
Powernomics and Powermetrics: A Key to Understand Security, Economics, and International Politics

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Abstract:

Purpose: The aim of the study is to show what relations exist between powernomics, powermetrics, international relations, security, and economics of states. In addition, it is important to show the relationships between the international policy of the state in the context of its power - military, economic or demographic.

Approach/Methodology/Design: As the research method, the literature analysis, theoretical foundations of powernomics and powermetrics, as well as statistical data analysis were used. Mathematical formulas were also used to calculate the power of states and to indicate the forecast, how the power of the state influences the position of the state in the international arena.

Findings: It was found that powernomics and powermetrics influence the policy of states, their actions in the field of economics, security as well as inter-state relations.

Practical Implications: The main effect of the research was to present the following indicators: Regions by general power in 1992-2016 expressed as a percentage of general, military and geopolitical power of two key players in the international arena in 1992-2016. Percentage share of selected countries in international control processes in 2012-2024.

Originality/Value: The research provides theoretical assumptions and practical answers to the use of powernomics and powermetrics in the study of economic security of countries. They can also be used in forecasting future wars and armed conflicts.

Keywords: Economy, security, states, mathematics.

JEL codes: F6, O5, Y8.

Paper Type: Research study.

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1. Introduction

Povernomics and powermetrics are an innovative and important factor in determining the international policy of states. The combination of economics, security and international relations make the subject of research interdisciplinary. Therefore, the research hypothesis of these studies was the statement that the power of the state determines its actions on the international arena. In short, *povernomics* is the science of the power of a state (political unit), while *powermetrics* is the science of modelling and measuring this power.

A political unit is a territorially organized political community. In other words, is an actor in the international scene, equipped with resources, reason, and motivated by a specific will. The sense of dealing with power as the central category of international relations theory, including its measurement, results from the assumptions made from the nature of these relations.

First, international relations remain relations of strength and interest. Secondly, the most striking manifestation of strength is military strength (as a form of physical strength in international relations), which is an essential component of the power of a political unit. Thirdly, military strength is based on a specific material, economic (potential) basis, which in the last instance determines the size and nature of military strength. Fourthly, both military strength, potential, and other manifestations of power can be estimated (measured) within certain limits and with a certain degree of credibility. Fifth, the measures of power obtained (actual, ready or achievable in a certain period of time) can be usefully used in the policy and strategy of the political unit (in its theoretical-analytical and practical, decision-making dimension), and above all in politics and security strategy.

After the end of the Cold War, it was recognized in many environments that international relations would undergo progressive economization at the expense of militarization, hence the focus of competition between countries would shift towards economic competition. The spirit of this thinking is reflected in the title of a collective work entitled *Povernomics* (Prestowitz and Morse, 1991). As the authors write, the title was chosen to highlight the relationship between the economy (economics) and other aspects of the national being (*power - economics*). It was also about defining the American response to the end of the Cold War, to the rise of a new era in which national security would be increasingly defined in economic terms.

As its name implies, povernomics should deal with the power of states (political units). Power has many dimensions, but this discipline is not so much about describing them separately, but rather about presenting a new quality whose motto is "power".

2. Materials and Methods

Powermetrics, in turn, refers us to the issues of modelling and measuring power. This direction of research can be treated as parallel to existing trends. It can also be understood more ambitiously - as a further development of *powernomics*. The name *powermetrics* binds "power" and "measurement" and in this sense is analogous to other - built on this principle - names.

These include, for example, "biometrics" (the study of the laws governing the variability of the characteristics of living organisms, based on methods and theorems of mathematical statistics), "psychometry" (a department of psychology dealing with issues related to the measurement of mental phenomena and processes), "sociometry" (a department of sociology dealing with the processes of shaping mutual relations between people and measuring them).

In normal situations there is a close connection between potential and power. In situations of "geopolitical shocks" or "tectonic movements", there may be quite a large divergence. Russia is a modern example. After the collapse of the Soviet Union, it entered a long period of social, economic, and political crisis, because of which its power weakened considerably.

However, its potential has decreased to a much lesser extent (in the form of accumulated weapons or the production apparatus). Every day, power is mainly used. Power is what is real, potential is what is possible. The competitive nature of the international environment means that political units strive to maximize their power. In this regard, foreign policy as such is always power politics, a policy of power (Evans, 1998). And this is not about maximizing military strength, but about the greatest "weight" of your country or geopolitical power or geopolitical potential.

