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CONTEMPORARY POLITICAL AND R&D DETERMINANTS OF THE LEVEL OF THE UNITED STATES DEFENCE SPENDING

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INTRODUCTION

The allocation of funds for defence does not raise controversy in the USA from the point of view of the functioning of the state. Its security (border protection, security of citizens, etc.) is one of the basic tasks that must and should be fulfilled by means of available means as it is constitutionally guaranteed. While there is no doubt as to the necessity of spending money on defence, the scale of the burdens to be borne, as well as the political and research-development determinants of decision-making in this area are open to dispute[1].

The starting point for the author's work on the issue contained in the title was to carry out an analysis of the problem of the contemporary level of US defence spending, relatively rarely studied in the national literature on the subject, and to fill a cognitive gap in this field. The main goal of the publication was to determine the impact of political and R&D conditions on the level of US defence spending.

The key questions put here were as follows: Does the doctrine determine the 'adequate' level of defence spending? What are the main factors shaping the level of defence spending in the USA? How are decisions on the level of

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1 The impact of defence spending on the economy will be discussed in a separate publication.

defence expenditures affected by political conditions, including both internal ones (disputes between the Democratic Party and the Republican Party) and external ones (to what degree is the level of defence spending present in US foreign policy)? What is the influence of research and development determinants on decisions about the level of outlays on defence?

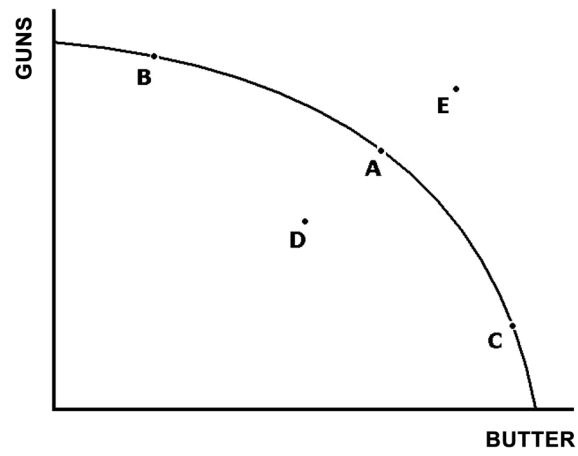
In the process of preparation for carrying out the study the following research hypothesis was proposed: political and R&D considerations shape the level of US defence spending to a large extent. In the analysis carried out the materials of the Ministry of Foreign Affairs, the North Atlantic Treaty Organisation (NATO) and literature on the subject were used (in this article the American system of numeration is used).

1. Theoretical Approach

The basic challenge for the security of the state is to ensure an appropriate level of defence expenditures. The term 'appropriate level' has been discussed for years by politicians, experts and economists and concerns the question of 'how much is enough' to guarantee state security. This debate is associated with the known dilemma of guns *vs.* butter, which in macroeconomic terms is defined as an example (a production capacity curve) – *vide* Figure 1 – of a simplified model of a combination of two goods using given production factors.

Figure 1

The production capacity curve



Source: Zieliński 2010.

The model confirms that the production capacity of the economy is limited; the production of one good (butter) can be increased only at the expense of the production of the other (guns). Increasing the production of a given good by each subsequent unit will lead to an increasingly serious diminution of the production of the other – it results from the impact of the law of diminishing returns. Points A, B and C on the curve show the maximum level of production of the two goods. Being on the curve, we cannot increase the production of one good without reducing the output of the other. If production reaches point D (the point under the curve), the economy does not fully use its production capabilities; it is possible to increase the production of one good without limiting the production of the other (or even to increase the production of both goods). Point E is a hypothetical level of production unachievable given the production used and the available factors (Zieliński 2010).

The 'guns *vs.* butter' dilemma can be seen in terms of the relationship between defence expenditure and spending on other (civilian) goods. It is a very simplified example of choosing the direction of allocating funds as part of the national income (Durham 2015: 147). This theory is attributable to William Jennings Bryan, the secretary of state in the administration of US President Woodrow Wilson, and in the history of the United States it is associated – it seems – with the person of President Lyndon Johnson, who – with the help of the majority of the Democratic Party in Congress (election of 1964) – began in the mid-1960s the implementation of the programme of the 'Great Society', the programme which was based on broad reforms of civil rights, education, health and transport policy, and was connected with significant budgetary expenditure. However, abandoning the 'guns *vs.* butter' alternative, Johnson also maintained the US's intense involvement in the Vietnam war. As a consequence, this led to an economic and social crisis (the need to abandon the 'Great Society' programme) and a political turning point (Johnson's resignation from applying for re-election) (Bernstein 1996)[2].

