The economics of disarmament

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THE ECONOMICS OF DISARMAMENT : A SURVEY

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Abstract : This survey reviews the literature on the economic determinants of military expenditure and the economic foundations of armament and disarmament. It considers the main economic effects of military expenditure and disarmament in developed and developing countries, including impact on consumption, investment, growth, employment, inflation and the balance of payment. It concludes that the main dividend of disarmament is peace itself and that disarmament without development is not synonymous of a durable peace. Disarmament by a reduction of defence spending constraints will not be decided by a rule of proportionality and should be progressive and gradual. It implies controls of military technology, R&D and international trade. Finally, it is useful to bear in mind the costs of peace as well as the investment for peace.

Key words : Disarmament, military expenditures, military R&D, international aid, Economic thought, peace, war

The economic analysis of disarmament is difficult for three reasons. First, for half a century past, economists have attempted to establish the existence of regularities and laws that did not fit in well with the real constraints of power and conflicts. This attitude has been an essential element in the continuous neglect of the multidisciplinary aspects of defence. The basis of war is not exclusively economic, it exists in the context of the struggle of power, and of religion and ideological convictions.

Second, states have to protect their wealth or run the risks of being deprived, ultimately, of their rights over the distribution of the world's wealth, a situation pithily summarized in the maxim. "Money to get the power, and power to keep the money". Defence expenditure is a vital necessity for developed countries that do not wish to be plundered. Japan and Germany are special cases, in the sense that their armed protection has been entrusted to other powers, and they are thus left free to realize their full potential in the economic sphere. In a war situation, defence takes over the whole of the national economy. In peace time, state face with a military reluctant to see defence

imperatives subordinated to economic considerations have to take into account the balance that must be maintained between expenditure that may prove to be unproductive and the maintenance of national security. There is, therefore, a choice to be made between today's and tomorrow's security, a choice dependent on the nature and strength of international tensions. The defence effort may have adverse effects on the economy as a whole. The government must therefore settle on the 'razor's edge' of spending just the amount needed to give itself military protection in the short term without threatening the increase in wealth needed to maintain the defence effort. It is extremely rare for what is militarily rational also to be economically rational.

Third, does disarmament give rise to economic factors or do they stem from it? If disarmament is a 'discrete' (not economically deterministic) decision of a political nature, reduction of military expenditure is then seen as an instrumental or exogenous variable that modifies the conditions of economic growth. If, on the other hand, economic factors condition the disarmament process, it becomes more of a consequence of a state of crisis in society brought about by failure to satisfy national consumer requirements or by an increase in the rate of unemployment. There is therefore no point in negotiating disarmament if nothing else is done to reduce or eliminate the causes of the arms race. Advocates of the New Economic Order see disarmament more as a consequence of development (Panel of Eminent Personalities, UN, 1986). The IMF and World Bank now favour making military budget cuts an explicit part of 'structural adjustment' programmes.

There are four main forms of disarmament, which do not have the same economic significance, and may moreover be carried out simultaneously. First, the destruction of military stocks (Fontanel and Ward, 1993) is a costly business, its initial effect is to tend to increase the economic burden of defence. But Bischak and Oden (1989) have attempted to compare the reduction of military purchases, operational and maintenance costs and personnel costs with the financial commitments occasioned by the destruction of arms and the verification of the INF Treaty ; they have estimated that the overall reductions of military expenditure for the USA were equal to $820 million for 1988-1991 and to $614 million for 1992-2000. On the other hand, even if no procedure is effectively established by the states, a disarmament process involves control and verification, the cost of which is obviously not inconsiderable in particular on observation satellites and systematic data gathering.

Second, the ban on the production of certain weapons (nuclear, chemical) modifies the output of the enterprises working in that sector. Conversion may have perverse effects. Converted industries faced with increased international competition may, in particular, seek new outlets that imply competition with the exported or locally marketed products of developing countries which may suffer economic collapse (Fontanel, 1990). Under the Ricardian theory of international trade, the United States does not have any obvious interest in reducing its output of cruise missiles under an agreement on disarmament. The government normally seeks to keep those arms for which it has the greatest comparative advantage. Economic considerations will therefore be involved in the negotiations.

Third, the reduction of military expenditure must be analyzed in opportunity cost terms. It must be said that disarmament may be imposed by disastrous economic conditions nationally. In other words, should modern armament have a recessionary effect on the economy it may hold back future arms production and consequently affect future defence. At the global level it is expressed in the very short term by loss of jobs or regional recession which may be offset after some time by the positive effects of expenditure on education, health or the infrastructure, unless failure to achieve the minimum activity threshold leads to the establishment of a vicious circle that complicates the use of substitutable resources. Reduction of military expenditure, if negotiated, raises problems of international comparison that are difficult to resolve, but for which it has already been possible to find some interesting solutions (Cars and Fontanel, 1985). The economic factors are not likely to be the best source of reliable indicators. On the one hand, having regard to the international agreements in force and the technological features of the munitions, nuclear missiles are clearly more effective than conventional weapons, and at a relatively low cost in terms of the strategic, military and political advantages that they confer. On the other hand, relations of strength are often expressed in terms of thresholds and a homothetic reduction of military expenditure does not necessarily result in the former balance of forces being maintained. Because military rationality and economic rationality do not have the same values disarmament cannot be determined solely by comparisons of national reductions in military expenditure.

Fourth, thoroughgoing disarmament appears on the scene when military expenditure becomes more of an endogenous variable than a true instrumental variable determined

at will by the government. It is possible to conceive of two scenarios. In one case military and strategic considerations are secondary to the economic reality; in the other, the view taken of defence costs leads states to achieve a better quality to price ratio for the arms of value for defence. The policy of easing trade restrictions in the military sector (Dunne and Smith, 1991), involving cost reductions, some opening up of the market to foreign companies or privatization of national undertakings, inevitably appears as a progressive factor of disarmament, bringing to mind the idea of Schumpeter that military activity is the least bourgeois of social functions. Under these conditions the defence sector loses its priorities and military expenditure is truly regarded as a burden. Moreover, the pursuit of new international co-operation when it works properly, which is rarely the case (Fontanel and Smith, 1991), leads to a reduction of military expenditure and stimulates new effects of interdependence (Olson and Zeckhauser, 1966). Disarmament ought not to be seen exclusively as a transfer of resources in favour of the civilian economy; it ought also to be analyzed in a dynamic setting of reduction of the opposing forces and the maintenance, in the final analysis, of balances that are of a fragile nature while the major strategic and economic variables undergo appreciable modifications.

Present day economic analysis is not such as to permit a clear reply to the three fundamental questions of the economics of defence and consequently of disarmament:

* What choice should be opted for between guns and butter (ie the opportunity cost of military expenditure in civilian production)? There are many myths connected with thinking on the dividends of peace, which are supposed to be

considerable, and capable of solving the economic and social problems of countries, despite some inherent costs and difficulties (UN, 1993; Fontanel, 1993).

* What is the explosive power of a dollar (the 'bang for a buck') - ie the explosive power of a dollar spent on national defence?

* How much has to be spent and in what way must it be spent (ie the search for the optimum level of military expenditure)?

Economists concern themselves mainly with the first and third of these questions. All the methods in general use in economic analysis may be applied to the economics of disarmament. The experimental approach is practically impossible in economics. No economic situation is ever repeated in exactly the same form. Under these conditions the methods of analysis most employed are theoretical deductive analysis, models and simulation studies, evaluation of structural and reduced forms, computational general equilibrium, input-output analysis and historical and cases studies (Smith, 1989, Chatterji, 1993).

Section I of this survey focuses on the economic determinants of military expenditure. Section II deals with the economic foundations of armament and disarmament. Section III considers the main economic effects of military expenditure and Section IV deals with the main economic effects of a disarmament process.

THE ECONOMIC DETERMINANTS OF MILITARY EXPENDITURE

The basic question where disarmament is concerned is to know whether it is self-ordained or whether it is the result of an endogenous systemic process. If armed conflicts do not always stem from imperial fiat, there may be economic factors at the origin of conflicts, along with the quest for power and ideological considerations. Nevertheless, states may always opt to control their levels of armament, either because they fear that massive stocks of arms could harm all nations, or because they seek an agreed reduction in the level of such unproductive expenditure. **Ceteris paribus**, such a decision will alter the conditions under which national economies operate.

(a) The special nature of military expenditure

Usually, economic theory makes the assumption that military expenditure does not directly satisfy an economic need and that it is unproductive (Fontanel and Smith, 1985). But defence provides a kind of national insurance against war or threat of war. As regards armaments, we may consider how the state can make strategic choices that are also economically effective. What do soldiers produce (what is their output)? What types of armament should be demanded? It is difficult to obtain answers to these questions. The theory of public finance provides interesting ideas on the optimum level of government expenditure, such as the indivisibility of public property, with no rivalry or exclusion in its consumption. However, if nuclear deterrence from the weak to the strong verifies the basic properties of public property pure and simple, the civil defence developed by Switzerland implies greater autonomy in the taking of decisions by those involved. Hewitt (1991, 1993) is of the opinion that, despite appearances, military expenditure does not lend itself readily to the traditional economic analysis of public

expenditure. The optimum level of military expenditure is a concept that is prescriptive, political, strategic, psychological, economic and even moral, with the result that theoretical analysis of public property is relatively powerless when it comes to revealing the financial choices of defence.