The ongoing hegemonic process can also be seen in numerous statistical data studies on the geopolitical strength of given force centers. Famous in Poland for his research, Professor Mirosław Sułek, in his considerations distinguished three types of state power (Sułek, Białoskórski and Kiczma, 2018):

- General power - which speaks of the ability of a given population to act in time and space. According to the assumptions, this indicator changes slowly, because a fixed sum was used for the whole world, thus reflecting the balance of power and the shift of the center of gravity of world power in the long run. It is expressed by the formula:

$$P_o = D^{0,625} x L^{0,217} x a^{0,109}$$

- Military power - it is a militarized part of general power, illustrating two key aspects - economic, where the share of military expenditure in GDP is taken into account, and demographic, i.e. the indicator of the participation of a given population in active service. It is expressed by the formula:

$$P_w = W^{0,625} x S^{0,217} x a^{0,109}$$

- Geopolitical power - based on the economic and military position of a given country. Expressed by the formula:

$$P_g = (D^{0,625} + L^{0,217})/2$$

Where:

- P_o – general power,
- P_w – military power,
- P_g – geopolitical power,
- D – GDP,
- L – population,
- a – area,
- W – military expenses,
- S – number of soldiers in active service.

3. Results

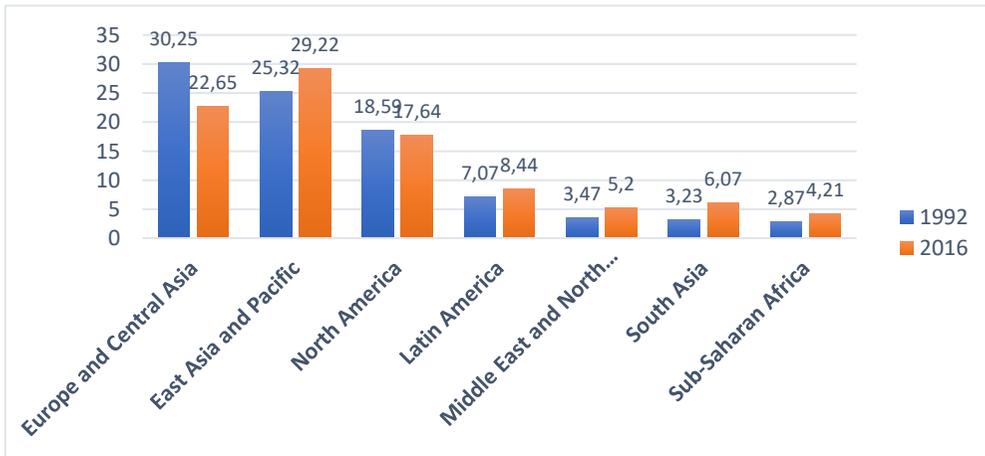
The application of previously indicated research assumptions and methodology allowed for making appropriate calculations showing the structure of the global order according to quantitative data. Figure 1 shows a trend of shifting the center of gravity of the power towards the Asia-Pacific countries, which, according to data, ranks first with over 29% of the world's power, thus increasing by 3.9 percentage points. It is worth emphasizing that all regions have recorded an increase relative to North America - from 18.59% to 17.64% - and the Old Continent, which recorded a spectacular decline in power and from 30.25%, to 25.65%.

Figure 2 in turn shows the power ratio of two key players in the international arena - the US and China. Compared to 1992, the United States achieved slightly, but weaker results in 2016. Noteworthy, however, is the rapid growth of China's power during this period, in each of the areas studied, practically equating with the US in general power, which diametrically shows the turning point in history.

Polish scientist Józef Kossecki came to similar conclusions in his research, namely in his method of cybernetic determination of state participation in international steering processes, he indicates a decrease in the ability to influence the environment of given countries with a simultaneous increase in those capabilities of the China, which can be seen in Figure 3.

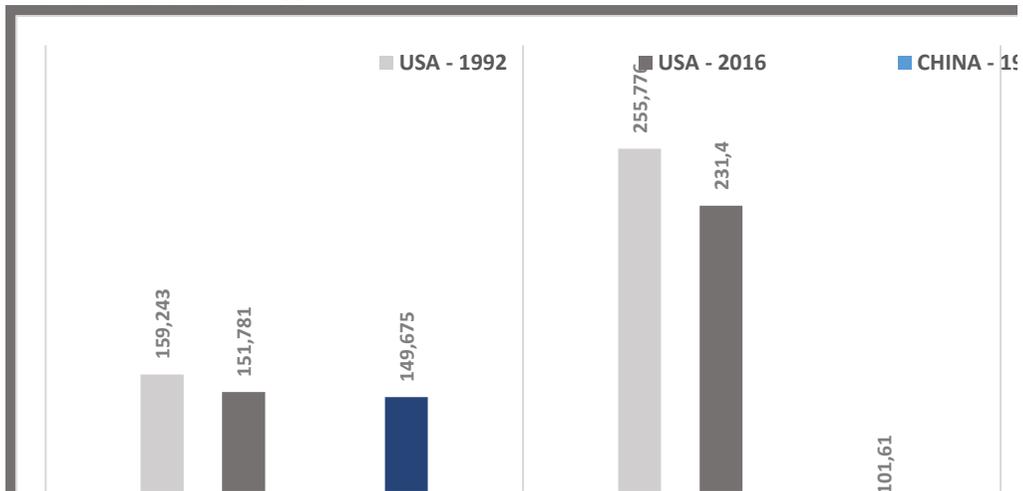
As the above quantitative analyses show, despite different research methodology, it is possible to achieve similar results, namely the picture of the current international order changing into a system with two clearly dominant decision-making centers.

