation, increasing inexpensive but influential operations such as advisory missions, and adapting flexible command-and-control structures when partnering with non-NATO actors on future battlefields.<sup>87</sup>

Bell finds that adopting a 'rebalanced' DIP 2.0 does not mean that how, when or what allies are already reporting against the 11 metrics needs to be changed. It would, however, require the creation of a new method for summarising and 'scoring' these submissions that takes into account the nine output measures and makes clear to the public each ally's performance in

this dimension of the pledge. In short, a 'DIP 2.0' that is underpinned by Stoltenberg's '3 Cs' would facilitate greater understanding by ordinary citizens and politicians as to how and whether each ally is fairly shouldering NATO's burdens in the face of Russia's continuing aggression against Ukraine and the clear and present danger to NATO members represented by that malign behaviour. This would involve not only how much each ally is spending on defence but also how effectively each is spending those resources to create and contribute the capabilities that are of greatest importance to the Alliance in the face of these new and grave strategic challenges. Amidst an uncertain economic and security environment confronting all NATO members, Adrian Kendry argues that strengthening measurement, transparency, accountability and integrity in defence spending is crucial to achieving successful collective defence, crisis management and cooperative security.<sup>88</sup>

# Conclusion

The study and determination of comparable military expenditure figures has always been a methodological challenge. The convenience of having single numbers that can be compared means that defence budgets will likely always be part of national discussions and form public and political perceptions. Military expenditure is an identifiable measure of resources dedicated to the military by each country and allows analysts to determine national priorities. With appropriate DS PPP exchange rates, defence-inflation estimates and persistent efforts to improve consistency in data collection for countries with limited transparency, the defence budget figures determined are a very useful objective summary to assist with multiple comparisons across time and countries.

A lack of transparency is a key barrier to this ambition. In order to determine a comprehensive DS PPP for countries, more granular breakdowns of defence expenditure need to be made public to determine the correct rate of conversion for each component of defence. The same is true for determining defence-inflation indices and establishing a true level of defence expenditure for opaque countries. When analysts make these calculations or judgements, they must also be transparent as to their methodology to aid in determining a consensus among defence economists and statisticians. This is needed to resolve – or at least reduce – the interpretation variance between the estimates of institutions and think tanks that is a prevalent and persistent issue.

The issue of capacity is an increasing challenge in the current economic environment. Notwithstanding the relatively limited pool of labour from which they could draw, most national institutions do not have the resources to establish vast squadrons of defence economists dedicated to resolving these discrepancies and establishing a highly modelled figure for all countries. While considerable effort has understandably been dedicated to the study of Russian and Chinese military expenditure, it is unlikely that such attention would be afforded to smaller states or to ones that pose less of a strategic threat.

Even when these difficult adjustments are made, there are limitations as to what the final budget figure reveals about a country's military capability, strength, effectiveness or progress towards strategic goals. It is an input measure only. Fundamentally, the output of the defence sector – whether conceived of as the ability to win a war, achieve geopolitical objectives or deter rivals – is not measurable. In terms of observable data, therefore, it is far more straightforward to measure the inputs. This must always be complemented by assessments of how the inputs might contribute to output through judgements about strategy, efficiency and morale. The persistent classification of data and the extensive resources required present considerable challenges but should not prevent efforts to further this research and area of study.

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