

THE RELEVANCE OF DEFENCE EXPENDITURES AS AN INDICATOR OF A COUNTRY'S MILITARY POWER

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Abstract: *The level defence expenditures is a useful indicator for cross-country comparisons and for the analysis of the trends regarding defence expenditures per country, region or groups of countries. Decision makers often refer to past trends for defence expenditures or the level of defence expenditures for a perceived enemy country to justify political decisions. Still, the data regarding defence expenditures should not be considered the ultimate indicator regarding a country's military strength and decision makers should be aware of the limitations and underlying assumptions of the methods used to quantify defence expenditures. The most used methods of estimating defence expenditures are based on the exchange rates and the purchasing power parity, with several advantages and disadvantages. While these type of statistics do offer a broad image on the defence expenditures of other countries, they are not a substitute for more in-depth analyses regarding the security and defence environment, the real military strength of perceived foes and a sound strategy for the long term development of the own forces.*

Keywords: defence, expenditures, quantification, real, capabilities

1. Introduction

The task of accurately estimating the military power of a country is not an easy one. One could take a look at the percentage of GDP allocated for defence (the notorious 2% for NATO countries), the number of people in the armed forces, the number of tanks, aircraft carriers or submarines – in other words, quantitative indicators. This type of indicators have their uses, but they present only a partial picture of the real military strength – we can count 100 tanks on paper, but in reality only 60 of them are in working order, due to lack of spare parts and maintenance, the crews are not properly trained to be able to safely operate them, they are kept in unsuitable facilities that accelerate the physical degradation etc. A country may have 100 000 people in the armed forces, but the

military personnel may be underequipped, poorly trained, lacking motivation and expertise. The result is that the image we get from using quantitative indicators to quantify the military power of a country is similar to a giant with clay feet, that may shatter at the first step.

2. Methods used in cross country comparison for defence expenditures

Until now, there is no consensus on a globally accepted, reliable and accurate indicator in this area. The most widely used indicator is the level of military expenditures of a country, but there are some caveats that must be taken in consideration when comparing the apparent military strength of various countries, in terms of methodology.

The sources for the level of defence expenditures are usually reported by the countries (with the caveat regarding their absolute accuracy), but these expenditures are done in national currencies, while for international comparisons we need to have a common denominator – usually the US dollar. This means we have to transform the defence expenditures expressed in national currencies in dollars, which complicates the calculations. Also, for comparisons made across more than one year, we have to adjust the numbers for inflation, which could heavily distort the numbers. As a result, there are three main methodologies used in order to compare defence expenditures between countries and across time: the average market exchange rate (MER), the official market exchange rate (OER) and the purchasing power parity (PPP) exchange rates. All three have their advantages, but are also plagued by a set of drawbacks that have to be understood before using the numbers for drawing a definite conclusion regarding a country's military strength.

2.1. Average market exchange rate (MER)

The most commonly used method in comparing defence expenditures is the *average market exchange rate (MER)*. According to the IMF, “market exchange rates are the logical choice when financial flows are involved. For example, the current account balance represents a flow 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” [1]. The market exchange rates are often used to measure the relative value of the goods and services that are exported and imported. The advantage of using this method to compare defence expenditures between countries derives from the fact that many countries already report statistical economic data using this method, and it is not difficult to convert the national

currencies in US dollars based on the average market exchange rates.

While convenient to calculate, this method has a few drawbacks that influence the accuracy of international defence expenditures comparisons. It has the advantage of providing a good common denominator for a sizeable part of the defence expenditures (such as procurement, in the case the equipment is imported), but it does not take into consideration the true cost of the other resources used for defence that are not imported – such as the cost of manpower or equipment and supplies procured from internal sources.

The method of average market exchange rates uses exchange rates resulting from the supply and demand of the currencies used for international transactions, and these exchange rates are not always objective. In the case of defence expenditures numbers, they may incorporate the fluctuations in the average market exchange rates caused by external events such as speculative attacks, economic sanctions, central banks interventions as part of the monetary policy, armed conflicts etc. These fluctuations distort the statistical usefulness of the defence expenditures indicators, as they are the result of temporary external events, totally unrelated to the real military power of a country.