Figure 1. Regions by general power in 1992-2016 expressed as a percentage



Source: Own.

Figure 2. General, military, and geopolitical power of two key players in the international arena in 1992-2016



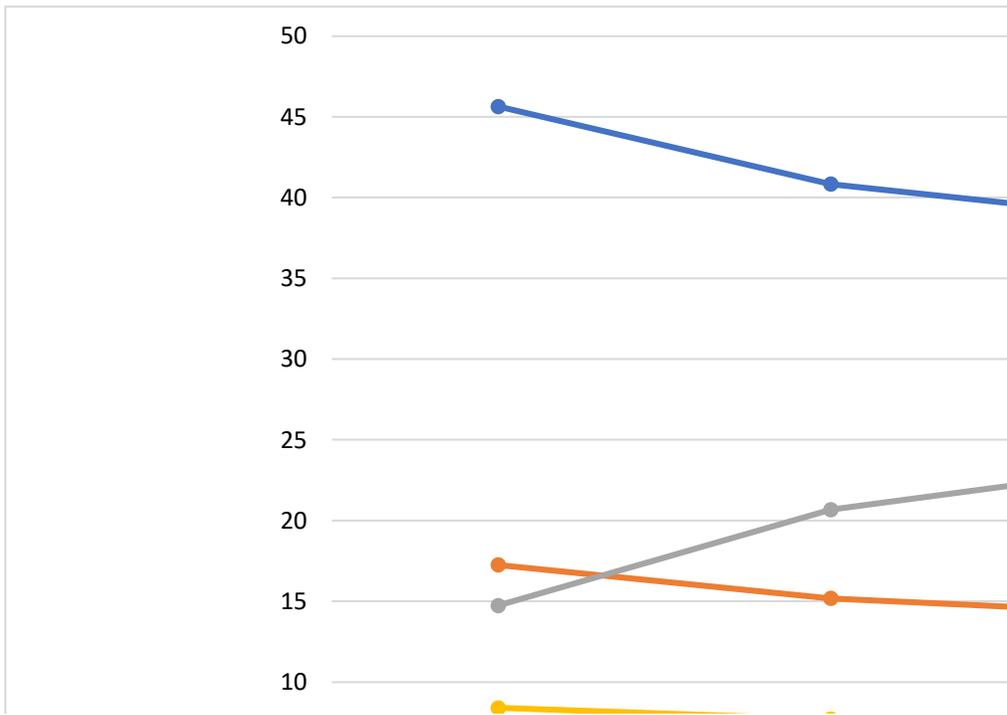
Source: Own.

4. Discussion

The balance of power is constantly changing, is associated with increasing or decreasing the power of the individual entities, which then results in the policy of this entity and influence the international order (Kłos and Kobryński, 2014). Different proportions of elements that make up the power of political units allow us to distinguish several characteristic forms of power. Let us take as a criterion the division of three groups of elements (three dimensions): economic, military, demographic and spatial.

Combining two dimensions together, we get three pure and three mixed forms of power: economic, military, demographic and spatial, economic, and military, economic, and demographic and spatial, demographic, spatial, and military. The combination of three dimensions leads to the distinction of only one form of power - economic, military, demographic and spatial power. None of these forms of power is directly dependent on the size of the state - each of them only speaks of the advantage of a selected group of elements.

Figure 3. *Percentage share of selected countries in international control processes in 2012-2024*



Source: Data according to own calculations and <https://instytuticas.wordpress.com/2017/09/14/schylek-potegi-nato/>.

Demographic and spatial power is based primarily on population and territory (and to some extent on geographical location). By its very nature, it is passive, a state based on such power can play a role in the international arena only in the highest quantitative ceilings (such as China or India). The demographic and geographical nature of power is not related to the size of the country - there may be large, medium, and small countries. Examples: China, India, Pakistan, Indonesia, Egypt, Iran, Iraq.