[2] Bernstein speculates, among others, that the US's refraining from the Vietnam War, in a very good economic situation (1965), would probably guarantee Johnson's re-election and the success of the 'Big Society' programme.

2. Factors Shaping the Level of Defence Expenditures

The debate on the level of defence expenditures necessary to ensure state security is interminable (Enthoven, and Smith 1971). It results from the endless discourse on the level of needs of the armed forces in given threat conditions. American literature indicates at least four political and economic dimensions (Mercile 2007: 3), which may shape defence spending:

1) a geographic one – regional issues are of decisive importance for the distribution of defence spending (e.g. local politicians interested in generating an increase in defence spending in their constituencies);
2) an economic one – where the impact of defence spending on increasing aggregate demand in the economy is decisive;
3) a liberal one – defence expenditure is subject to pressure from various interest groups;
4) an action-reaction one – defence expenditures based on the arms race and the impact of shifts in the defence budget in the adversary countries.

Opinions on the scope and significance of the determining factors are divided among American experts. Enthoven and Smith supported the thesis that 'foreign policy, military strategy, defence budgets, and the choice of (…) weapons and forces are all closely related matters of basic national security policy' (Enthoven, and Smith 1971) and they should determine the level of expenditures; this also results from the logic of the current procedure of drawing up the US defence budget (the perception of the threat determines the defence strategy, which should shape the budget) and the approach of the American doctrine in this area (Boone, and Cohn 2016). For Collier and Hoeffler these are: the need for security (especially exposed during warfare), stakeholder lobbying (especially of military environments) and government financial resources (Collier, and Hoeffler 2002). On the other hand, Smith enumerates: the decision-making process in a given country, threat perception, structure and effectiveness of military responses to these threats, and the cost of these responses in relation to publicly available resources (Smith 2009: 46–51). In this context, rejecting the possibility of using 'general explanations' for the level of defence expenditures, it resembles some factors shaping (mainly increasing) the US defence budget in the past, such as: the way to reduce unemployment (the 30s of the twentieth century), artificial raising of the level of threats (the 50s of the twentieth century – common interests of the administration, army, armament manufacturers and some members of the Congress) or the 'prisoner's dilemma' of the period of the Cold War arms race between the USA and the USSR when each party made decisions

regarding a low or a high level of defence expenditures. Although it would be a better solution to cooperate having a lower level of budgets, a sense of danger forced both parties to raise their spending, and since the rate of development of both countries' economies was different it was debilitating for the USSR in the long run (Smith 2009). The categorisation of the factors determining defence expenditures used by Smith, although relatively holistic, omits the question of military alliances (Bel, and Elias-Moreno 2009: 1)[3].

Reference to historical premises is a constant element of the debate on the level of defence expenditures and may result from (even experts') difficulties in defining

> 'the nation's security needs or the proper mix of forces and capabilities to meet those needs. Alternative concepts of operation (…) can use different forces and capabilities to meet the same strategic objectives' (Harrison 2016: 6).

This leads, as Harrison points out, to making the simplest comparison (comparing historical levels of defence spending), using three main indicators: (defensive expenditures after taking into account inflation, defence spending as a percentage of total federal spending, and defence spending as a percentage of gross domestic product).

3. Political Determinants

The comparative elements in the level of US defence spending also result from the internal conditions and differences in policy between the Democratic Party and the Republican Party. The experiences of the last few decades allows us to claim that the reduction in defence spending was connected with the takeover of leadership by the president nominated by the Democratic Party (J. Carter 1977–1981, B. Clinton 1993–2001 and B. Obama 2009–2016; it is worth pointing out that during these periods the Democratic Party had – with the exception of 1995–2001 – a majority in both chambers of the Congress, which is important for the legislative process). This did not result so much from the fact that threats were perceived differently by the major US parties. It was rather a combination of two factors: the use of so-called 'soft power' present in the Democrats' foreign policy and a greater emphasis

[3] From the point of view of the USA, as the main donor of potential for its own alliances, it is irrelevant; however, for a small country it may be an incentive to limit its own expenses and base its defence on the largest of the allies – so-called travelling without a ticket.

on solving the problems of the internal policy of the United States, in which economic issues were an important element. The weakening of the defence budget position in the hierarchy of federal spending was a consequence of the re-prioritisation of US policy.