Economists generally regard military expenditure as a cost needed to ensure national security. Defence is therefore an output measured in terms of the level of security ensured by the size of the military expenditure relative to the external threat and the actual political situation. Just like the idea of utility, however, the concept of defence is scarcely such as to permit the definition of cardinal units capable of providing clear indications of the degree of security of each country. That being the case, economists regard the level of defence as a monotonic function of military expenditure, whatever its form, the strategy and the arms that it procures. Thus, the military expenditure of one country constitutes a threat to other countries and that helps to accelerate the arms race. Military expenditure is not, in general, taken as a variable in national or international macro-economic models, and when it is such expenditure is treated as an exogenous variable unilaterally determined by the state. However, depending on the immediacy of the threat and the power of the states, economic factors are more or less heavily involved in the determination of military expenditure (a fact frequently presented as the choice between guns or butter).

(b) Military expenditure and the structure of public expenditure

Relying on a study of the proportions of military expenditure and private expenditure in the GDP, Russett (1970) concludes that military expenditure modifies investment,

individual consumption and reduces social expenditure in the United States. However, this hypothesis has not always been borne out when re-examined by more sophisticated methods and over a longer period of time or for other countries (Russett, 1982). The reports of Brandt (1988), Palme (1982) and Thorsson (1981) assert that military expenditure is a threat to economic growth and development, and therefore to future security, and they condemn the use of public funds in the military sector to the detriment of health and education. Econometric studies on the negative relationship between expenditure on health and military expenditure yield contradictory results (Hayes, 1975; Deger, 1986). In fact, we may question the permanency of a relationship that may change with the actual economic situation in which choices are exercised by governments. Most of the analyses that have been made of developing countries conclude that countries in which military expenditure is low are also modest consumers as regards education and health (and vice versa), that military expenditure is just as vulnerable as other forms of public expenditure to a reduction of the state budget, and that there are scarcely any consequences on appropriations for health and education following an increase in military expenditure. For Hicks and Kubisch (1984), social expenditure is less vulnerable than administration and defence outlays to a reduction of public expenditure in developing countries, and far less vulnerable than the productive sectors and the infrastructure. Harris, Kelly and Pranowo (1988) emphasize that the effects of substitution between military expenditure and social expenditure are weak and military expenditure is found to be quite sensitive to a reduction of public expenditure, at all events clearly more so than is social expenditure. For Hewitt (1991) when governments were confronted with a rise in interest rates, they tackled this by increasing their public expenditure and reducing the importance of some sectors, in particular

military and economic services expenditures. Social expenditure tended to be maintained or even to increase. For De Masi and Lorie (1988), military expenditure was slightly reduced when the adjustment programme requested by the World Bank called for a tight fiscal policy. On the other hand, when public expenditure could be increased it was the non-military sector that took priority. The inertial and stabilizing effects of military expenditure were higher than those of other public expenditures (Galbraith, 1967). For Aben and Daures (1993), on a strict economic ground, it is better to have education than defence expenditure, except if education outlays means education equipment

(c) Military expenditure as an endogenous variable

The last decade has witnessed the development of a number of formalized studies, often backed by econometric research of varying degrees of complexity, the aim of which was to explain the economic foundations of military expenditure, but current economic analysis is still failing to produce decisive results in this field of thought. Military expenditure may be regarded as a variable that is half endogenous and half exogenous. That is how authors who take a Marxist line come to consider that military expenditure serves both to offset the weakness of internal demand (Cypher, 1974; Krell, 1981) and to soak up the surplus that monopoly capitalism secretes (Baran and Sweezy, 1966). Several economic determinants of military expenditure have been discovered:-

(i) There is a positive relationship between the civil budget of the State and military expenditure (Lotz, 1970; Fontanel, 1980; Hewitt, 1991), from which it would appear that the vagueness that is a feature of the options of governments in

matters of security was countered by an inertial effect inducing governments to set military expenditure at a more or less constant proportion of the public budget from one period to the next.

(ii) Military expenditure is often seen as an economic burden. The larger is per capita income in a country, the less, proportionally, is the state inclined to increase its military expenditure (Lotz, 1970). This is the analytical expression of the choice between guns and butter. The current disarmament is probably connected with the economic crisis of the major military powers, which is obliging them, in the absence of incontrovertible military superiority, to seek a breathing space favourable to new economic growth. Under these conditions, disarmament would be the result of a readiness to 'redeal' the cards of competition, given that all the players have a blocking hand increasingly opposed by public opinion (Brito and Intriligator, 1987). In a situation of economic crisis it proves increasingly difficult to manage a heavily militarized economy.

(iii) The availability of petro-dollars is a factor that tends to increase military expenditure in developing countries, both to curb the territorial, political or economic ambitions of neighbouring countries and to take up the surplus of abundant resources (Deger and Smith, 1983);

(iv) Cyclical movements of the economy (Griffin, Wallace and Devine, 1982), in particular the attempt to maintain full employment in the short term (Smith and

Deger, 1983), are not unimportant causal variables of the military expenditure of developed countries. Under those conditions, the status of military expenditure vacillates between the endogenous and the exogenous;

(v) The existence of a military and industrial complex tends to have a positive effect on military expenditure (Melman, 1974; Kidron, 1970; Griffin, Wallace and Devine, 1982). Militarization embraces the sociological, political, economic and social dimensions of the production, sale and use of arms (Smith and Smith, 1983). In a broader setting, and with reference to the United States, Adams and Gold (1987) point out that the extent of military expenditure is dependent on national security, but also on the 'Iron triangle' (the government, the arms industries and the Congress) which has some impact on the choice of materials, their quantity, their make-up and their cost, with all the wastage that such a situation implies, and which operates by virtue of a great complicity of special interests based on close working relations. Under these conditions it is no longer the Head of State and the constitutional bodies that decide the level of military expenditure, but a network of interests. For Hewitt (1993), the military budget depends mainly on the political situation and on the ideological priorities of governments. Military expenditure has a favoured position in the sense that the greater is the national product and the less the richness effect, the more positive is the effect on it. On the other hand, indebtedness tends to reduce the defence effort. Furthermore, the existence of wars, monarchies, military governments and socialist states are, in decreasing order of importance, factors that increase military expenditure. Geographic variables such as land area or

land frontiers (and sea frontiers, to a lesser degree) have a positive effect on the defence effort. Lastly, it should be noted that consideration of the military expenditure of opposing and allied countries sometimes plays a not inconsiderable part, especially in highly conflict-prone regions.

(vi) The economy has become an instrument of power often applied to relations of conflict between states. Insecurity is dependent on the arms race, on inequality, on international domination and even social exploitation. Indirect strategies of dissuasion, economic forms of retaliation, embargoes and boycotts are all powerful weapons with economic and political effects dependent on defence measures, international expressions of solidarity and the potential for substitution (Baldwin, 1985). The economic weapon frequently comes within the scope of military conflicts since the economy provides the military resources by which to combat the enemy.

(vii) It remains the case that factors other than economic ones are more generally advanced as explanations for military expenditure. They include the bureaucratic procedures involved in the allocation of military resources (Treddenick, 1985), urbanization (Lotz, 1970), ideological struggles (Thee, 1982), elections (Nincic and Cusack, 1979), the power struggle (Griffin, 1982), changes in society (Grindle, 1986), dictatorship (Kende, 1980), the militarization of society (Maizels and Nissanke, 1986; Rajmara and Ward, 1990), the arms race (Intriligator, 1992), strategy (Fontanel and Smith, 1990) and imperialist rivalries (Thee, 1982). Empirical studies are dependent on the

measurement of military expenditure and it is possible to have different theoretical interpretations of the factors that explain the evolution of military expenditure conditioned by how the dependent variables are defined and calculated (Fontanel and Smith, 1990). Although governments do make choices over military expenditure, their freedom of choice is very limited by all the partial cause variables, the basis for which is strengthened to the extent that the international strategic and economic situation evolves slowly.

THE ECONOMIC FOUNDATIONS OF ARMAMENT AND DISARMAMENT

Reasoning in the usual way for cosmopolitan economics, modern economic science tends to obliterate all non-economic conflicts, despite the fact that the strategies adopted by states do exert some influence on international economic relations as a whole. In a world of sovereign states the security of nations is both a priority and a constraint that economists have not always viewed in the same way. The history of economic thought is instructive in this context (Fontanel, 1985). We present some very general conclusions, which must be summarised for each author of a theoretical school.