Demographic, spatial, and economic power is characterized mainly by intermediate countries with weak militarization. These are countries with small political and military ambitions (their power is passive). Mexico is an example.

Demographic, spatial, and military power characterizes countries with medium and low level of development, strongly militarized. They are usually aggressive countries, but the nature of their power, which is rather passive, does not allow playing a more serious role.

The economic power is characterized by high indicators of economic development, measured by labour productivity and the level of national income per capita. Countries that can be described as economic powers play a more active role in international relations (especially if they also have a large share in international trade), but this form is not enough to become a global power. Economic power must be supported by military power. Examples of economic power: Japan, Taiwan, Hong Kong, Singapore.

Economic and military power differs from economic power by an increased level of militarization, which allows it to play an active role in international relations. Countries characterized by such power usually have a long tradition of statehood, a solid economic base and high-capacity armed forces. Their high general strength is often strengthened by a moral, psychological, ideological factor, etc. If economic and military power characterizes a large state, it is certainly a political power. Examples of such power are USA, France, Great Britain (Aron, 1995).

Military power is characterized by countries with a medium and high level of economic development and a high degree of militarization. Military powers usually have a large impact on international relations, but it is largely unnatural, forced - until military power is based on a more solid economic base, this impact will not last. Examples of military power: former USSR, Turkey and, to a lesser extent, Israel. Military factor is invariably one of the basic components of power of the nation state (Korzeniowski and Schmidt, 2017).

The economic, military, demographic and spatial power combines all three groups of elements in a harmonized way. This power is rather active, but rather indicates moderate political and military ambitions (Sulek, 2001).

The above classification was based on the so-called hard (material) elements of power. At this point, a legitimate question may arise about the role of soft (intangible) dimensions of power, i.e. the political and moral-psychological factor. Well, in this work I adopted the point of view that the intangible dimensions of power are important, but they still need to be identified and determined based on dynamic analysis of power parameters. In other words, according to my research attitudes, intangible elements manifest themselves primarily in the field of military factor, as a representative of a specific will and strategy (policy).

National power stems from various elements, also called instruments or attributes; these may be put into two groups based on their applicability and origin - "natural" and "social" (Jablonsky, 2010).

The above classification is obviously not the only option, but the approach presented is quite transparent and well-established. It seems complete at the same time.

Another issue is the distinction of power profiles based on the criterion of the degree of harmonization of groups of elements forming a given power. From this point of view, one can mention: one-dimensional power, two-dimensional power, multidimensional power. It is obvious that the number of possible profiles depends on the number of dimensions adopted. If we added to three hard dimensions (demographic and spatial, economic, and military) two soft (strategic and moral) we could get even five-dimensional power.

One-dimensional power is based on one group of elements, on one group of power factors, e.g. economic or military. So, it is a power with the most dislocated internal structure.

From the point of view of international relations, it is important which group of elements forms the said "one dimension". Demographic and spatial power is, in principle, unable to implement aggressive goals, but, for example, military power - vice versa. It seems that high military strength and a weak economic base support aggressive intention and therefore it is extremely dangerous. Economic power, in turn, can have a significant impact using economic means, but it is not a "physical coercion" of military strength. The unilateral nature of power significantly narrows the range of possible measures - its effectiveness is not great.

Two-dimensional power is based on two groups of elements. Its internal structure is still dislocated, but more harmonious than in the case of one-dimensional power.

Multidimensional power means that it is shaped in a harmonized way by at least three groups of elements. The lower form of multidimensional power is three-dimensional power, which is based on three groups of elements. Regardless of the specific form, three-dimensional power is characterized by a harmonious internal structure, which allows the use of quite diverse forms of interaction with considerable efficiency (Brzeziński, 2008).

5. Conclusion

Powernomics is the science of the power of the state (political unit), while powermetrics is the science of modelling and measuring this power. A political unit is a territorially organized political community; he is an actor in the international scene, equipped with resources, reason, and motivated by a specific will. Assessing

the national power of political entities was already a matter of relevance during the classical antiquity, the middle ages and the renaissance and today (Fels, 2017).

The importance of power issues largely depends on the research direction (school) and assumptions made. Undoubtedly, for the directions of realistic power of political units is the central category. According to her, international relations are relations of strength and interests, so political leaders (like military commanders) must reason in terms of force relations. This in turn requires estimating the size of the power and its basic parameters. Povernomics and powermetrics provide great help in this aspect of research.

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