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Ron Smith, Jacques Fontanel

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The UK Defence Sector

Ron Smith & Jacques Fontanel

Cahiers du CEDSI
Université des Sciences Sociales de Grenoble
Grenoble

Résumé : L'industrie d'armement du Royaume-Uni est en grande ébullition, car les stratégies budgétaires et de développement de l'industrie de défense sont en situation d'évolution rapide, avec la volonté politique de réduire le budget de la défense britannique et d'introduire la concurrence internationale pour chacun de des fournisseurs de la défense, sauf pour les technologies d'une importance capitale pour l'avenir. L'Etat dispose d'une base industrielle d'armement conséquente qui peut satisfaire au moins partiellement les besoins stratégiques. Avec la mise en concurrence, la liste des technologies essentielles pour maintenir une base technologique satisfaisante n'est pas très longue et exclusivement militaire. En principe, il s'agit d'une volonté d'importer ou d'autoriser la vente des firmes d'armement britanniques dans un éventail beaucoup plus large que celui de ses alliés. En pratique, le lobbying réduit quelque peu l'effet de ces principes. L'acquisition et la prise de contrôle par une firme étrangère d'une société nationale d'armement sont à a fois politiquement et financièrement beaucoup plus faciles dans une en Grande-Bretagne libérale que sur les autres pays du continent européen.

The UK armaments industry is in a state of turmoil as the defence industry's budgetary and development strategies are changing rapidly, with the political will to cut the UK defence budget and introduce international competition for all but the most important technologies for the future. The state has a substantial armament industrial base that can at least partially satisfy strategic needs. With competitive bidding, the list of technologies essential to maintain a satisfactory technological base is not very long and is exclusively military. In principle, it is a question of a willingness to import or authorise the sale of British armaments firms in a much wider range than that of its allies. In practice, lobbying somewhat reduces the effect of these principles. The acquisition and takeover by a foreign firm of a national armaments company is both politically and financially much easier in a liberal Britain than in other countries on the European continent.

Industrie d'armement, entreprises d'armement, arsenal, achats d'armes, ventes d'armes, Royaume-Uni

Armament industry, armament companies, arsenal, arms purchases, arms sales, United Kingdom

Reviewing the UK defence sector in the summer of 1990 is a dangerous activity, any analysis is likely to be rapidly overtaken by events, because of the rapid pace of strategic, budgetary and industrial developments. In this review, we shall try to identify the main characteristics of the defence sector and the pressures for change that are prompting rapid restructuring of the industry and budgets. Cuts in the planned defence budget are presently being implemented in response to the "Options for Change" Defence Review.

From an international perspective, one of the most distinctive features of the UK is the defence industrial policy of the Conservative Government – it does not have one, and is proud of it. Traditionally in the UK, and currently in most other countries, Defence Ministries regard themselves as responsible for the health and direction of the defence industrial base, which is often partly owned by the state. During the 1980s the UK Ministry of Defence (MOD) switched to a policy which privatised arms firms, emphasised free competition and tried to create a more commercial, value for money driven, procurement policy. With relatively few qualifications, it was to be the responsibility of market forces, not the government, to decide the shape of the defence sector.

In real terms, defence expenditure peaked in 1985 and has been declining since then, and is projected to fall below 4% of GDP in 1991, the lowest proportion of GDP since the 1930s. The conjunction of a much more competitive procurement policy and falling real defence expenditure prompted a reconsideration of corporate strategy and major restructuring of the UK industry, even before the events of 1989 in Eastern Europe prompted a vision of much more substantial cuts in defence.

After some general background on the military market, this paper reviews the main arms producers, the role of R&D, the evolution of policy, the likely effects of future cuts in military expenditure and the restructuring of the industry, before concluding with a

consideration of the link between production and strategy.

The military market.

Although it is common to talk of the arms industry, this can be misleading. Not only are weapons themselves a very heterogeneous category, but the MOD buys a vast range of other products, including standardised commodities for which there exists a large civil market, such as oil. The commodity composition of demand is shown in Table 1. In general the pattern of spending has remained very stable. Expenditure on fuel was influenced by variations in the price of oil and exceptionally high military travel to the Falkland/Malvinas islands in 1982. Expenditure on aerospace reflected the progress of the large Tornado aircraft project through the system.

The MOD accounts for around 80% of demand for UK arms production: £8bn of MOD equipment purchases as compared to around £2bn of exports in 1984. Thus it is effectively a monopsonist as are most Defence Departments. In the later 1980s UK arms sales abroad have been very successful, on some figures replacing France as the third largest arms exporters, in particular as a result of two large Saudi Arabian orders for the Tornado aircraft and other equipment as part of the al Yamamah project. Arms exports in 1989 were probably about £4 bn, of which the Middle East was the major market.

Production of major weapons tends to be characterised by economies of scale. There are large fixed costs, particularly for Research & Development, which, on average, accounts for over a quarter of total costs in the UK, about 12% of the defence budget, a similar proportion to France. These fixed costs then have to be spread over the relatively short production runs warranted by domestic demand, unless the product can be exported. To obtain export sales in competition with other countries also trying to protect their Defence Industrial Base requires designing equipment in the light of foreign demand as well as domestic military requirements and pricing closer to marginal cost than average cost. The difference between these can be substantial, because of the large fixed costs. Hartley (1988) suggests that cost savings up to 25% over domestic production might be available if a nation was willing to purchase its defence

equipment from the cheapest supplier on the world market.