(a) Armed defence as a factor in development

In this type of theory disarmament cannot be accompanied by development. For mercantilists, the might of the Prince is the basic objective of any national economy. Under these conditions, what is economically the best has no intrinsic significance, since it is always preferable for a nation to be less rich if the other States are proportionally even poorer. Under such conditions disarmament makes no sense. These ideas were to be taken up again in different forms by List, an out and out advocate of

the national system of political economy, who suggests that liberal laissez-faire leads to the domination of the strongest and that nations must protect themselves against foreign domination. Most current thought on economic warfare can be traced back to these lines of thought. In modern analyses of game theory applied to international relations (Brewer and Shubik, 1979), the thesis of unequal exchange (Emmanuel, 1969), the theory of underdevelopment as a product of the development of the great powers (Freyssinet, 1969), and concepts of economic warfare (Baldwin,1985) are all examples of reasoning that perpetuate this economic analysis in terms of power.

Bouthoul (1961) regards war as a necessary evil that permits a harsh solution to excessive population growth. It is irreplaceable in that it carries out the functions of socio-demographic rebalancing and readjustment. This suggestion is expanded on by Mandel (1975), who considers that conflicts or threats of war eliminate unemployment by creating an artificial shortage and that they accelerate technical progress. In the view of Galbraith (1968), disarmament accompanied by a reduction of international tension would be liable to have adverse effects on the American economy and society because the subordination of its citizens is dependent on international security, the threat of war is essential in keeping social discord and anti-social trends under control, and the factors likely to be associated with the social functions of armed conflicts and relations of dominance over other states are essential to the wealth of the great powers. Attali (1978) even regards war as an extreme manifestation of industrial competition, the creation of demand and the employment of the factors of production. Conflict provides a stimulus to production and transforms the patterns of consumption and social habits. To sum up: any disarmament procedure that does not confine itself to the reduction of

excess levels of armament does not necessarily make for human and economic progress.

(b) Armed defence as a political constraint and as economic wastage

For the classical British economists, state intervention in the economy should be kept to the minimum because individuals have complementary interests in generalized freedom of trade. War and preparation for war are explicit variables of the monopoly spirit, on which grounds both Adam Smith (1776) and David Ricardo (1817) were to condemn mercantilist thought dominated by the hegemonic drive of the ruler. Armed conflicts are analyzed exclusively as political phenomena. Nevertheless, it is advocated that armed forces be established to ensure the sovereignty of states threatened by less developed economies. The disarmament processes of rich countries are dangerous, having regard to the covetousness with which they are regarded, a covetousness that may possibly be given a military expression, depending on the relations of armed force. Nevertheless, Ricardo wished for negotiated disarmament, since he considered that the uninterrupted growth of military expenditure leads inevitably to war. Malthus (1803) analyzes war as being the result of the inadequacy of economic development to population growth. For the classical British economists, generalized development precedes disarmament. These ideas were to be picked up by the French liberals - once in a while does no harm - with Jean-Baptiste Say (1816) at their head taking the view that a policy of free trade is conducive to disarmament and vice versa. The utopian socialists (Saint-Simon, Fourier, Proudhon) of the 19th century were to consider, in general, that the material well-being of the populace was at odds with the development of military expenditure. They even developed the idea that war was tending to disappear with the emergence of the industrial class, because it was eliminating

pauperism, the true cause of wretchedness. Generally speaking, most liberal economists considered that the military function should be kept to the minimum so as to improve the performance of national economies in the struggle against scarcity. Nef (1949), for example, thinks that peace simulates the economic activity of states, while Seymour Melman (1971), in counterpoint, stresses the harmful effects of military expenditure on the American economy: loss of competitiveness, development of the bureaucracy, reduction of productive investment, and the appearance of military-industrial complexes. On this view, disarmament is conducive to development but, conversely, generalized disarmament is impossible in the absence of universal economic development.

(c) The inherent contradictions of the capitalist system make a disarmament procedure illusory

For Marx and Engels (1860), peace and, by extension, disarmament have no intrinsic moral virtue. War and conflicts relate to the superstructure and are conditioned by antagonistic social relations. Disarmament is desirable only if capable of producing economic development induced by the radical break with capitalism and the emergence of socialism, since it is not truly compatible with the continued existence of capitalism. These analyses were continued by, in particular, Rosa Luxembourg (1913) and Lenin (1916). The former considered military investment to be very useful for the development of capitalist economies, in the first instance as a catalyst of primitive accumulation; then as an instrument of colonial domination; and lastly as a hegemonic factor of the struggle between the capitalist countries to divide up the world. The second thought that imperialism, the highest stage of capitalism, necessarily stigmatized by total wars and the capitalist exploitation of the world, ruled out any non-economic

disarmament process without the advent of socialism. These theses have been taken up by contemporary authors. Baran and Sweezy (1966) argued that military expenditure serves to absorb the economic surplus that monopoly capitalism secretes; on that view the arms race matches the logic of capitalism, which seeks to maintain a constant ratio between production and solvent demand through unproductive expenditure. The surplus may be taken up through consumption by capitalists, through wastage, and through civilian governmental expenditure, but military expenditure is more effective in this role; in effect such expenditure is in line with capitalism in that it does not redistribute income to those whose productivity is low, while it does stimulate collective values. Disarmament is incompatible with capitalism, which constantly generates international tensions that find expression notably in armed conflicts or in the increased squandering of resources constituted by arms expenditure. The thesis of the economy of continuous arms (Kidron, 1970) takes the view that military expenditure exerts a positive influence on profits, on capitalist technology and on the demand for labour. Lastly, Gunder Franck (1972) considers that colonialism is the original and lasting cause of underdevelopment. Military strength enables other nations to be exploited, either through the occupation of territory, or through intimidation, or through the giving of power to national collaborators. The idea of disarmament is dissatisfying in the context of triumphant capitalism.

(d) Negotiated disarmament in the context of co-existence between rival economic powers

The Keynesian analysis is more concerned with the economic and social consequences of the arms race than with the social and political conditions of disarmament

(Keynes, 1921). As Keynes saw it, military expenditure reduces the national investment potential, so that the choice between guns and butter remains in force in a situation of full employment. Military expenditure remains of use to improve international security and to confront the threat from planned economies, mainly the Soviet Union. By virtue of the excessive generalization of their analysis, the Keynesians reduced it to a purely political and economic concept of national security in which considerable scope remained for negotiated disarmament. As far as neo-classical analysis is concerned, there is in every society a function of social well-being that is maximized under constraints. Expenditure on security contributes to the definition of this optimum. The arms race is rational only if it can counter socialist imperialism. Models of the arms race such as the model of Richardson (Brito and Intriligator, 1987) demonstrate that budgets preparing for war increase the likelihood of war. Military force is an important instrument in the redistribution of consumer rights between countries. Although dissuasion may be conducive to the establishment of a stable equilibrium, it may also lead inexorably towards war.

THE MAIN ECONOMIC EFFECTS OF MILITARY EXPENDITURE

Armed conflicts and threats of war are almost always omitted from economic analysis at the present time. Be that as it may, the choice of defence system may be influenced by the use of the direct or indirect effects of military expenditure on the economy, leading to its relentless militarization (Smith and Smith, 1983). The results yielded by econometric analysis are often divergent. Macro-economic analysis of military expenditure is generally examined in relation to some key economic variables, namely,

investment, growth, employment, the balance of payments, inflation, research and development and economic development.

(a) Economic growth

Military expenditure is assumed to be non-productive and redistribution in favour of the civilian sector can have only positive effects. However, it has been considered in some analyses that the military sector has benefitted the civilian economy with important technological spin-offs, key innovations and productivity effects (De Grasse,1983). In opportunity cost terms, civilian investment is, **a priori**, more conducive to economic development than is military investment. However, this is an assessment that needs qualification, partly because not all civilian investment is equally profitable (notably investment that prompts demonstration effects or effects stemming from a mistaken appreciation of the market), and partly because orders placed by the military sector may maintain the level of production and the competitiveness of entire branches of the economy (aeronautics, the computer industry and shipbuilding). The existence of a national armaments industry is a factor making against disarmament, especially when arms production is heavily integrated into the industrial fabric.