An example in this sense are the defence expenditures of Iran and their evolution over time.

According to the Stockholm International Peace Research Institute - SIPRI numbers presented in figure 1 [2], the Iranian defence expenditures expressed in constant 2017 US dollars have increased steadily until 2006, then experienced a decrease until 2012, followed by a sharp decrease until 2015. The Iranian defence expenditures increased again until 2017, and decreased in 2018. The numbers would apparently support the assumption that Iran's military capabilities were strongly affected between 2010 and 2015

by the international sanctions imposed as a response to the Iranian nuclear program

and by the sanctions imposed by the Trump administration in 2017.

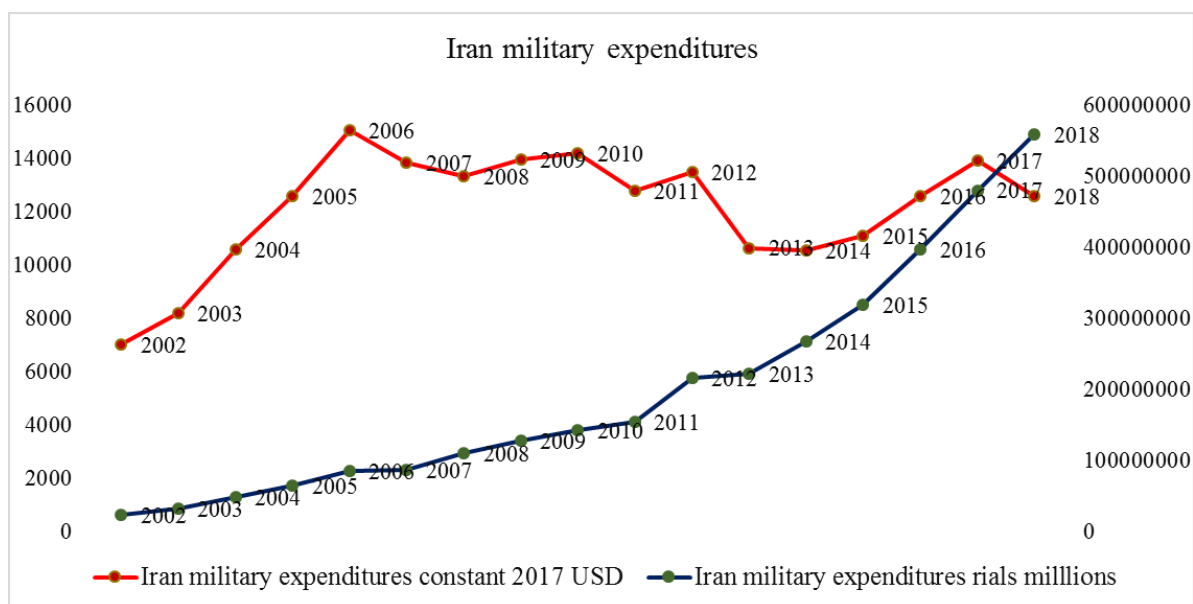


Figure 1: Iran Military Expenditures

Of course, military expenditures, like any other type of government expenditures, are negatively affected by national currency devaluations and inflation. Following the economic sanctions, Iran had difficulties in attracting funding for investments and trade and saw its oil revenues reduces. These external factors, combined with the degradation of the internal economic environment, plagued by inefficiencies and inflation, have taken their toll on Iran's economy.

Still, the shape of the evolution of the defence expenditures expressed in constant USD and rials is totally different. If we analyse the evolution of Iran's military expenditures in the same time frame expressed in the national currency, the rial, the picture looks dramatically different. The military expenses in rials show that, contrary to a decline, the military expenditures have registered a steady increase from 2002 onwards, with a steeper slope from 2013. Even if this increase in rials, it is a definite and it should not be considered solely as the result of the rial devaluation. The argument that Iran simply has to spend more in national currency and that this doesn't translate into real

capabilities is not accurate, as we have to take into consideration the composition of Iran's military capabilities, their main weapon suppliers and their degree of self-sufficiency regarding arms production.

