Determinants of military budgets

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Summary: The determination of military expenditures has been the subject of a great deal of economic literature. It is undeniable that GDP and national wealth influence the level of the military budget. On this basis, economists have developed arms race models, incorporating grievances between states and the effects of inertia spending. However, many other factors can be highlighted, such as the evolution of threats, the birth of new weapons, the will of power of a state, alliances, the existence of a national arms industry, the rise of military research and development, the budget of the state or the taking into account of the values of the future.

Key words: arms race, arms industry, military alliance, military research and development, state budget, new weapons

With the end of the cold war in 1991, the US government refocused its strategy. The main principle starts from the need to simultaneously prepare two major regional conflicts (Major regional conflicts, later renamed Major Theater Wars), with Iraq and North Korea being presented as the most likely actors in this scenario. The Clinton Administration (Bottom-Up Review 1993, Quadrennial Defense Review 1997[1]) confirmed this objective. . But some analysts considered that the real target countries were China and Russia, two countries that, moreover, had sketched, at the end of the 1990s, some inclinations for rapprochement, notably concerning the trade of arms and oil.

The increase in US military spending has been revived since 2000 after several years of decline. In the same way as tax cuts, military spending largely contributes to the current rise in the US public deficit (which reached 4% of GDP in 2004)[2]. Considerable credit has been given to the armaments industries; they include the launch of the F-35 fighter aircraft program, worth $ 220 billion (for 3,000 aircraft). If between 1990 and 2000 the gap between the level of defense spending of the United States and that of European NATO member

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[1] Achcar, G. (2000), L'esprit (et le budget) d'une nouvelle guerre froide, .
www.russfound.org/consult2/papers1/achcar_fre.htm
[2] *Analyse et conjoncture économiques, Finances Québec,* 2 (3), juin 2004.

countries had tended to decrease[3], US rearmament has once again reversed the trend, widening the gap Technology and capability between US industry and the rest of the world. In 2003, the US defense budget amounted to $ 366 billion, or 3.5% of GDP; it exceeded 400 billion in 2004 and 420 billion in 2005. These increases are imposed by the will of modernization and development of the armed forces in "situation of peace". They do not relate to war operations, whose annual budget cost is estimated at $ 50 billion for Afghanistan and $ 100 billion for Iraq[4]. Studies show that US military spending in constant 2004 dollars has always fluctuated since the 1950s between a constant 300 billion dollars (in the absence of conflict) and 450 and 500 billion dollars in conflict situations (which was observed during the wars in Korea, Vietnam, and the Star Wars project, and these amounts are again planned for 2010[5].

What are the main factors behind the steady rise in US military spending? The "peaks" observed before 1991 were clearly linked to a reactivation of the cold war. Can the current rise also be attributed to a process of interaction with "enemy" countries or judged as such? What is the role of internal determinants in the process of allocating resources to the military budget? The methods of economic analysis can shed some light on these topics. In particular, arms race models can be reconsidered.

1) Explanation by the arms race

The arms race can be defined as a dynamic process of interaction and competitive increase in the quantity and / or quality of armaments by two or more states (or coalition of states) resulting from conflicting objectives or grievances between nations, engendered by fear of the other or the will of power or independence.

However, several criticisms have been made of these models, in particular by their insufficient consideration of the internal determinants of military expenditure. In particular, econometric tests have generally not validated the hypothesis of a determination of the level of defense budgets by the mutual stimulation of competing or enemy states. It often appears that national self-stimulation is ultimately more important. Several heterodox analyzes, notably from the Marxist movement, have tended to explain that military expenditures are certainly unproductive but nevertheless essential to the proper functioning of capitalism, insofar as they make it possible to fight against underemployment and productive overcapacity[6]. This is a state intervention to maintain the level of the average profit rate in the economy as a whole. Other analyzes have gone in