Econometric studies generally developed in the framework of a macro-economic model let it be understood that increased military expenditure appears to be associated with a weaker real rate of growth (Smith,1980; Leontieff and Duchin,1983; Deger and Smith,1983; Biswas and Ram,1986, Mueller and Atesoglu,1993). For Kinsella (1990) and Payne and Ross (1992), there appears no causal relationship in either direction between defence spending and economic performance. The main debate is concerned

with the multiplier effects of military expenditure. The Keynesian school regards military expenditure as a means of combatting the under-consumption crisis of market economies, but Samuelson (1964) thought that military expenditure has, at best, a neutral multiplier effect. For Dumas (1987), the security of the United States is at least as much dependent on its economy as on arms, and military expenditure squanders the work force, capital and technology of a private enterprise economy in a situation of harsh competition, thus detracting from its effectiveness in the long term and producing a bureaucratic and military organization that is little concerned with the rules of international competitiveness. However, Browne (1988), who made a close examination of the American economy, did not find any clear indications of the responsibility of military expenditure for the low productivity of American industries, since there were only a few effects of the supplanting of technology and loss of jobs. Alexander (1990) considered that increasing military expenditure does exert crowding-out effects between economic sectors ; but the overall result does not necessarily indicate a negative connection with growth, even if the military sector proves to be less productive and less economically efficient than the other sectors. It may be difficult to analyze the negative effects of military expenditure on the national economy in the short term; it would gradually erode the very foundations of the economy, mainly by limiting its competitiveness.

The effects of military expenditure on economic growth are transmitted through four main channels, namely the possible reduction of investment, the crowding-out effect of the work force, the application of a military technology less concerned with the economic rules of profitability and the growth of effective demand. In a situation of

under-employment, military expenditure boosts the economy, but at the same time it has inertial effects in the longer term that are capable of impeding future growth and it does not necessarily produce the cumulative effects that are a feature of economic development. On the other hand, the expenditure on imported arms of small countries limits the reserves of scarce foreign exchange; military imports overtake productive imports and result in indebtedness. Military expenditure has a direct and very unfavourable effect on economic growth. In the case of developing countries, military expenditure redistributes the capital available for investment, and absorbs resources. According to Deger (1986), a reduction of military expenditure increases economic growth, eliminates the external capital requirement of the least advanced countries and reduces the deficit on the trade balance. For Scheetz (1991), the econometric analyses for Argentina, Chile, Paraguay and Peru show a negative impact of military expenditure on growth in the four countries. However, econometric analyses seem relatively incapable of providing indisputable information on the existence of the negative or positive relationship under consideration. The ultimate effect of military expenditure on economic growth depends both on the functional combination of several parameters concerned with its causal variables, namely investment, consumption, the balance of payments, inflation and unemployment and on the content of growth (Tinbergen, 1993). It is not surprising that the effect of military spending on growth is disputed, since there are no good theories of growth within which the marginal effect of military spending can be examined.

The existence of a negative relationship between investment and military expenditure is a fairly old hypothesis, one that had already been advanced in his day by Pigou. Most econometric studies tend to provide empirical confirmation of this hypothesis (De Grasse, 1983; Smith, 1980, Deger, 1986; Percebois, 1986) and to give three explanations for it, namely the crowding-out effects, the constraints of industrial capacity and the objectives of social consumption:-

a) The taxes required to finance military expenditure depress private demand and reduce the profit hoped for from investment. Possible debts connected with the financing of the defence effort result in increased interest rates and are therefore conducive to a cutting back of private investment. For Findlay and Parker (1992), an increase in U. S. military spending causes a significantly larger increase in interest rates than do increases in civilian spending. The crowding-out of private expenditures can be reduced when government shifts resources from military to non-military spending. Lastly, the defence effort reduces or slows down other government programmes, which are often free to be decided. These supplanting effects cannot be denied, but the extent of their impact varies with the time and place.

b) Military purchases are the specialized output of some specific industries, such as aeronautics or shipbuilding, typically sectors producing capital goods. If military demand takes priority, these industries are no longer able to supply the civilian demand for capital goods, particularly in times of rapid rearmament.

Under those conditions, military expenditure creates bottlenecks that reduce the possibilities of investment and cause inflationary trends (Gansler, 1982).

c) The objective of social consumption raises the problem of the division of social resources between current and future needs. Private or public civil consumption is a current 'concern', whereas military expenditure does not yield immediate benefits except in a period of open conflict, and is therefore a future good. Societies have a relatively stable objective for social consumption, with a fixed proportion of revenue devoted to the present. Within that proportion and independently from it there is a distinction between public and private property. The only adjustments possible are in the part devoted to investment (representing the future) and consumption (representing the present). It is therefore possible to substitute public consumption and private consumption, on the one hand, and military expenditure and investment on the other, but the substitutions between the two groups prove to be limited. This analysis can explain why the crowding-out effects between investment and military expenditure are not always operative. Should the economic effort of defence be perceived as a present need yielding immediate profits or responding to an urgent situation, military expenditure is substituted for global consumption. It is therefore the immediacy of danger and its national perception that determine the quality of the substitution between military expenditure and investment.

There are, therefore, four factors that may invalidate this relationship, namely social acceptance of the financial effort of defence, the structure of military expenditure (the

ratio of personnel costs to capital or infrastructure costs), the level of economic growth (in a period of economic stagnation, military expenditure is more directly in competition with investment), and the existence of a strong arms industry. If the population is prepared to accept the defence effort, in a situation of an oppressive and identified international danger, it may make up its mind to reduce its consumption (Schultze, 1981). This provides a vindication of Boulding (1973), confirmed by the studies of Russett (1970) and Weidenbaum (1990), who has shown that although military expenditure in the United States in the years 1929-1969 adversely affected expenditure on personal consumption, there was only a slight down-turn in gross investment. This was all the more so because the American arms industry had some dominating effects on all the industrialized countries. Lastly, Looney's analysis (1988), contested on methodological grounds, concludes that arms industries may benefit from an increase in military expenditure, and that this may have positive effects on the investment of developing countries. The establishment of an infrastructure, the modernization of ways of thinking and education in national feeling and in the collective interest that are features of the militarization of economies make it possible for the less advanced countries to oppose the swallowing-up of production capacity and the potential for innovation (Deger, 1986). It makes no odds that the effects of military expenditure must be analyzed more closely, having regard to the nature of outlays (personnel, conscription, current operations, R & D, investment) and the supplier (national, multi-national or foreign undertaking).

(c) Employment

Boulding (1970), de Grasse (1983), Szymanski (1973), and Anderson, Frisch and Oden (1986) all consider that military expenditure tends to have a negative effect on employment. The general conclusions, however, are unsatisfactory. If disarmament applies mainly to personnel costs, the effect on unemployment is liable to be negative, whereas an increase in military capital expenditure would not have a positive effect. Wider conscription is capable of reducing underemployment in the short term, but may restrict the development in the long term, particularly if job losses lead skilled workers to leave the production sector. Aben (1981) has shown that a drastic reduction in military expenditure inevitably leads to increased unemployment, at least in the short term. For Richards (1991), major cuts in defence expenditure necessarily reduce employment in some manufacturing industries and involve social loss in terms of unemployment, reduced wages or involuntary retirement, which can be minimised if new investment and retraining are encouraged.

This hypothesis is partly disputed by Dunne and Smith (1990), who concluded for the United States, the United Kingdom and 11 OECD countries that the unemployment rate was not significantly affected by the proportion of the national product devoted to military expenditure. It may be concluded that military expenditure does not have to be specifically considered in an analysis of employment, but also that disarmament may not be systematically associated with a rise in the unemployment rate. For Adams and Gold (1987), the number of jobs created by military expenditure is not a good indicator of the impact of defence expenditure on the jobs market. Such expenditure creates jobs in some regions, but not in others, at certain levels of specialization or skill, in particular branches or industries, and for certain firms. The first effects to be felt are

crowding-out effects which, in the long run, are difficult to quantify. More generally speaking, the economic consequences of military expenditure on employment may be analyzed only by taking several causal variables into consideration such as the existence of conscription, the ratio of expenditure on personnel to capital expenditure, the relationship between military pay and wages in the civilian sector, the national arms production, the nature of the jobs in the arms industry or whether the employment situation is one of under-employment or full employment. If we confine our attention to public expenditure, it is clearly apparent that military expenditure 'generates' less jobs than the education system. However, given that these two types of expenditure do not satisfy the same objectives, this answer is no more than a very general **a posteriori** indication, it being understood that some social values such as equality, justice, legitimacy and security transcend the imperialist pretensions of the economist in collective choices. The fact of admitting that military expenditure does not create many jobs ought not to be seen as prescriptive.

(d) Inflation

The first effect involves considering price movements in the military sector, which tend to be inflationary in arms-producing countries (cost-push inflation). Boulding (1970), Skons (1983), Dussauge (1985) and Adam and Gold (1987) consider that military prices tend to rise faster than prices for civilian products. However, although considerable unexpected increases are indicated by analysis of some products, it is scarcely possible to arrive at precise quantitative conclusions owing to the lack of information on military price indices and especially on the costs of permanent technical progress included in weapons (Aben and Maury, 1987; Hébert, 1993).