An analysis of the level of US defence spending in 1977–2020 (*vide* Table 1) can prove the thesis about the reduction of defence expenditures in the analysed periods, and the indicator will be the share of defence expenditures in GDP (a commonly used measure for examining the so-called defence effort).

Table 1

The share of defence expenditures in GDP in 1977–2020 (values in %)

Years	President	Party	Share of defence expenditures in GDP – years 1977–2020
1977–1980	Jimmy Carter	Democratic	1977 – 4.8; 1978 – 4.6; 1979 – 4.5; 1980 – 4.8.
1981–1988	Ronald Reagan	Republican	1981 – 5.0; 1982 – 5.6; 1983 – 5.9; 1984 – 5.8; 1985 – 5.9; 1986 – 6.0; 1987 – 5.9; 1988 – 5.6.
1989–1992	George H. Bush	Republican	1989 – 5.4; 1990 – 5.1; 1991 – 4.5; 1992 – 4.6.
1993–2000	Bill Clinton	Democratic	1993 – 4.3; 1994 – 3.9; 1995 – 3.6; 1996 – 3.3; 1997 – 3.2; 1998 – 3.0; 1999 – 2.9; 2000 – 2.9.
2001–2008	George W. Bush	Republican	2001 – 2.9; 2002 – 3.2; 2003 – 3.6; 2004 – 3.8; 2005 – 3.8; 2006 – 3.6; 2007 – 3.8; 2008 – 4.2.
2009–2016	Barack Obama	Democratic	2009 – 4.6; 2010 – 4.7; 2011 – 4.6; 2012 – 4.2; 2013 – 3.8; 2014 – 3.5; 2015 – 3.3; 2016 – 3.2.
2017–2020	Donald Trump	Republican	2017 – 3.1; 2018 – 3.2; 2019 – 3.3; 2020 – 4.2.

Source: Office of the Under Secretary of Defense (2016 and 2019).

When a president nominated by the Democratic Party was the leader, a decrease in the share of defence expenditures in GDP was recorded. In the years 1977–1980 (J. Carter) their amount did not exceed 4.8%, while in the years 1981–1989 (R. Reagan) the indicator amounted to 6.0%. In 1993–2001 (B. Clinton), the share of defence expenditure in GDP fell from 4.6 (in 1992) to 2.9% (in 2001). Meanwhile, during the presidency of his successor (G. W. Bush), this ratio increased from 2.9 to 4.2, while in Obama's term there was a decrease from 4.6 (4.7 in 2010) to 3.3% (2016). During Trump's presidency, a gradual increase in defence spending, which can reach the level of over 4% of GDP in the financial year 2020, is again noted. The analysis of

defence expenditures in the examined period allows us to come to a conclusion about their different positioning by the Republicans and the Democrats.

Explaining the differences in the approach of both parties to defence spending, two factors should be borne in mind. First of all, external factors may influence the development of security policy (*vide* 11 September 2001 would imply an increase in expenses regardless of which party would form the government). Secondly, the demarcation line between the Democratic Party and the Republicans in terms of defence spending is not always the same; the position of individual congress politicians may be influenced by the interests of particular states and constituencies with a strong element of the Department of Defence as an employer, supported by the lobbying of the armaments industry.

The dispute over the level of defence financing revolves also around the doctrine and engages experts from American research and expert centres. Typical arguments of supporters and opponents of the reduction of the defence budget are presented in Table 2.

Table 2

Arguments of supporters and opponents of the reduction of the defence budget (selected experts' opinions)

Supporters of cuts	Opponents of cuts
The USA spends on defence more than the next seven countries combined	Defence spending has been falling for the last five years; The USA spends more than the next few countries combined not only on defence; The U.S. provides better training, equipment, and pay to its soldiers.
Defence spending has grown too much in the twenty-first century	Between 2001 and 2015, spending on social and economic programmes grew faster than the defence budget; Security spending is a small part of total federal spending (about 15% in 2015); National security is a small part of a percentage of GDP (about 3.3% in 2015).
The biggest security threat for the USA is public debt	Public debt is another type of threat; it hurts the economy just like a security threat; limiting (only) defence expenditures will not solve problems connected with public debt.
The armed forces do not optimally use their funds; Congress should reduce these funds	The Pentagon should first conduct an appropriate financial audit of the entire system; Every year the Government Accountability Office draws attention to sensitive (in terms of implementation) budget items; this is to protect against unjustified spending.