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[3] Hébert, J-P (2002), « Le rapport des dépenses militaries Etats-Unis/Europe se réduit en longue période », *Le Débat Stratégique*, n° 60, 1-2.
[4] Corbin, M. (2004), Rebalancing the US national security budget,
http//www.ecaar.org/newsletter/july04/corbin.htm
[5] Futuris (2004), Les dépenses militaires des Etats-Unis, juin 2004, www.operation-futuris.org
[6] Baran P. & Sweezy PM (1979), *Le capitalisme monopoliste*, Maspéro, Paris

the same direction, especially those concerning the text on "the usefulness of wars"[7]. In fact, the economic importance of the military sector in some capitalist economies today seems unquestionable, if only in relation to the role played by military research and development in the development of advanced technologies. The US government is often accused of pursuing an industrial innovation policy (which is contrary to the principles of the World Trade Organization[8]), through the military industry (which is exempt, in the name of national security, obligations applying to the civil sector[9]).

In the 1960s, arms race models allowed for the reintegration of the influence of economic variables on strategic national security decisions. The Richardson model (1960)[10], consisting of three equations representing the political factor, the strategic factor and the economic factor respectively, constitutes the basic model. It describes the armament processes of two rival countries as an action-reaction process, where economic variables play a stabilizing effect. It introduces the military expenditure of the enemy or enemies, the economic burden (the effect of fatigability) and grievances (whose history is partly explanatory of the phenomenon). Richardson believes that the arms race of the First World War was driven by nationalist ambitions of annexing or reconquering territories, and not only by a desire to respond to the arms increases of the adversary. This is why he completes his model with the coefficient of "grievance".

This theoretically interesting model has not explained the latest developments in world military spending. It has not been able to highlight the crisis of the Soviet Union, because the definition of the threshold of fatigability is not easy to determine. Given the level of military expenditure of the potential adversary, the curves that define the sets of "best possible choices" for a nation are not always representative a posteriori past events, for several reasons, including

- The difficulty of defining military expenditures and estimating the economic importance of a national defense effort,

- The foundations of the different structures of expenditure between those dedicated to the personnel (in particular the existence or not of the conscription) and those dedicated to the investments, or the research-development,

- The importance of the possession of nuclear arms,

The theoretical extensions developed by Brito and Intriligator[11] on the basis of constraint optimization mathematical tools, duopoly theory and game theory (according to the work of T. Schelling in particular) are no longer valid today.

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[7] Galbraith (attribué à), J.K. (1968,La paix indésirable, rapport sur l'utilité des guerres, Calmann-Lévy, Paris

[8] Fontanel, J. (1981, 1995), Organisations Economiques Internationales, Masson, Paris.

[9] Fontanel, J. (1995), Dépenses militaires et désarmement, Publisud, Paris.

[10] Richardson, L. F. (1960), *Arms and insecurity - A mathematical study of the causes and origins of war*, The Boxwood Press, Pittsburgh and Quadrangle Books, Inc., Chicago.

[11] Brito, D. et Intriligator, M. (1995), Arms races and proliferation, in Hartley, K. and Sandler, T. (eds.), *Handbook of defense economics*, Elsevier.

- These arms race models have tended to separate from economic considerations in favor of strategic considerations, forgetting to specify the structural characteristics of the economies studied. They thus made the implicit assumption of the organizational and systemic similarity of rival states. The "demand for military expenditure" is different according to the types of political regime. The fatigability effect of the planned USSR was certainly not the same as that of the US markets. The US-Soviet arms race, revived by Reagan in the early 1980s, had exhausted the USSR economy and led to the collapse of the Soviet regime. Current asymmetric conflicts do not require the same level of financial resources. The cost of these new wars is much lower than that of the Cold War conflicts.

- They give a "safe" justification for the increase in military spending. They thus refute internal factors[12], such as the existence of a military-industrial complex or an industrial innovation policy, as factors for the growth of military expenditures.

- They do not always include official or "de facto" alliances and collective political decisions of regional security, etc.