The second effect, more controversial, laying the emphasis on the macro-economic effects of a change in military expenditure, is also dependent on the economic conditions of full employment or under-employment, on the production capacity of the arms industries, the arms effort required over a short period of time, changes in the remuneration received by military personnel, the social status of the military, etc. Lester Thurow (1982) was of the opinion that only a significant deficit in the public budget could finance the defence effort of the United States, and that it would contribute to great instability of the financial markets and the development of inflationary tensions. This situation could be the source of 'compulsory saving' or of ostentatious consumption. Taken overall, military expenditure appeared to fan inflationary tensions. However, this relationship has not been clearly established for France (Percebois, 1986), or for the United Kingdom (Starr *et al*, 1979). For Schultze (1981), inflation appears when rapid defense spending contributes to the increase in nominal demand growth without restrictive monetary actions or tax increases. Actual economic situations differ too much over time and in space for it to be said that the existence of a necessarily negative impact of the decrease of military expenditure on prices is a rule or an inevitability. On the contrary, rapid rearmament leads inescapably to inflation, as a general rule.

(e) The balance of payments

There is no strong long-run relationship of real military expenditures as a determinant of real dollar exchange rates (Olszewski *et al* 1993). However, two other aspects of the impact of the military effort on the balance of payments must be examined: whether arms exports or imports play an important role in the stability of the balance of

payments, and how the macro-economic effects of the defence effort influence international trading and financial transactions.

If all the arms purchases of a state are imports, its trade balance is adversely affected by the defence effort, at least in the short term. However, the economic proposal should take into account the comparative advantages (ie a country may improve the situation of its balance of trade by not producing its own arms and by specializing in other, more profitable activities). The recipient is variously dependent on the perception of the danger, its degree of autonomy over arms purchases, its capacity to initiate or step up national arms production, the availability of alternative sources of supply, the reliance placed on foreign suppliers regarding spare parts, the degree of training and the degree of self-sufficiency. The econometric study of Pearson (1989) has given prominence to the variables relating to arms imports by geographic zone, by testing the following five hypotheses: national characteristics (eg area, population), government (military state or democracy), military characteristics (defence budgets), economic characteristics (degree of wealth or the level of trade), and international characteristics (involvement in international disputes). In general, it is military considerations that dominate the explanation of how arms imports are determined (especially the level of military expenditure), as well as the inertial effects that highlight a veritable market with buyers and sellers involved practically every day in negotiations. However that may be, the arms-producing countries of the Third World are reducing their arms imports, according to Looney (1988), which justifies the policy of import substitution.

Arms exports make it possible to develop learning effects, to improve economies of scale, and to apportion fixed costs over a larger output; they are an active component of foreign and defence policies which establishes links of interdependence at both the military and the commercial level. Arms exporters must take imports of intermediate consumables into consideration, along with payment periods and non-payments, and the effect of the time lags between delivery and financial settlement on exchange rates and the competitive position of the national economy. Exporting is not necessarily a lucrative activity for industrialized countries (Smith *et al*, 1985; Chesnais, 1990) and it does not reduce the national armament effort despite the possible economies of scale, which seem rather to favour the importers. For Hartley and Martin (1993), if military aircraft international co-operation leads to cost savings and greater scales of output, there is little evidence that collaborative projects perform better in exports markets than their national rivals.

Thurow (1980, 1982), Melman (1974) and Rothschild (1973) all consider that military expenditure reduces industrial competitiveness and promotes a trade deficit. Adams and Gold (1987) even think that military expenditure, being inherently inflationary, is bound to weaken the competitiveness of American enterprises and may lead to a worsening of the trade balance. Under these conditions, the international arms market would be less congested. It is now being asserted that the arms industries have weak industrializing effects, notably because the spin-off from military technology is relatively limited for the civilian sector and because the arms export war is probably very costly for the community (Fontanel,1993). For Looney (1988), the arms-exporting developing countries come out of the situation better than their importing opposite numbers, in

particular because of an improvement in their balance of trade. Finally, it is quite difficult to arrive at any overall conclusions concerning the impact of military expenditure on the balance of payments.

(f) Military research and development

What contribution the wastage of US military R&D (a third of civilian R&D) has made to the loss of competitiveness of the American economy is a question that has been widely debated. Mary Kaldor (1982) referred to baroque technology because the weapons were so sophisticated that they were bound directly or indirectly to have harmful effects on civilian technology. For Browne (1988), there was little to indicate that military expenditure would have a pernicious effect on American innovativeness; nevertheless, no relationship could be established for the short term spin-off of military technology onto its civilian counterpart. Weidenbaum (1990) additionally considered that military R&D did not enter into competition with civilian R&D, and that the two sectors were mutually independent in their operation. There was therefore no financial switching of amounts allocated to one or the other. There are many relationships between military technology and civilian technology in which the former naturally utilizes the results of the latter, whereas the latter, restricted by secrecy and by the considerable difference of highly sophisticated products manufactured in small series, is only indirectly influenced by the major decisions taken by the state in the main branches of basic research. When there is a dual technology, the civilian sector loses its own freedom of choice, with the secrecy and controls of military sectors (Hartley and Singleton, 1990). For Buck *et al*, (1993), defence R&D is a controversial subject. In the absence of a negative causal relationship between public defence and civil R&D

expenditure, there may be a role for public policy in aiding the absorption of displaced qualified scientists and engineers into the economy (also, ACOST 1989).

The arguments put forward in condemnation of the influence of the military sector on modern technology are not however always consistent between those who consider both that the civilian applications of military research and development are very slight (the baroque arsenal theory) and that present day societies are undergoing a militarization of the economy (the theory of the military-industrial complex); and those who take the view that military research is an essential vector of present economic development (the theory of human capital and training) while at the same time considering that it must be protected against civilian diffusion that would be bound in the long run to favour the evil designs of potential adversaries (the theory of unequal exchange).

(g) Development

Development is a broader concept than growth, introducing the idea that well-being is irreversible or that entitlement is flourishing (Sen, 1983). The question is one of knowing whether or not a prolonged military effort is a brake on economic development. Deger (1986) thinks that there is a negative relationship between socio-economic development and military influence, even if this basic hypothesis is not always supported by oversimplified econometric studies. There are at the present time four main approaches to economic development.

First, liberal theoreticians take the view that the opening of economic frontiers is egalitarian in promoting economic and social progress and favourable to peace. The

easing of restrictions on trade affords little opportunity for developing countries to attain their own independent advanced arms industry. Every country ought to specialize in products for which it is reasonably cost-effective. The production of arms essential to security ought to be carried out in allied states that have the best comparative advantage. Vernon's theory of the product cycle (Fontanel and Saraiva, 1986) stresses the progressive transformation of the world economic landscape (ie the irreversible trend for some industrial sectors to shift to the developing countries). In its first phase the new product is manufactured in the developed countries, which are havens of scientific and technical research and are the principal purchasers. The developed product is better known, and demand for it increases considerably owing to the diffusion of technology and the appearance of new competitors. The product becomes increasingly international and the conditions are established for the manufacture of the standardized product, the features of which are a good knowledge of the manufacturing processes and their simplification. If the labour input of the product is high, the price elasticity high and the transport cost low, the developing countries are able to gain a place in the market. These products even have a tendency to drift outwards. In that context, however, the developing countries are unable to take on production of arms needed for their security on their own and their production responds above all to purely economic considerations and is confined to ordinary munitions. Were one or two countries to prove to be the most competitive in this sector, it is likely that after several years of near monopoly they would progressively use this power to subjugate all their customers. The arms industry is not an activity like all the others, but one that calls security and freedom into question.

Second, the policy of import substitution seeks to replace imports by a product manufactured within the country. The pursuit of endogenous development is opposed to liberal theories based on comparative advantages and the contributions of factors. Early in the seventies there were many agreements for the manufacture of arms under licence. Countries in a high-threat, technologically sophisticated military environment have found it very difficult to reduce substantially dependence upon arms and technology, even when considerable resources have been involved (Ross, 1989). If it be true that arms production is favourable to national supply industries, it also permits the penetration of foreign capital and the conversion of military industries into transnational industries. This policy is nevertheless estimated to economize on scarce foreign currency, but it is sometimes the source of a deficit that may have grievous consequences through its effects on speculation, worsening of the terms of trade, and the emergence of cumulative effects that aggravate the deficits and inflationary tensions. Nevertheless, the arms industry does not really promote economic growth and even less does it promote industrial integration because the multiplier effects are, empirically, fairly weak, having regard to the divorce between civilian activities and military activities, the fact of military secrecy, and the economic dislocation. It may lead to a very considerable increase in costs, to dependence for intermediate consumables and patents, to a break between the protected military sector and a civilian sector in a competitive situation, etc. Technological competition, which is unending, accelerates obsolescence. That is why it is difficult for developing countries to assert their economic independence, since they are obliged to seek foreign licences, generally for the production of what is already on the way to obsolescence. Under these conditions,

national production may even run counter to the very security of the country (Brauer, 1991).