In Iran's case, the striking difference in trends is generated by the specificity of Iran's political and military situation. After the 8 years Iran-Iraq war in the 80's, Iran attempted to build a large conventional military, by purchasing weapons from the former Eastern Bloc countries, at lower costs – from combat aircraft to armoured vehicles. The lack of budgetary funds and the US pressure to limit the country's military power have resulted in a different strategy. As a result, Iran strategy has been to avoid a long, costly and eventually not very successful direct confrontation and shape the environment in the Middle East through the use of proxies and unconventional warfare.

This approach is visible both in the creation and support of various militia groups fighting in Iraq, Syria, Lebanon, Yemen [3], but also in its acquisition programs. For example, the Defence Intelligence Agency report "Iran military power Ensuring Regime Survival and Securing Regional

Dominance” [4] states that in order to enhance its navy capability of supporting guerrilla warfare, Iran has acquired mine and anti-ship missiles, missiles, small fast boats, small submarines.

According to the same Defence Intelligence Agency report [5], Iran military power is based on few main capability areas:

- ballistic missiles (able to threaten distant targets and to provide deterrence);
- naval forces (that may be used to block the navigation in crucial areas such as the Strait of Hormuz and Bab el Mandeb strait),
- unconventional capabilities (the use of partners and proxy forces to extend its regional influence);
- integrated air defence systems, by acquiring the Russian the S-300 Favorit surface-to-air missile system.