Source: Johnson (2015).

The data in Table 2 confirm that the disagreement about the level of defence expenditures in the USA takes place on the political plane (defence expenses of the main adversaries), the economic and financial one (amount of defence expenditures and their impact on limiting other expenses, or increasing public debt) or that of management (the Pentagon's investment policy). In the context of the last argument, it is worth noting the shortcomings of the Pentagon's investment policy, generally shared by both parties of the dispute. It was particularly significant during the economic and financial crisis in the USA in 2008–2010. In the opinion of the then defence secretary, Robert Gates, the key to the new philosophy of action within the US defence strategy should be to sustain the broadly understood balance (on several levels, including participation in current conflicts and preparation for other contingencies) and some temperateness in external activities ('not every outrage, every act of aggression, or every crisis can or should elicit a U.S. military response') and internal ones ('we should be modest about what our military force can accomplish and what our technology can accomplish') in accordance with the statement that 'the United States cannot eliminate national security risks through higher defence budgets, to do everything and buy everything'. This goal was to be achieved in two ways: re-prioritisation of expenses within the Department of Defence (as the secretary of defence said 'we will be forced to make difficult choices': the problem is not that funds are limited, but their proper use is essential) and the change of the investment policy of the Department of Defence based on tightening the fiscal discipline in defence expenditures, which (as evidenced by the experience of invalidating expensive tenders, or the implementation of excessively expensive projects) had not been sufficiently supervised before. This concerned, among others contracts for the purchase of CSAR-X helicopters, fighter planes, Osprey multirole vertical takeoff and landing planes, or airplanes equipped with air refuelling facilities (a USD 40 billions contract cancelled in 2008 as a result of a dispute between Northrop Grumman and Boeing).

4. The Role of Foreign Policy. A Place of Defence Spending in Donald Trump's Policy

It is widely believed that the USA's high-level defence spending also has its source in American foreign policy, which aims to maintain the hegemonist position of the United States in the post-Cold War conditions. As already mentioned, for example during George W. Bush's presidency the

> 'first objective of U.S. foreign policy (…) should be to prevent the re-emergence of a new rival'; high defence spending would enable the USA to maintain its superpower status and discourage other countries from seeking to rival it' (Schonberg 2009: 100).

This thesis seems to be particularly present in the current policy of the White House. President Donald Trump positions the issue of adequately high funding of defence as one of the priorities of his policy. In the currently valid National Security Strategy of the United States of America Trump directly points to the necessity to maintain such a level of defence funding that will allow us to

> 'secure our homeland, to respond to our enemies quickly and decisively, and (…) always win' (The White House 2017).

He critically assesses previous efforts to build defence capabilities during Obama's presidency, stressing that the acquisition of new weapon systems was 'severely limited'.

The scale of defence spending is also connected with the implementation of policy towards US allies. Washington has been putting pressure on them for years, noting the tendency of the majority of its European allies to base their NATO commitments on the United States. In many cases it gives rise to allegations of travelling without a ticket, and although it is not a new practise (Kozłowski 2016: 67–87), it was given high priority in the current president's campaign. The candidate for the office, Donald Trump, said:

> 'among others, that '*NATO is costing us a fortune, and yes, we're protecting Europe with NATO, but we're spending a lot of money*' (Rucker, and Costa 2016).

In accordance with the NATO guidelines agreed upon at the Alliance Summit in Wales in 2014 and confirmed at the summits in Warsaw in 2016 and in Brussels in 2018 (NATO 2018a), member states should allocate at least 2% of GDP to defence, including a minimum of 20% for investment expenditures. Only a part of the allies fulfil the accepted commitments (*vide* Table 3).

The insufficient state of the allocation of funds to defence in NATO leads to Washington's allegations of uneven distribution of burdens especially when the range of the allies' spending is compared directly (column 4 of Table 3). This is the central point of Trump's rhetoric, who requires European allies to adhere to the binding guidelines as soon as possible. It found its particular reflection during the last NATO summit in Brussels in 2018 where the US

president announced the need for a further increase in defence spending, even up to 4% of GDP (Kacprzyk 2018).