Third, the strategy of development through exports is extremely dangerous when applied to the military sphere. The trade balance will not necessarily benefit, at least not initially, since allowance must be made for the imports required for the manufacture of national equipment (more than 30 per cent of the cost of the military equipment exported by France), for the price competitiveness of nationally-produced arms in relation to their foreign counterparts (on pain of temporarily replacing a deficit of the trade balance by a budget deficit or of redistributing public expenditure), and for time-lags (purchases from abroad are rarely paid for in cash, but imported components for military equipment are, which may cause unacceptable bottlenecks). The need to export in order to cut costs through economies of scale also gives rise to economic dependence. The exporting of arms is often regarded as a highly lucrative activity. In fact, this function appears to have been quite poorly fulfilled for several years past. Sales are accompanied by credit conditions favourable to the purchaser, and often they do not involve any reciprocal financial transactions for heavily indebted countries. Some equipment is on occasion sold more cheaply abroad than to the country's own armed forces, and there is such a thing as impoverishing exportation. Furthermore, a decision to disarm would then be highly prejudicial to the national economy as a whole (Fontanel and Saraiva,1986).

Fourth, arms industries as industrializing sectors are an idea strongly developed in Brazil and India. Economic development must be brought about through stimulating

investment. What is needed, therefore, is to invest in activities that have the effect of providing an impulse through sequences of induced investments that ensure vertical and/or horizontal complementarity of the country's industry. The effectiveness of investment is measured by these induced knock-on effects. In this sense, military industry is a pole of development either through the backward linkage effect, which reveals the increased demand of all the production sectors feeding the sector in which the investment is made, or through the forward linkage effect, which is felt further down the line. Production of military equipment stimulates the civilian sector through the purchase of intermediate consumables on the internal market and through the creation of new jobs. Nevertheless, these stimulating effects are not decisive for development, since there is considerable risk of obsolescence in an economy in which there is already little innovation, there is considerable risk in exporting to achieve acceptable economies of scale, the risk of penetration by foreign capital is far from negligible, and military industries make great demands on capital, a scarce factor of production for developing countries.

Two basic economic reasons are usually advanced to justify arms industries: the saving in scarce resources and the industrializing effects. Analyses of import substitution policies and of industrializing effects are not very encouraging in this respect. The opportunity costs of using highly skilled personnel in the military sector, the heavy investment involved, the pace of innovation and the speed of obsolescence in the military sector, the resulting imports, the length of the production cycle, the intervention of multinational corporations, and the weakness of the industrial base needed if the best-performing products are to be competitive are deterrents at the purely economic

level against national production of arms in developing countries (Fontanel and Saraiva, 1986). Arms production does not promote industrialization nor does it save foreign exchange by circumventing arms imports (Brauer, 1991).

THE ECONOMIC IMPACT OF DISARMAMENT

Reductions in military expenditure have a three stage impact, namely, the immediate short-run effects of the change in the structure of the final demand, then a transition process as resources are either transferred to different uses or left idle, and finally the longer term supply side effects of the new allocations of resources on the economy as a whole (Smith,1993). The economic impact of disarmament is usually connected with the economic development level of the country and the question of military conversion.

(a) Impact on developed countries

Whereas a number of economic models have been constructed to analyze the impact of increased military expenditure, there are few formal analyses of the economic effects of disarmament. The application of simulations based on the reduction of military expenditure involves the hypothesis that the effects on the national economy of an increase or a decrease in the economic effort of defence will be to some extent homothetic. Now, it is probable that threshold effects will emerge to render such a generalization questionable, above all effects of stocks or of property.

A very simple model focusing on chronological series (Fontanel, 1980) shows that progressive disarmament has a weak positive effect on the GDP of France. This impact is due mainly to a reduction of the inflationary tensions and to the appreciable increase

in national investment. As public expenditure, military expenditure has an impact on global demand (Keynesian multiplier effects); also military expenditure has quite high opportunity costs, notably because it reduces the public and private investment potential for production. The effects of a 40 per cent reduction of military expenditure on the main sectors of the economy and on employment were studied in another model of the input-output type (Aben, 1981). None of the several hypotheses on the structure of the new allocations for the conversion of defence activity made it possible to avoid a worsening of the employment situation in the short term. But, the harsh, disturbing result of the enforced loss of jobs resulting from disarmament is therefore considerably tempered by the relative lowness of the figures obtained and by the positive effects in the medium term of the replacement of military expenditure by more efficient civilian expenditure.

As regards the United Kingdom, Dunne and Smith (1984) and Barker *et al* (1991) are of the opinion that disarmament is more of an opportunity than an economic problem, depending on the choice of the government between an exact compensation of public expenditure or no compensation at all. The first type of disarmament produced a slight improvement in the balance of payments, a limitation of inflationary tensions and additional growth. The second policy led to a reduction in the GDP, a fall of the price index, and a worsening of the jobs situation. This situation was, however, brought about more by the deflationary policy than by the actual reduction of military expenditure. For Smith (1993), the impact of cuts of the size now envisaged would be relatively small relative to other recent UK structural adjustments, such as faced by the coal and steel industries. The structural changes were, however, mainly of a micro-

economic and sectoral order and highly heterogeneous. The authors assert that the results are in line with the historical experience of the United Kingdom and with studies that stress the effects of substitution of military R & D to the detriment of civilian products (Kaldor, 1980), poor use of military technology (Maddock, 1983), and the crowding-out effects on investment (Smith, 1980). Disarmament eases the constraints on financial policy, the scarcity of technological ability, capital formation and the balance of payments. Hartley (1987) emphasized the somewhat negative effect of military expenditure on the growth of the United Kingdom, an effect also manifested by health expenditure. There is a need for an adjustment policy, because private markets might fail to work properly and the adjustment process might be long and painful (Kirby and Hooper, 1991).

Ceteris paribus, reducing the level of military spending will reduce real output, the price level, employment and the production of some industries and these effects will tend to attenuate after five years (Thomas *et al*, 1991). But, Joshua Goldstein (1988) suggested that war and prosperity were closely connected in a relationship of repulsion and that one per cent of American military expenditure relative to the GDP destroyed 1. 5 per cent of annual economic growth. A changing economic situation is sometimes the source or the cause of new potential for conflict and rearmament. The decline of the American economy has been emphasized over the last few years by the way in which innovation has lagged, low productivity, the twin deficits, and problems of competitiveness. Paul Kennedy (1987) formulated the hypothesis that these problems could be due to too high level of military expenditure in the USA. The reduction of defence expenditure did further the competitiveness and the productivity of American

enterprises, all the more so since the technological spin-off from the military sector was considered to be inefficient and costly (Melman,1988). The statistical data do not provide irrefutable proof of a negative relationship between capital formation and military expenditure, and the productivity problems of American industry cannot be ascribed to the defence effort alone (Gold and Adams,1990). Kinsella (1990) demonstrated by the use of an autoregression vector that no substantial causal relationship existed between military expenditure and prices, unemployment and the interest rate. A direct positive relationship (without a time lag) did exist between military expenditure and national output, but only for monthly or quarterly information, notably when the economy was in bad shape and thus was under the effect of the Keynesian multiplier. For Huang and Mintz (1990), defence cuts had an indirect and retarded effect upon growth ; it would take five years of reduced military spending to promote economic growth through the boosting of investment. Atesoglu and Mueller (1990) thought that there is a positive relationship between military expenditure and economic growth, but that the multiplier is very small. Unless the reduction of military expenditure is very considerable and abrupt, the effects of highly progressive disarmament on American economic growth would be negligible. This relationship might imply that the United States had relatively too few opportunities for investment and that the increase of military expenditure was a Keynesian opportunity of increasing credit-worthy demand. In a recent study, Mueller and Atesoglu(1993) include technical change which separates the effect of defense spending into two significant components, the change in the rate of defense spending and the relative size of the defense sector. A reduction in defense expenditure will result in a reduction in the growth rate of the US real GNP, but the rate of change effect is short run and the size effect is long run.

It is then difficult to gauge the total effect of even a one time cut, except to calculate the ultimate result after the long run completion.

A study by Ward and Davis (1990) demonstrated the multiplier effects of governmental, military and civilian expenditure on the national economy and revealed the existence of contradictory effects, the result of which was dependent both on the magnitude of defence expenditure in the economy of the United States and on the importance of the military effort in the state budget. The relative weight of military expenditure in the national economy is a burden for the economy, whereas public non-military expenditure tends to have a positive effect. In other words, periods of increased defence effort tend to restrict economic growth. Conversely, by virtue of the difference in the productivity of governmental expenditure itself, the share of non-military expenditure in government expenditure tends to have a positive influence on growth, unlike that of military expenditure. It must be pointed out that the state often has to be responsible for activities that are not very productive but the defence of justice, freedom and the rules of democracy does not always make sense in terms of economic value added. Ward and Davis (1990) concluded that the global effect of American military expenditure during the period (1952-1988) had been very slightly positive, but that its contribution to national productivity had declined, in contrast to that of government civilian expenditure. Lastly, a simulation relating to a 5 per cent reduction of military expenditure indicated that were investment and employment to remain constant, growth ought not to be affected in the short term. Furthermore, Aschauer (1989), who applied an empirical test to productivity, was of the opinion that whereas the expenditure of the state infrastructure had very positive effects on growth, the same could not be said of

military capital expenditure. In terms of opportunity cost, it does not appear that defence effort is the best economic investment in today's USA.