- Today, there is no arms race or if there is one it is Washington against the whole world. It is very asymmetrical and it is not always very understandable from a purely strategic point of view, except to express the military and economic power of a State.

- In the current international economic context, marked by globalization and the formation of powerful regional economic blocs around the main economic powers, some countries might be tempted to conquer by force access to world wealth, until now made impossible by fierce international competition and high barriers to entry for industries generating the highest added value. Taking these predation strategies into account would imply placing the issue of the economic determinants of conflict at the heart of weapon strategy analysis, whereas it was excluded from the models of the cold war. The question arises for Iraq. Is it also an attempt to predation or regulation of the oil market, among other considerations? The story may give some answers in 20 years.

- While arms races historically opposed comparable players, it is likely that 21st century arms races will be of a very different, asymmetrical nature between countries holding high technology weapons and those holding low technology weapons[13]. However, technological superiority is not a guarantee of security or victory in the event of war, in a context where the democracies of the industrialized countries are anxious to limit the number of their losses in combat. Public opinion puts pressure on governments, and foreign armed forces are not generally well received by local populations, even when they have been the victims of tyrannies or dictatorships.

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[12] Galbraith (attribué à), J.K. (1968,La paix indésirable, rapport sur l'utilité des guerres, Calmann-Lévy, Paris.
[13] Münkler, H. (2003), The wars of the 21st century, IRRC, 85 (849), pp. 7-22,

2. The new international threats

The phenomenon of terrorism makes it necessary to reconsider models of military expenditure. In particular, the question of the rationality of the actors, presupposed essential to any economic model, poses a problem; it may be wondered whether the application of methods exclusively borrowed from "pure" economic science does not constitute an unsurpassable limit for undertaking an economic study of terrorism. In addition, asymmetry of information (e.g. concerning the level of arming of the opponent) must be taken into account in the reflection. In the face of the terrorist threat, it is no longer the observation of the enemy's military expenditure that determines the evolution of a country's security expenditures, but rather the perception of a threat. The quantification of this threat is problematic: the identification of rogue states by the United States is an indicator element, as is the country's involvement in external areas or the maintenance of system not included in the international market economy.

Since the attacks of September 11, 2001, the President of the United States speaks explicitly of "war against terrorism" and plans to increase military spending, probably up to the level reached during previous episodes of diplomatic tension mentioned above (war of Korea, Vietnam War and "Star Wars" mainly). However, not all components of military spending are affected in the same way by changes in the geopolitical context[14]. Thus, military research and development spending is less sensitive to geopolitical developments, but still remains on the rise. According to estimates in 2004 constant dollars, the R & D expenditure (research, development, test and evaluation) is the largest increase since 1980 and this trend is expected to continue at least until 2010[15].

Economic globalization has made the more industrialized countries more vulnerable to hostile attacks by groups or states, due to the globalization of communications, the growth of transport (including air transport), the concentration of populations and resources in urban areas, etc. Terrorist methods have the advantage of not having to rely on the involvement and support of large numbers of the civilian population, which was the problem facing the guerrillas. Terrorist actions achieve their goal by attacking the civilian populations of the target countries, using the opportunities offered by their logistics and infrastructure.

3. Membership of an alliance

The analysis of US military spending must also take into account the country's membership in strategic alliances, including NATO. Indeed, because of the

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[14] Smith, R., Humm, A., & Fontanel, J. (1987). Capital labour substitution in defence provision. Defence Security and Development, 69-80.