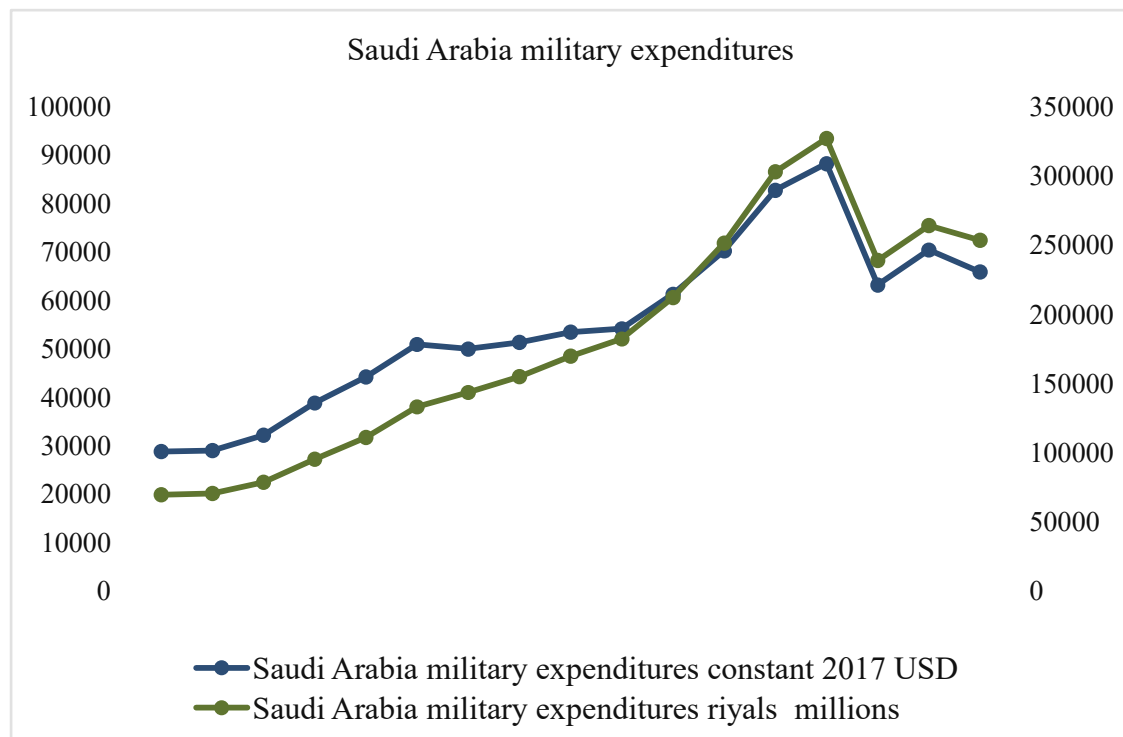


Figure 2: Saudi Arabia military expenditures

A similar comparison between Saudi Arabia’s defence expenditures calculated in constant 2017 USD and national currency shows that despite the differences in the numbers, the trends are rather similar over time, as shown in figure 2.

The difference in the shapes of defence expenditures in constant us dollars and national currencies between Iran Saudi Arabia can be explained also based on the source of the acquisitions of weapons. Saudi Arabia purchases weapons and military equipment mainly from the United States (61% of its arms purchases), United

Kingdom (23% of its arms purchases), and several European countries (France, Spain, Sweden, Switzerland etc) [6], which means its arms purchases are made almost exclusively in US dollars. Iran’s acquisitions, on the other hand, are less dependent on the US dollar-rial exchange rate, as its main weapons suppliers after 2008 are Russia (for example Su-30 fighter aircraft, S-400 surface-to-air missile systems, T-90 tanks, modern artillery systems and Yakhont anti-ship cruise missiles) and China [7]. Iran aims at self-sufficiency in producing internally as many

weapon systems as possible and purchasing other equipment from other countries than the US and its allies. The result is that Iran's military expenditures expressed in constant US dollars may be understated, as they are less affected by the dollar-rial exchange rate and the costs of producing the military equipment and weapons inside the country are lower (due to the differences in the purchasing power parity the costs of labour and non-imported goods and services are lower than those in the United States or other Western countries). The figures expressed in constant US dollars depend on the base year chosen, which can have an impact on defence expenditures comparisons between countries. For instance, the Stockholm International Peace Research Institute figures use for the constant dollar figures 2017 as a base year [8], and there is a sizeable difference between the data regarding defence expenditures in the year 2017 (expressed in constant US dollars) and the 2018 figures, expressed in current 2018 US dollars, generated by the depreciation of the US currency.

2.2. The official exchange rate (OER)

A second method used for the cross-country comparison of defence expenditures is the use of *the official exchange rate (OER)*. The advantage of this method derives from the facility of calculations – for example, Romania's defence budget at official exchange rates is calculated by dividing the budget figures for the respective year in lei to the average US exchange rate with the Romanian leu in that year. The calculations are easy to perform and the method is preferred by economists in cross-country economic comparisons, but it has the main disadvantage that it is even less accurate regarding the relative purchasing power of a currency than the average market exchange rates.

Official exchange rates can be artificially manipulated (by countries interested in increasing their competitive advantage in exports by devaluating their currencies, for instance – the most recent case being the

US accusations against China regarding currency manipulation), so they may be even less accurate than the average market exchange rates when comparing defence expenditures across countries. The official market exchange rates are determined based on the exchange rates set by the markets, but they are usually based on a limited set of goods and services (the most common traded by a specific country), hence they are not very relevant for other types of goods and services, especially in the defence area. Another disadvantage of this method derives from the way it is calculated – based on one year figures. This makes it ill-suited for comparisons of defence expenditures over many years, as the appreciation and depreciation of a currency over time reflects its relation with other currency and not its specific evolution. For example, an appreciation of the US dollar against the Japanese yen may be the result of the Japanese government policy of devaluating its own currency and does not necessarily mean the US dollar appreciated against all other currencies.