For Klein (1990, 1993), the effect of disarmament on the American economy will be bound to be positive. The production of civilian capital goods will be very useful when it takes the place of military production, because the former creates new income flows, whereas the latter is used to destroy or to be destroyed without any economic return. All conversion of the military to the civil leads, **a priori**, to an indisputable economic gain, even if certain situational or regional problems may sometimes arouse a hint of doubt. However, the reduction of military expenditure ought not to result in a limitation of global demand, and the government ought simultaneously to pursue a policy of compensatory public expenditure or reduction of the budget deficit. Thus, disarmament would inevitably lead the government of the United States to pursue a policy of limiting the public deficit, restoring national savings and progressively reducing interest rates. Should the American deficit decrease, the crowding-out effects of civilian investment will be reduced, at the same time as the pressures on interest rates will tend to diminish. In the short term, however, some major national enterprises will suffer a considerable reduction in their public orders, but in the medium term, lower interest rates will lead to more investment, and that situation will favour both international trade and reduction of the public deficit. Lastly, military expenditure exerts undoubted inflationary pressures, because the economy provides salaries without a flow of goods being produced in exchange. The result should therefore be an increased propensity for investment and an improvement of confidence of the international financial operators. Klein recommends a progressive reduction of the public deficit, the initial consequence

of which would be reduction of the interest rate, followed by a limitation on the cost of the debt, and ultimately by an improvement in exporting situations. The LINK model posed the question of what the effect would be of a 3 per cent reduction in military expenditure, accompanied by a more flexible monetary policy. The main answer was that there would be an appreciable reduction, of the order of 2 per cent, in interest rates. There would then be a revival of heavily indebted economies. Schultze (1990) was putting forward a plan for a progressive reduction of military expenditure, mainly for the reduction of the public deficit and for the Federal civilian expenditure for high-priority programmes. For Eisner (1993), reducing defense expenditure may be expected to increase unemployment and using this reduction to cut the budget deficit is likely to make matters worse ; easier monetary policy will help but probably not sufficiently ; cutting taxes is interesting but the cut would have to be greater than the cut of defense spending, which in the short run produces a deflationary effect and then an increase of the state deficit ; replacing the cuts in defense spending with increases in other government spending might fully offset the effects of defense cuts in GDP or unemployment. For Hormats (1992), the so-called 'peace dividend' will be insufficient by itself to cure the structural ills afflicting the US economy. He proposes to create incentives to savings and investment and to strengthen US educational system, because the most important problems facing the US economy are insufficient investment, inadequate national savings and deficient training methods. It is then useful to reduce capital gains taxes, in order to increase the willingness of people to take the risk of starting up a new business and investing in new technologies. A portion of the peace dividend would be allocated for civilian R&D, some for infrastructure development and

maintenance and finally some for assistance to the nations of the former Soviet bloc in order to help these nations to consolidate democratic and market reforms.

The countries of the East are currently confronted by two basic problems: the restructuring of their economy and the reduction of military expenditure. At the present time Russia wants ongoing disarmament, because the economic impact of military expenditure is too onerous for an economy of scarcity. With the disintegration of the Soviet Union, central economic planning and management have disappeared, military expenditure has been drastically reduced and the military industrial complex ceased to exist as a tightly controlled system, well organized and privileged. But several barriers to conversion exist, such as its low mobilization capacities, lack of market and financing, the privatization process, inefficient technology, the needs of education and the weakness of the networks. Authoritarian conversion has been replaced by project conversion (UN, 1993, pp 61-63).

(b) Disarmament for development

Disarmament and development are two essential objectives of our time. What we need to know is whether it is desirable that they should be linked. It may be recalled that successive French governments have frequently called for the establishment of an international fund of disarmament for development that would enable the amounts saved on arms to be used to develop productive activities that would speed up economic development and extend it through aid arrangements to the developing countries (Fontanel and Smith, 1987). Disarmament for development is generally analyzed, on the one hand, in the absence of any international transfer of the resources saved through

disarmament and, on the other, in the context of increased aid for the most destitute countries.

If military expenditure is unproductive, it follows that anything that tends to reduce it while maintaining an equivalent level of security is economically desirable. Nevertheless, it cannot be denied that considerable sectoral, regional and short run problems may arise as a result of ongoing disarmament. It is assumed in the reports of the United Nations (1981, 1983) that the arms race reduces world growth potential and limits the scope for economic development by its squandering of scarce resources. The well known study by Benoit (1978), partly confirmed by Frederiksen and Looney (1982), suggested that military investment would be conducive to industrial modernization, to training and knowledge, to the improvement of infrastructures, to full use of the productive capacities, and to the sense of order and discipline of the economies of developing countries. It has been strongly questioned both as regards its form and its content, by the analysis of Deger and Smith (1983), which arrived at opposite results.

There are three substitution effects in countries in which resources are scarce: temporal (the choice between the present and the future), sectoral (the choice between the military and civilian spheres) and by category (the investment eviction effect caused by defence expenditure). Varas (1986) considers that the effect of military expenditure differs with the development level of countries, influencing the material well-being of Third World countries and the growth of developed countries. The militarization of developing countries is not conducive to their economic development in the long term,

despite the mobilization of the surplus to which it may give rise. Gyimah-Brempong (1989) is of the opinion that the military expenditure of African countries is not capable of being passed on to economic growth, since the positive effects often instanced are largely offset by the reduction of investment occasioned by the defence effort.

Saadet Deger (1986) and Nicole Ball (1988) regard national armament as a cause of under-development, whereas Robert Looney (1988) thinks that this relationship can really be accepted only for countries that are not arms producers. Looney's econometric results indicate that:

(i) political and administrative influences do more to determine military expenditure than do international rivalries;

(ii) the substitution effects are greater in arms producing countries than in countries that merely import the arms that they need for their defence; and

(iii) military expenditure has made only a slight contribution to the increased indebtedness of Third World countries.

Whynes (1979) and Wulf (1985) suggest that only large developing countries, notably Brazil and perhaps Indonesia, are really in a position to derive sufficient multiplier effects from their military effort to exceed the eviction effects that the military sector undoubtedly exerts on the civilian sector. Ward (1991) demonstrates that the military programmes in Brazil and India are tending to be globally positive. But if account is

taken of the fact that other public expenditure is even more satisfactory for growth, opportunity cost is a question that still has to be considered.

In the absence of transfers, for countries that do not have an arms industry, the effects of a reduction of military expenditure will be positive even in the short term, provided that they are not offset by an equal or greater expenditure on the maintenance of internal order or on the purchase of imported luxury goods. For arms-producing countries, disarmament may have perverse effects in the short term, notably for the industries and regions directly involved in the industrial activities of armament. The economic impact should be positive in the long term, provided that the situation of economic decline triggered by the reduction of internal arms purchases does not lead to irreversible effects, notably as regards conversion of activity. The effects of disarmament cannot be measured in isolation from the economic policies implemented by governments. A voluntary reduction in military expenditure cannot be satisfied with reasoning of the 'all other things being equal' type. The theory of under-development as a product of development takes the view that the economic situation of Third World countries may worsen if the developed countries cease to buy the raw materials that constituted the greater part of their export resources, an example that the model of Leontieff and Duchin (1983) did not verify. The conversion from military to civilian activities may, however, lead to a search for new outlets and to increased competition for the products of Third World countries. Similarly, a reduction in expenditure on military research and development to the benefit of the civilian sector may widen the technological gap and lead ultimately to greater economic inequality.

The question is differently analyzed when the military effort is accompanied by assistance from a developed country. In that case, the effects of modernization may have free play, without the economic constraints of a limitation on investment being apparent. Irrespective of the improvement in international relations that would stem from disarmament and improvements in international interdependence, aid linked to disarmament should normally have the same effects as existing traditional forms of aid. It should, however, be noted that disarmament can have favourable effects on economic development only if the saving that it makes possible is not confiscated by a social grouping that decides to devote it to unproductive uses. In other words, a transfer makes economic sense only if it finds expression in a highly productive activity. A transfer may on occasion be capable of having an adverse effect, notably by aggravating inflationary trends owing to the appearance of demonstration effects. A resource transfer may also be the occasion of new markets for the developed countries and new dependence for the poor countries. Thus, James Lebovic (1988) succeeded in demonstrating that political and military considerations were just as uppermost in American foreign aid during the Presidency of Carter, with its heavy emphasis on defence of human rights, as during that of Reagan, when the pursuit of the military might essential to American security was a strong influence. Transfer satisfies political and military considerations, in the first instance, then the economic interests of the donor, and only lastly the economic development needs of Third World countries. The developing countries must therefore avoid the transfer being, on the whole, impoverishing. Lastly, international aid may lead to distorted development, especially if it is not disinterested. Some forms of transfers prove ultimately to be costly, notably in operating costs, and political constraints are rarely absent from such an undertaking

by rich countries. Aid to developing countries may be devoted to prestige expenditure, to the increasing of social inequalities, and to furthering the development of societies in which human rights are not necessarily respected. Transfers may also be the subject of sordid calculations of interest tending to accustom populations to a type of consumption that renders them dependent on the industrialized countries (Fontanel, 1984).