[15] Futuris, p 5, from Office of the under secretary of defense (2003), National defense budget estimates for FY 2004, mars,

variety of foreign policy instruments (diplomatic operations, interventions in regional conflicts, economic and military aid, alliance), the only consideration of the reaction of a state's military expenditure to those of a rival state is insufficient. The alliance represents the decentralized production of public good generating cross-border externalities. This is one of the explanatory parameters of a country's level of military spending. Many economists have been interested in the analysis of alliances as public goods, and the link between interstate alliances and the pacification of relations between member countries. . These approaches are based on the founding contribution of Olson and Zeckhauser[16]. They use the concepts developed by game theory. It now appears that the main obstacles to the optimal functioning of the alliance remain the same as those identified in the founding model. Thus, because of the "stowaway" problem, the greater the number of members who could benefit from collective action, the less likely it is that the property will be provided in an optimal manner. In addition, asymmetries within the group (in terms of the size of countries, or their level of wealth) can lead to "the exploitation of the big by the small", for example in the case where the small country adopts a "stowaway" behavior. Dysfunctional collective action can be overcome by institutions arrangements and the introduction of a system of selective incentives[17]. Today, perverse effects dominate. However, Washington has all the keys to NATO's power, which allows it to indirectly dispose of the forces engaged by its allies at a low cost. The alliance is funded first by the United States, but the country masters the main issues of international security and instruments likely to maintain it. However, this is a gamble that is not yet won, as evidenced by the current situation of the US government in Afghanistan and Iraq.

4. The existence of a national armaments industry

The importance of defense industries in the national economy is one of the determinants of a country's level of military spending. Admittedly, many hopes for a "peace dividend" had been raised in 1991 at the time of the collapse of the Soviet Union, which seemed to pave the way for sustainable international disarmament. Specifically military knowledge, very involve in the best level of technology, has sometimes no civilian applications. The concept of "peace dividend", very popular during the Cold War, was replaced by "peace investment", reflecting the costs associated with the cessation of defense activities. The crisis in the arms markets in the early 1990s led to major restructuring of US arms industries, initiated by the authorities, leading to the

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[16] Olson, M. and Zeckhauser, R., (1966) 'An economic theory of alliances', *Review of Economics and Statistics*, 48(3), 266-279.

[17] Brauer, J. & Roux, A. (2000), Peace as an international public good : an application to Southern Africa, *Defence and Peace Economics*, 11(6), pp. 643-659

birth of four major firms[18]. The US defense industry now accounts for half of global arms exports, worth 14.2 billion in 2003 (and a turnover of 120 billion dollars in 2001)[19]. It now seems that defense companies are moving more and more towards foreign outsourcing and belonging to networks or industrial alliances, the consortium for the Joint Strike Fighter being illustrative of this trend. In addition, defense companies now realize a significant portion of their turnover in the civil sector, which allows them to limit the risks associated with budget cuts in the defense field. This will undoubtedly favor transfers between the military and civilian sectors, in terms of human and physical capital, technologies or products, especially in the digital industry.

5. Values of the future and military R & D

The question of the impact of military spending on economic growth is one of the issues in the debate between supporters and opponents of a decrease in military spending. The question of the impact of military research and development (R & D) on the growth of industrial productivity in the United States is one of the most controversial topics today in this field of investigation. Indeed, technologies originally developed for defense purposes, such as computers and satellite systems, appear to have played an important role in US growth during the 1990s. The econometric studies that have been developed in recent years yet show no decisive link between the growth of US industrial productivity and the development of these new technologies.

Saal's analysis[20], however, shows that sophisticated econometric methods can lead to highlight the positive effect of federal R & D spending on overall industrial productivity since the 1970s. In 2002, 54.4% of spending R & D was devoted to military R & D in the United States (against 24.2% in France, for example[21]). The financial volume of US military R & D was $ 53 billion in 2003 (up from $ 44 billion in 2000)[22]. In addition, 10-15% of US military spending is used to fund basic research[23], helping to increase R & D in advanced technologies.

Thus, the use of military expenditures for "industrial policy" purposes can be considered as one of the explanatory factors of their level in the United States. Similarly, the increasing use of intelligence services for economic purposes can

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[18] Boeing, Lockeed Martin, Northrop Grumman et Raytheon

[19] Ambassade de France à Washington (2004), Les Etats-Unis en chiffres, www.info-france-usa.org/fr/franceus/usachiffres.pdf

[20] Saal, D. (2001), The impact of procurement-driven technological change on U.S. manufacturing productivity growth, *Defence and Peace Economics*,12(6), pp. 537-568.