2.3. Purchasing power parity (PPP)

The last methodology for expressing the defence expenditures relies on using the *purchasing power parity (PPP)*. This method attempts to overcome the disadvantages of the MER or OER methods, by taking into account the differences between countries in terms of purchasing power and the costs of goods and services. According to the OECD definition, “the purchasing power parities (PPPs) are the rates of currency conversion that try to equalize the purchasing power of different currencies, by eliminating the differences in price levels between countries. The basket of goods and services priced is a sample of all those that are part of final expenditures: final consumption of households and government, fixed capital formation, and net exports. This indicator is measured in terms of national currency per US dollar”[9].

By taking into consideration the differences in the costs of a basket of similar goods and

services in various countries, the method can be used for more realistic cross country comparisons of per-capita welfare and could be also used to compare defence expenditures. Similar to the other two methods, this method also has its drawbacks, as it is based on the assumption of identifying similar goods and services in other countries that have an equivalent in the US. The problem is that the goods and services in various countries are not identical. “The Economist” launched a famous informal measure, called the Big Mac PPP, estimating the relative value of different currencies based on the relative price of the Big Mac burger in various countries [10].

The Big Mac indicator is easy to calculate, considering that the burger is a rather common and easy to replicate good. Measuring PPP across countries based on a larger basket of goods becomes more difficult, as same goods do not have equivalents in the US. This is especially true in the case of military equipment – what could be the US value of a Russian Sukhoi 57 plane or a Chinese ZTZ99 main battle tank? It is a difficult task to estimate and compare the relative price of a Sukhoi 57 and an American F 35, as the calculations would require an in-depth analysis of the technical characteristics, component and information about the prices of the many inputs (labour, production equipment, parts etc) that make up the final product.

Still, various international institutions (the International Monetary Fund, the World Bank, the United Nations, but also think tanks from the defence area such as Stockholm Peace Research Institute or the Heritage Foundation) have made the effort of attempting to calculate PPP estimates, in order to make cross country comparisons of

GDP or defence expenditures, by using a small and sometimes different basket of goods and services. The results are interesting, but we have to be aware that their accuracy depends on the methodology used (the composition of the basket of goods and services, for instance), but also on the accuracy and availability of reports from the countries. Still, in terms of cross-countries comparisons regarding GDP, the PPP is considered to be more suitable than the methods based on the exchange rates. Generally speaking, the MER and OER methods tend to underestimate the purchasing power in the developing countries, where the costs of goods and services are lower than in the developed countries.

The same is true for the defence expenditures. As presented in figure 3 [11], the military expenditures expressed in constant 2017 US dollars and PPP rates for various selected countries show different pictures, as the numbers in PPP attempt to take into consideration the size of each country’s economy and to adjust for differences in living costs and purchasing power.

As expected, the figure above shows that in developed countries, the difference between the military expenditures in constant US dollars and PPP are lower in developed countries (US, UK, Germany), but they are significant in developing countries (Iran and India show the highest differences).

The differences between the defence expenditures in PPP and constant USD for India and Pakistan are also relevant. The differences are visibly bigger for India than Pakistan, reflecting the difference in the size of their respective economies (according to CIA Fact-book, India’s GDP is 9 times higher than Pakistan’s [12]).