A reduction of military expenditure has been simulated in several models of the world economy, three of which yield interesting results. First, the transfer of resources to poor countries furthers their economic development in the model of Leontieff and Duchin (1983). Ongoing disarmament would have a positive effect for all the regions of the world and the transfers of resources would clearly increase consumption and the per capita GDP of the arid countries of Africa, and the low-income countries of Asia and tropical Africa. Nevertheless, the econometric results obtained do not seem very significant. They give only a very global idea of what the economic impact of disarmament means. Second, Cappelin, Bjerkholt and Gleditsch (1984) make several simulations of the world model, applying the same methods. These simulations yield the same types of results and conclusions as those of Leontieff and Duchin, and the same criticisms may be levelled at them. Third, the results yielded by the LINK model are not without interest. For example, a 10 per cent reduction of military expenditure accompanied by an improvement in international assistance put at 0. 7 per cent of the GNP of the developed countries is capable, in the best case of a transfer relating exclusively to capital goods, of leading to a 1. 7 per cent growth of the GNP in the developing countries and an 0. 2 per cent growth in the developed countries. However,

assistance is not always used advisedly. Should it be squandered, the growth rate of the developing countries would not experience any negative shock in the short term, but the developed countries would experience a negative effect of the order of 0. 3 per cent of their annual growth. For this transfer to be positive for all parties (donors and recipients), 60 per cent of the aid must be expended on capital goods.

The estimates of IMF's world macro-economic MULTIMOD model (IMF, 1993) indicate the large scope and widely distributed long-term benefit of world-wide cuts in military expenditure. A 20% reduction of military outlays in the world in over five years (by each nation, with equal increments over the period, with the same percentage reduction for military aid and military export and imports) could increase private consumption and investment by 1% and 2%, respectively, after 11 years. The sum of annual long-term economic benefits, in 1992 dollars, would be 10,000 billion dollars, about 45% of 1992 world GDP. During the first year, the industrial countries' output decline by $6 billion, but in the second year, there are lower government spending, lower interest rates and higher private sector spending on consumption and investment. Countries that implement the largest cuts have the largest short-term losses in output, but the largest long-term gains in consumption and investment. By the end of 11 years, the economic output of developed countries will be increased by $59. 6 billion, to compare with the benefit of $11. 5 billion for developing countries. Among the developing countries, Africa has the largest economic welfare gains. This model is interesting but does not take into account the distributional consequences of lower military spending for different regions, sectors and firms and the conversion of the capital currently used in the production of military output to civilian use: two factors

which should not be exaggerated because of the small percent of the world capital stock engaged in military production and its depreciation over time.

(c) Conversion

The transition after World War II was a question of reconversion, because during the war a large share of the former civil production was modified for military purposes. At the end of the war, the production facilities were converted to their original purposes. Now, it is a problem of conversion, because generations of personnel and technologies, very specialized on military activities, have spent their working lives in the military sector. The similarity between technologies needed in military and civil sectors has diminished. The challenge for conversion is more difficult than the challenge of reconversion. The most common corporate response to the change in the trend of the arms market was inertia, do nothing, which produced a large amount of excess capacity. In France, since the mid-eighties, there has been 'de facto' creeping conversion, which was not chosen for political or strategical reasons, but which depends on decreasing demand from the French state and from foreign customers (Hébert,1993). Acquisitions, divestments, redundancies and closures have changed the shape of the arms industry.

Conversion is defined broadly as a new allocation of resources from military sector to civilian uses. The micro-economic approach defines conversion as plant-by-plant transformation of armament production units into industrial facilities to civil production. In a wider sense, it is the process of re-deploying the resources freed from military activities in favour of civilian sectors, in a continuous macro-economic process

depending on the proper functioning of the labour and capital markets (Fontanel, 1993). Military conversion includes demobilization, reduced defence expenditure and weapons' production (Conberg and Hansen, 1992). On a political level, it implies a fundamental change of priorities, in favour of disarmament.

Technological conversion could take place as an acceleration of the spin-off mechanisms, but a British report (ACOST,1989) concluded that less than 20 per cent of the UK military R&D had civil spin-offs. The military-industrial complex involves a dichotomy between civil and military production (length of the products cycles, importance of performance for weapons, radical innovations and planned obsolescence). The military companies sell their products before they are produced and then the ultimate price and the economic risk are not their primary concerns. The defence management has a lack of skills in the civil sector (which is more concerned with the importance of effective advertising campaigns, the public acceptance of the new product line and the prices for the penetration of a new market), because in the military market, it has mainly to know the administrative rules, to develop good working relationships with key procurement government personnel, and to lobby with members of Congress (Dumas,1982). Furthermore, it has little interest in conversion, because of the security and lack of cost-consciousness of the military activities. The defence engineers are very specialized and a retraining and re-orientation will be needed. There are six main military enterprise responses to a process of disarmament (Petris,1993) :

* the development of weapon exports

* a restructuring of companies, implying a reduction in production volume by laying-off workers and selling or closing plants

* the development of generic or dual technologies

* specialization, narrowing the range of products manufactured and identifying niches with high profit potential

* diversification, with the production of civil and military products

* and the complete conversion, based on a transfer of activity away from the military to the civilian sector.

For General Dynamics, diversification is illusory, a waste of management time and shareholders funds, because the failure rate (80%) is unacceptably high. Hughes and Lockheed acquired the military activities of General Dynamics, in order to consolidate their positions in a market with few competitors. For Alexander (1990), the shift into non-defence products will generally be unsuccessful because of mis-matches between defence and civilian experiences, skills and technologies, but primarily because the culture and management of defence industry militate against civilian success.

When military demand turns down, conversion is required, but if the companies could produce profitable non-defence products, why should they choose to develop them only

in times of crisis? In the end, the task is not converting the defence industry from military to commercial markets but changing the industry. Diversification supposes an increase in the heterogeneity of the military firms markets. It reduces the company's dependence on defence by acquisition or organic growth of non-defence operations. There are four main diversifications :

* market, using dual technologies;

* external with the acquisition of stable and lasting agreements with other companies;

* geographical with the relocation of installations and markets, and

* portfolio diversifications, based on financial operations involving the purchase and sale of companies.

Conversion, in the strictest sense, refers to a re-utilization of the former military installation for civilian production facility. The market solution may appear very wasteful, particularly when the bulk of redundancies have occurred at a time of rising unemployment. The state command conversion implies a national planned programme, whereas conversion by distribution uses the rule of market economies. A principal change in demilitarization of the Russian economy is the shift both theoretically and practically from 'command' conversion to 'market conversion'. In March 1992, there was legislation on conversion, and the enterprises can reject orders 'from the top' and initiate their own conversion projects. Now, conversion by community is very often

necessary technical assistance to make new product assessments or marketing studies, which can be solved by state and local government support (UN, 1993).

It is even likely that good management of the reduction of military expenditure would have positive long term effects on civilian R&D, on the real productivity of national economies, and on confidence in international trading relations that cannot be quantified by econometric studies. Despite the negative effects in the short run, it is possible to say that disarmament is a very good investment for economic development, **ceteris paribus**.

CONCLUSION

Effective disarmament supposes the application of such principles as :

* the main dividend of disarmament is peace itself (Fontanel, 1993);

* disarmament without development is not synonymous of a durable peace;

* it must be considered as a public or private investment;

* disarmament by a reduction of defence spending constraints will not be decided by a rule of proportionality and should be gradual;

* it implies controls of military technology, R&D and international trade;

* it implies controls of military technology, R&D and international trade;

* it is necessary to bear in mind the costs of peace as well as the dividends of peace (Fontanel and Ward,1993).

Disarmament sets the scene for the 'civilization' of modern societies, the retreat of the ideas of militarism, the hierarchy, discipline, nationalism, patriotism and xenophobia. Outlooks and behaviour do not decree why this should not be so. The economy of disarmament does not stop at the mere reduction of military expenditure; it must also apply itself to the reasons on which the disarmament is based and which, if possible, make it irreversible. This latter point is not, however, one that can be tackled by economists on their own, for it involves consideration of the very nature of humankind.

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