In the context of the level of US defence spending, however, it should be remembered that the position of the issue of burden-sharing in foreign policy is not a direct argument for increasing the amount of funds, but rather for their possible reallocation (e.g. to a greater extent for national security than for the security of the allies).

Table 3

Defence expenditures in GDP of NATO countries (2017–2018)

	State	The level of defence expenditures in GDP (%)		The share of defence spending among all NATO countries (%)	
		2017e	2018e	2017e	2018e
1.	The USA	3.57	3.50	71.55	69.67
2.	Greece	2.38	2.27	0.49	0.49
3.	The United Kingdom	2.11	2.10	5.77	6.07
4.	Estonia	2.08	2.14	0.06	0.06
5.	Poland	1.89	1.98	1.04	1.19
6.	France	1.78	1.81	4.80	5.13
7.	Lithuania	1.73	1.96	0.08	0.11
8.	Romania	1.72	1.93	0.38	0.47
9.	Latvia	1.69	2.00	0.05	0.07
10.	Norway	1.55	1.61	0.67	0.72
11.	Turkey	1.52	1.68	1.35	1.50
12.	Montenegro	1.38	1.58	0.01	0.01
13.	Canada	1.36	1.23	2.34	2.13
14–15.	Bulgaria	1.27	1.56	0.07	0.10
	Croatia	1.27	1.30	0.07	0.08
16–17.	Germany	1.24	1.24	4.75	5.03
	Portugal	1.24	1.36	0.28	0.33

Table 3 (cont.)

	State	The level of defence expenditures in GDP (%)		The share of defence spending among all NATO countries (%)	
		2017e	2018e	2017e	2018e
18–19.	Denmark	1.16	1.21	0.39	0.43
	The Netherlands	1.16	1.35	1.02	1.28
20.	Italy	1.15	1.15	2.48	2.54
21.	Albania	1.11	1.19	0.01	0.02
22.	Slovakia	1.10	1.20	0.11	0.13
23.	Hungary	1.05	1.08	0.15	0.17
24.	The Czech Republic	1.04	1.11	0.24	0.28
25.	Slovenia	0.98	1.01	0.04	0.05
26.	Belgium	0.91	0.93	0.47	0.50
27.	Spain	0.90	0.93	1.23	1.37
28.	Luxemburg	0.52	0.55	0.03	0.04
29.	Island	n.a.*	n.a.	n.a.	n.a.

* n.a. – not applicable

Source: NATO (2018b).

5. R&D Determinants

The importance of defence spending for research and development has a multi-faceted dimension for the United States. First of all, it can be located in the USA's wide strategy of retaining technological dominance over the rest of the world and the strictly related competitiveness of American enterprises. Secondly, defence spending on innovation has specific implications for the US economy, not only for the military but also for the civilian sector. Thirdly, it results from the USA's need to dominate also in the area of R&D. It was of particular importance during the Cold War and the arms race, and it is still vital at present in the conditions of very rapid spread of threats related to the development of modern technologies.

5.1. Defence expenditures on research and development and maintaining the technological advantage of the USA

Innovation is of key importance for the development of the American economy. It is the foundation of maintaining the US technological advantage in all major spheres of life. Key documents of the White House confirm this. In Barack Obama's Strategy for American Innovation 2015 we read that

> 'America must continually innovate because our workers and firms are often operating at the technological frontier. Innovation is also a powerful tool for addressing our most pressing challenges as a nation and American society' (The White House 2015).

In the currently binding National Security Strategy of the USA maintaining supremacy in 'research, technology, invention, and innovation' is one of the priorities of the military and economic dimensions (The White House 2017).

The high position of innovativeness in the hierarchy of objectives of the American government is reflected in the amount of funds earmarked for research and development. In 2017–2019, the United States was still a leader among countries allocating money to research and development, spending about 25% of the total world value in this area (about USD 570 billions, of which about ¼ was generated from the federal budget). It is also worth noting that, according to experts, the position of the USA may be taken over by China in 2024 (2019 Global R&D Funding Forecast). This is one of the reasons why Beijing is perceived by Washington as one of the greatest threats (The White House 2017).

Defence expenditures on research and development accounted for around half of all federal spending in this area in the last decade (*vide* Table 4).