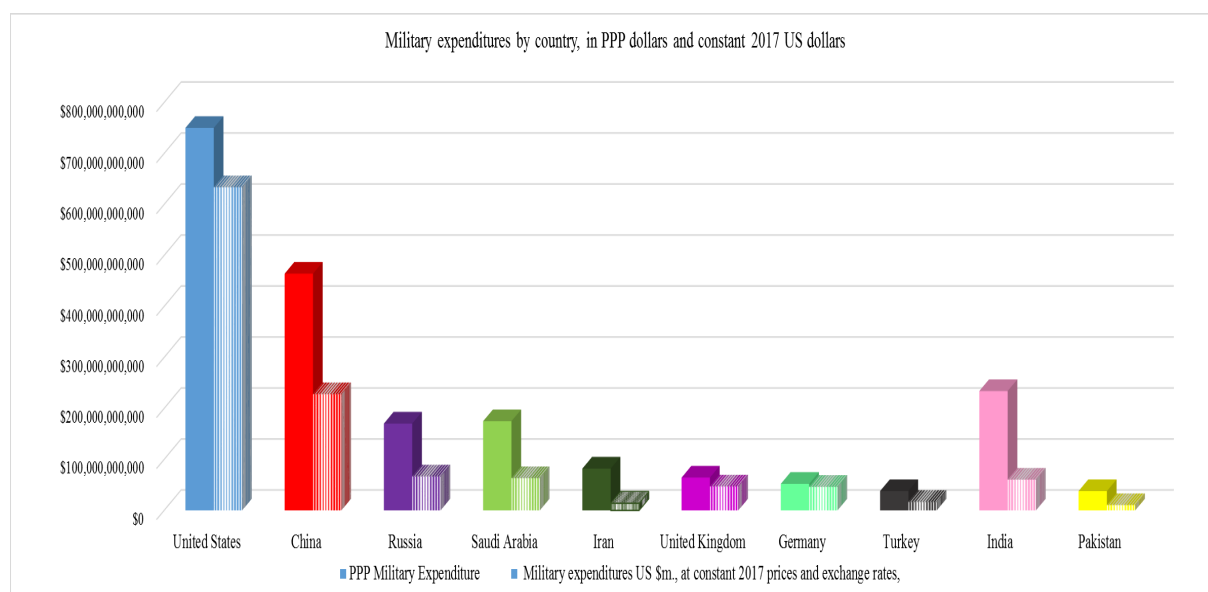


Figure 3: Military expenditures by country, in PPP and constant 2017 USD

In a crude comparison presented in Table 1 [13], the differences between the defence expenditures of the US and other countries are not spectacular for Germany (in PPP the US defence spending is 14.4 bigger than Germany's, while in constant US dollars is only 13.5 bigger). On the other hand, US

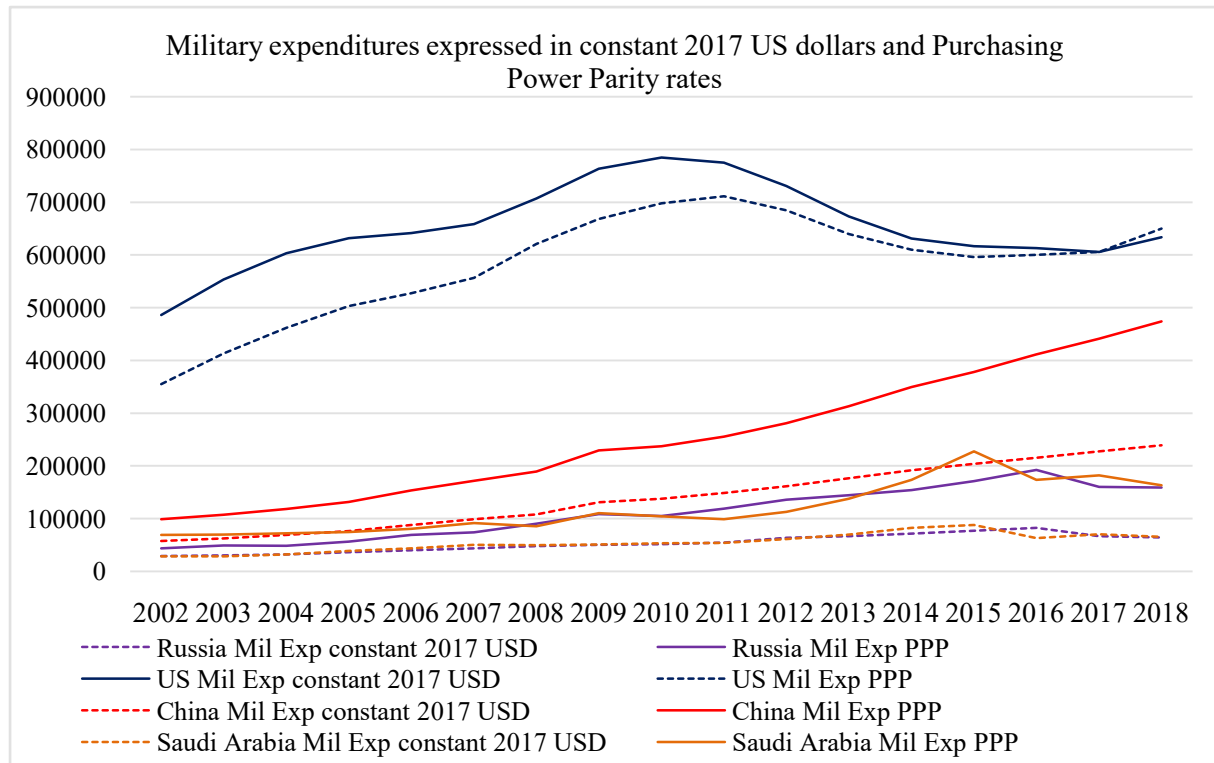
appears to spend 45.5 times more than Iran in terms of constant USD, but the difference is significantly lower – 9 times more, in PPP terms. Similarly, US appears to spend 9.5 times more than Russia in constant USD, but only 4.4 more than Russia in PPP terms.