[21] Perrier, J.J. (2003), Que pèse le militaire dans la recherche française ?, *Revue du Vivant* n°1, www.vivantinfo.com/numero1/recherche_militaireimp.html. Chiffres de l'OCDE 2003, base MSTI.

[22] Ambassade de France à Washington, www.info-france-usa.org/fr/franceus/usachiffres.pdf

[23] Alesina, A., Giavazzi, F. (2004), *Inégalité de l'Europe en matière d'investissement de défense*, Project Syndicate, http://www.project-syndicate.org/article_print_text?mid=842&lang=4. .

affect the level of military spending, especially in the United States, where economic intelligence devices are particularly developed[24].

6. Economic values and the state budget

The determination of a country's defense budget is dependent on many internal parameters. It can be considered that the optimization of social welfare by the allocation of resources to the defense is not guaranteed by the collective choice procedure, because of the divergences of interests between the different groups or individuals composing society. The neo-classical "Public Choice" theory, mainly developed in the 1970s, explains why, in some cases, the policy pursued by the government does not exploit all the opportunities to increase social well-being. . The state is the sum of the particular interests of the groups or individuals that compose it and its intervention is the result of the pressure of specific interest groups, each seeking to maximize its utility. Examples of public choice models tend to show a connection between political cycles and the signing of contracts with the defense industries. They denounce the bureaucratic growth that leads to dysfunctions, such as the underestimates of the costs of the evaluated projects. Due to the temporary scarcity of votes, decision-makers are given latitude to interpret the national preference for defense policy. The different interest groups (defense industrial base, political parties, state bureaucracies, consumer lobbies or international agencies) try to influence the defense policy in the sense that is favorable to them.

More broadly, the study of the determinants of US military spending questions the question of determining the demand for defense. How is the perception of the threat determined? What are the parameters that allow a government to determine the "demand for defense" specified in the military expenditure models? The military expenditure of a country during a year depends on those of the previous year: it is the phenomenon of "fiscal inertia", around which certain models of military expenditure, described as "bureaucratic models". The analysis of the United States defense budget must take this reality into account.

In addition, studies of the industrial defense base (or military-industrial complex), numerous since the 1960s, tend to show that there is a phenomenon of cost growth in military production, leading defense budgets to the rise. Thus, Spinney showed that from 1953 to 1992, the average cost per military aircraft in the United States increased at a faster rate than the total military expenditure in that country[25]. The increasing sophistication of armaments, as well as the particular characteristics of contracts in the armaments industry, explain this phenomenon (Baroque arsenal)[26].

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[24] Fontanel, J., Bensahel, L. (2005), Intelligence économique et sécurité militaire, ARES, n°54, volume XXI.
[25] Spinney (1996), "Defense time bomb : F22/JSF case study. Hypothetical escape options", *Challenge*, July-August, 23-33.
[26] Kaldor M. (1981), *The Baroque Arsenal*, New York : Hill and Wang.

Military spending is sometimes used to revive the economy, especially when unemployment increases[27]. It is Military Keynesianism condemned by both Keynes himself and Paul Samuelson. Economic factors are not independent of the relative evolution of military spending, even when France wanted to pursue a policy of "grandeur"[28]. For France, when the debt is too high, the budget is moving away more and more from the initial budget. It can be seen that, unlike the USSR, which held its image as the great systemic power of its military power, all the choices made in the military field are always dependent on economic factors, both to determine the level of military expenditure that is sufficient, but also to use the choice of expenditure according to a particular economic situation or in favor of certain economic sectors (such as nuclear power in France).

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[27] Fontanel, J., Ward, M. (1993), Military Expenditures, Armaments and Disarmament, Defence Economics, Vol. 4, 1993.

[28] Fontanel, J., Hébert, J-P. (1997), The end of the French Grandeur policy", Defence and Peace Economics, Vol. 8, pp. 37-55, 1997

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