Table 4

Spending on military and non-military research and development in the USA in 2008–2018 (in USD million – current prices)

Year	Spending on R&D in total	Military spending	Share	Non-military spending	Share
2008	167,726	98,848	58.9	68,878	41.1
2009	167,126	97,917	58.6	69,208	41.4
2010	170,208	98,710	58.0	71,498	42.0
2011	160,989	92,770	57.6	68,219	42.4

Table 4 (cont.)

Year	Spending on R&D in total	Military spending	Share	Non-military spending	Share
2012	156,079	86,205	55.2	69,874	44.8
2013	141,599	75,134	53.1	66,465	46.9
2014	144,443	75,592	52.3	68,851	47.7
2015	144,562	75,998	52.5	68,564	47.5
2016	154,211	81,729	53.0	72,482	47.0
2017	130,553	58,347	44.7	72,207	55.3
2018	142,888	66,132	46.3	76,757	53.7

Source: Hourihan (2015).

The annual financial upper limit of military expenditure on research and development ranged between USD billions 98 (in 2008) and 58 (in 2017) in the United States in 2008–2018, one of the reasons for the decline in the last two years are methodological changes; since 2017 programmes of late development, testing and evaluation have been excluded from the category of defensive expenses.

5.2. Economic aspects of defence spending on research and development

Although military expenditures on research and development are not motivated (mainly) by economic goals, they are

> 'the most important *de facto* industrial policy used by the federal government to affect the speed and direction of innovation in the economy' (Moretti, Steinwender, and Van Reenen 2016: 1).

The dominance of the United States in the field of the arms industry is so great that the term 'globalisation in defence' means 'Americanisation' to a large extent. This results mainly from the predominance of defence-related R&D expenditures, but also from the developed arms market (Reppy 2017: 17). Newly developed military technologies cannot always be used in other (non-military) areas but they are particularly important for basic sciences and for supporting technologies at their initial stage and without a market built for them. The private sector is often not willing to get involved in high-risk

investments (Mazzucato 2013). Many research projects are risky and may require long-term financing, which often leads to a deficit of funding from the private sector (focused on low-risk projects with a short-term return period). This is why, as Hourihan stresses, American industry

> 'spends 80 cents of every R&D dollar on development, and only 20 cents on basic and applied research (for civilian science agencies, the ratio is reversed). In this sense, public funds, including those on defence, lay a foundation of knowledge, tools, and skills, forming an ecosystem based on industry (including arms industry) and universities' (Hourihan 2015).

The degree of the relationship between defence-related R&D expenditures on innovativeness and the economic development of the private sector has been the subject of many analyses (Lichtenberg 2015). Supporters of positive correlation emphasise the importance of many inventions, the sources of which should be sought in defence-related R&D expenditures, e.g. laser technology, semiconductors, or nuclear energy (Bernanke, O'Hanlon, and Muro 2015). These technologies confirm that defence spending on research and development has been crucial for the development of civilian technologies. Some analysts stress that

> 'an important reason why US manufacturing became so dominant in the second half of the twentieth century was that during the Cold War the Pentagon became the world's most generous investor (…), which ultimately resulted in superior technologies for American companies and long lasting gains in their competitiveness' (Moretti, Steinwender, and Van Rennen 2016).

In this context, it is worth reaching for research by Moretti, Steinwender and Van Reenen in which it was noted that (in addition to the fact that changes in defence expenditures are motivated by political and military factors, while remaining resistant to external productivity shocks) the amount of defence expenditures on research and development varies considerably depending on the industry (e.g. a high level in the aviation sector and low in the automotive sector). The conducted analyses confirmed that

> 'increases in government funded R&D generated by increases in defence R&D translate into significant increases in privately funded R&D expenditures, with the most reliable estimates of the long run elasticity between 0.2 and 0.5' (Moretti, Steinwender, and Van Reenen 2016: 2).

Defence expenditures on research and development influence – in some sectors – generating a significant part of private sector development spending; e.g. in the aviation sector, approximately USD 36.9 billions (2003, 2016

prices) translated into additional USD 7.1–7.8 billions investment in research and development in the private sector (Moretti, Steinwender, and Van Reenen 2016: 3–4). Other experts share this opinion; according to Ben Bernanke, former Federal Reserve Chair:

> 'every dollar on research and development in the defence sector brings additional 20–30 cents in the private sector' (Bernanke, O'Hanlon, and Muro 2015).