Table 1 Comparison of the US defence expenditures in PPP and constant 2017 USD against various countries defence expenditures

Comparison of the US defence expenditures in PPP and constant 2017 USD against various countries defence expenditures		
Country	PPP	Constant 2017 USD
United States	1	1
China	1.6	2.8
Russia	4.4	9.5
Saudi Arabia	4.3	10.0
Iran	9.1	45.5
United Kingdom	11.7	13.5
Germany	14.4	13.7
Turkey	19.8	38.1
India	3.2	10.5
Pakistan	19.9	61.2

Using PPP for a more accurate view on the real defence capabilities that can be acquired through defence expenditures is

valid also for comparisons stretching over a number of years and for identifying trends in defence expenditures.



From figure 4 [14], in China’s case, the upward trend in defence expenditures is visibly steeper when expressed in PPP than the line featuring the data in constant USD and a lot closer to the level of the US expenditures in PPP than expected. According to Office of the Secretary of Defence Annual Report To Congress Military and Security Developments Involving the People’s Republic of China 2019 [15], “China is advancing a comprehensive military modernization program aimed at completing modernization by 2035 and making the People’s Liberation Army into a “world-class” military by 2049” and the trend is a lot clearer in the PPP numbers.

China’s military strength cannot be estimated exclusively from these numbers, as the country’s defence budget has a low transparency, but considering the factors below, China’s military power appears be

understated when taking into consideration just the constant USD numbers.

One factor that may lead to underestimate China’s real defence expenditures is related to its goals of developing and producing a lot of its military equipment and weapons domestically – according to the Stockholm Peace Research Institute calculations, China is the world’s second-biggest arms producer, behind the United States [16], which means it can purchase and maintain a lot more capabilities with the same amount of money than it would be able to do if importing the equipment. Also, China invests heavily in R&D as it aims to modernize and increase the level of IT in its armed forces [17] and the costs of labour (military personnel, but also research personnel and the manpower in the defence industry) are significantly lower than in developed countries. China’s operating and maintenance costs are also lower than those of the western countries, especially for the

military equipment and the spare parts/consumables produced domestically.

3. Conclusions

There is no ideal way of calculating and comparing defence expenditures across countries, as all the known methods have their advantages and disadvantages. Still, these numbers are more than a statistical exercise, as decision makers often use them to justify strategic political and military decisions, such as increasing or decreasing

the defence allocations or deciding the way the budgetary allocations are split between categories of expenditures such as R&D and procurement versus personnel expenses. While these type of statistics do offer a broad image on the defence expenditures of other countries, they are not a substitute for more in-depth analyses regarding the security and defence environment, the real military strength of perceived foes and a sound strategy for the long term development of the own forces.

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