In a wider historical perspective, the essential impact of defence spending on the innovativeness of the Unites States has been noted. Bracken emphasises, e. g. that the early development of the Silicon Valley in the 1950s and 1960s came largely through defence expenditures. Defence investments in the ICT sector facilitated the creation of a series of inventions, such as integrated circuits, that opened the way to the creation of a computer or satellites (Bracken 2015); while in the period after the terrorist attack of 11 September 2001 an increased wave of defence spending on research and development led

> 'to building a second Silicon Valley. A Silicon Valley of defence created in northern Virginia – the Dulles Corridor' (Bracken 2015).

Bracken notes that funds flow mainly to smaller companies, which may pose some risks, also the area of security (for example a spying program, revealed by Edward Snowden, created on the basis of the cooperation of the National Security Agency with small enterprises).

Sapolsky, Friedman and Green (2009) wrote extensively on military innovations in the Cold War period. They noted that a negative element of defence expenditures on research and development can be their classified (implicit) nature. It limits the possibility of using some of the ideas by the civilian sector. However, this type of information is mostly unconfirmed and is not based on analyses using econometric models.

5.3. Defence expenditures on innovation. Threats and research and development. DARPA as a special example of the activities of the US administration in the field of R&D

Washington is aware of the fact that technological development in the world directly affects the nature of threats, encouraging their multiplication. As a result, the USA's policy should provide for 'the best ability to adapt and integrate new technologies' including, inter alia, in the areas of: artificial

intelligence, autonomous and hypersonic systems (Office of Management and Budget 2018). This is not a new phenomenon; the dynamic development of technology during the Cold War was determined by political and military imperatives; the priority objective was to use technological advantages over the Soviet Union (in the face of challenges related to the rising costs of armaments, especially felt in the conditions of the arms race). During that period, the most dynamic development of communication systems, radars, aviation, submarines and nuclear energy was recorded in the American army.

As China's and Russia's (seen as the biggest threat to Washington's position in the world) defence outlays (including on R&D) gradually increase, the USA realises that it must sustain its technological advantage in the military sector (or, more broadly, the area of security, including the energy sector). It becomes more and more necessary due to the proliferation of modern technologies and easy access to them of non-state actors, in particular terrorist groups. One of the keys to resisting threats is to maintain the position of the industrial and defence complex DIB – Defence Industrial Base

> 'as a priority element of the position of the United States and its research and development base' (Lord 2017).

Washington is undertaking various types of ventures to stimulate innovation in the defence sector to the largest possible extent. It is aware, as former defence secretary Chuck Hagel noted that

> 'American dominance in key warfighting domains is eroding and requires new counter--measures' (Hagel 2014).

This requires special responses. In this context, an example of effective action is the operation of DARPA – Defence Advanced Research Projects Agency, an American government agency in the structures of the Department of Defence, which is responsible for the development of military technology. The agency (originally ARPA – Advanced Research Projects Agency) was set up in 1958 in reaction to the fact that the USSR putt Sputnik 1 satellite into orbit (the flight of Sputnik 1 in 1957 initiated the space race between the USSR and the US and fuelled the arms race, the agency's task was to contribute to gaining US technological advantage over the USSR).

DARPA is focused on searching for breakthrough defence solutions that improve US security; the agency serves as a research and development unit of the Department of Defence, whose main task is 'to maintain the US technological pre-eminence'. DARPA's success is associated with a unique

agency management model and approach to research. It develops particular fields of science, while at the same time looking for applications for its discoveries by setting specific goals. It carries out its projects by financing of research conducted by scientists employed at universities, commercial institutions and other entities. Due to the importance and intellectual potential of the agency, DARPA is commonly referred to as 'the Pentagon's brain'. The Agency is an entity which provides the American army with innovative tools that raise the effectiveness of war operations and increase the level of national security. Therefore, DARPA performs – despite its extensive autonomy – a service function in relation the Pentagon. Thanks to DARPA's efforts, many groundbreaking solutions and technologies have been developed for the use of the army, such as drones, platforms for drones, stealth technology used in the production of aircraft not detectable by radars, gauging body blasts, modern maps for mobile devices, or underwater unmanned vehicles (Walker 2017).

A successful R&D endeavour in recent years was the third offset strategy, the main aim of which was the development of a long-term research and development programme that would support the maintenance of the technological advantage of America and the introduction of new innovative operational concepts to counter new threats.

Conclusion

The debate on the level of defence expenditures necessary to ensure state security is interminable because it is impossible to capture the state of threats to which an 'adequate' level of financing would be an answer. The obligations of member states operating in the North Atlantic Treaty Organisation to allocate at least 2% of their GDP to defence is a guideline and refers only to the so-called minimum needs.

One of the basic factors determining the amount of expenses are internal political conditions (the Republicans are more willing to spend more money than the Democrats) and external ones (using military potential to maintain the hegemonistic position of the United States in relation to allies and adversaries). They are subject to certain technical (budgetary) restrictions; changes in the one-year level of spending on defence are usually (unless external factors interfere – an armed conflict) gradual, and are subject to historical extrapolation.

Research and development expenditure is an important factor in shaping the defence budget. It affects the maintenance of the US technological pre-eminence in the world and has very beneficial implications for the economy.

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Contemporary Political and R&D Determinants of the Level of the United States Defence Spending

Abstract

The aim of the publication was to analyse political and research and development conditions for the level of defense spending in the USA. They are of key importance for shaping the Pentagon military budget in conditions in which it seems very difficult to grasp the state of threats to which an 'adequate' level of financing would be an answer.

The debate on the level of defense expenditures required to ensure the security of the state is everlasting. There are two decisive elements for determining defense expenditures. First, political circumstances, both of internal ones (the Republicans are more inclined to spend more on defense than the Democrats) and external ones (using military capabilities to keep hegemonistic position of the United States, including *vis-à-vis* allies and adversaries); second, research and development circumstances aimed at ensuring technological supremacy of the United States in the world and having positive implications for military and civilian sectors.

Key words: defence expenditures, guns *vs.* butter, the United States, the Democrats, the Republicans, R&D, DARPA

Współczesne uwarunkowania polityczne oraz badawczo-rozwojowe dla poziomu wydatków obronnych Stanów Zjednoczonych

Streszczenie

Celem publikacji była analiza uwarunkowań politycznych oraz badawczo-rozwojowych dla poziomu wydatków obronnych w USA. Mają one kluczowe znaczenie dla kształtowania budżetu wojskowego Pentagonu w warunkach, w których uchwycenie stanu zagrożeń, na które odpowiedzią byłby „adekwatny" poziom finansowania, wydaje się bardzo trudne.

Debata nad poziomem wydatków obronnych niezbędnych do zapewnienia bezpieczeństwa państwa ma trwały charakter. Kluczowe znaczenie dla określenia wydatków obronnych mają dwa elementy. Po pierwsze, uwarunkowania polityczne o charakterze wewnętrznym (republikanie są bardziej skłonni do wydatkowania większej ilości środków niż demokraci) oraz zewnętrznym (wykorzystywania potencjału militarnego dla utrzymywania hegemonistycznej pozycji Stanów Zjednoczonych wobec sojuszników, jak i adwersarzy); po drugie, uwarunkowania badawczo-rozwojowe, ukierunkowane na zachowanie supremacji technologicznej USA na świecie oraz mające korzystne implikacje dla rozwoju innowacyjności, zarówno w sektorze obronnym, jak też cywilnym.

Słowa kluczowe: wydatki obronne, armaty *vs.* masło, Stany Zjednoczone, demokraci, republikanie, R&D, DARPA

Современные политические и исследовательско-развивающие детерминанты уровня оборонных расходов США

Резюме

Цель статьи – анализ политических и исследовательско-развивающих детерминантов для уровня оборонных расходов в США. Они очень важны для формирования военного бюджета Пентагона в условиях, при которых выявление состояния угроз, для которых уровень финансирования был бы «адекватен», представляется достаточно сложным.

Дискуссия об уровне оборонных расходов, необходимых для обеспечения безопасности государства, имеет перманентный характер. Ключевое значение для определения оборонных расходов имеют два элемента. Во-первых, внутриполитические детерминанты (республиканцы отличаются большей склонностью к расходованию средств, чем демократы) и внешнеполитические детерминанты (использоввание милитаристского потенциала для сохранения у Соединённых Штатов позиции лидера как среди союзников, так и среди противников); во-вторых, исследовательско-развивающие детерминанты, направленные на сохранение технологического превосходства США в мире и дающие положительные результаты в сфере развития инновационности как в оборонном, так и гражданском секторе.

Ключевые слова: оборонные расходы, пушки вместо масла, Соединенные Штаты, демократы, республиканцы, R&D, DARPA

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