In the UK, as in the US and France, imports meet a relatively small proportion of demand, partly because of concern over security of supply. Fear of obstacles to delivery during a conflict, political embargo, or diversion of the arms to the exporter's armed forces, all lead to a preference for domestic products and a desire to maintain a Defence Industrial Base. The preference for domestic supply can inhibit international division of labour and promote excess capacity, while the value of a Defence Industrial Base is disputed, Hartley Hussain & Smith (1987) and Taylor and Hayward (1989) discuss the issues.

The proportion of UK demand met directly by imports has risen from about 5 to 10 per cent in recent years, partly in response to a few large purchases such as AWACS and Trident. When indirect imports of components used in British contracts and the like are taken into account the import content is significantly higher. Contributions to collaborative projects account for about 15% of UK and French procurement and 25% of German procurement. The characteristics of costs differ substantially between the four main ways of meeting demand – domestic production, collaboration, licensed production and imports – and the relative advantages of these four routes are discussed in Smith & Fontanel (1987). In recent years the UK has considered foreign supply more seriously, chosen imported systems against domestic competition on a number of occasions, including a Brazilian designed trainer for the RAF and the Boeing AWACS rather than the ill fated GEC Nimrod, and as a result the import share has risen. These choices have made the threat of foreign competition more credible.

The producers.

In 1988–89 the MOD had 9650 companies on its defence contractors list, of whom 115 received contracts worth more than £5m, 14 worth more than £100m, and 5 more than £250 million. The top five were British Aerospace (BAe) airframes, the General Electric Company (GEC) electronics, Plessey, electronics and since acquired by GEC and Siemens, Rolls Royce aeroengines, and Vickers Shipbuilders and Engineering Limited (VSEL), nuclear submarines. Among the 9 companies gaining between £100 and £250 million, there was one foreign company Boeing, supplier of AWACS. VSEL was originally owned by the Vickers but was nationalised

into British Shipbuilders in 1978, and then privatised as a separate company, and is now quite separate from the Vickers company which is also a large defence contractor, the main UK tank producer, getting between £100 and £250 million in contracts in 1988–9.

Table 2 gives data on the defence dependence and financial performance of some of the major defence contractors in the mid 1980s. There are various difficulties with these estimates so they should be regarded as approximate, and they are also out of date since the position has changed for some of these companies since then. There is very little quantitative evidence on the relative profitability of UK defence and non-defence companies, but the position is likely to be similar to the US, where there is little evidence of a systematic or persistent difference in measured profitability between defence and civil firms.

The typical large defence contractor is a specialised division within a diversified conglomerate. The market is dominated by three majors: GEC, in electronics; Rolls Royce in aeroengines, and British Aerospace (BAe) in airframes and missiles. Of the companies listed in Table 2, BAe was the most dependent on defence (76% of sales and 100% of profits) but moved further in the direction of diversification by acquiring the Rover car company in 1988. Among the smaller contractors there are more that concentrate entirely on defence, usually by establishing niches in specialised areas.

As one might expect, the combination of domestic preference and economies of scale makes monopoly common in defence markets, though, in some cases the monopolists are relatively small firms. Products where there is a single UK producer include: major airframes and missiles, British Aerospace (BAe); ordnance and small arms, Royal Ordnance Factories (ROF), now owned by BAe; tanks, Vickers who purchased the ROF tank factories; topedods, GEC; nuclear submarines, VSEL; large aero and marine turbine engines and nuclear propulsion units, Rolls Royce; and helicopters, Westland.

Traditionally defence contracting was a secure and stable activity for a large contractor, since there were significant barriers to entry into the market and payment was on a cost-plus basis. NAO (1985) provides details on the historical position. In 1976–7 38 companies received more than £5m. Of these 8 had their defence interests totally nationalised to form BAe and BS; 4 (Ultra, Sperry, Decca, EMI) were taken over by other listed contractors. Of the 28 continuing companies, all but 4 received as much or more from MOD in

all of the nine following years. The probability of getting the same or more in the following year rises with the amount paid in the current year. Averaged over the 1978-9 to 1983-4 period, this probability averaged 72% for the lowest group rising to 100% for the group receiving over £100m. For the large defence contractors, payments conformed closely to what Kurth (1971) calls the "follow on imperative", the scheduling of orders to keep defence industrial capacity occupied. The assumption by the large firms that they could rely on a flow of contracts to maintain capacity was threatened by the move by the MOD in 1984 to a more competitive procurement process. This change in policy and its consequences is examined later.

R&D and Technology.

The attitude to technology in the UK Government contrasts very strongly with that in France. France has traditionally been very concerned, not to say obsessed, with technological sovereignty and the leading role of the State in maintaining French companies at the leading edge of competitive technologies. For the last decade, the British Conservative government has been concerned, obsessed, with encouraging the free play of market forces, and has been much less concerned about issues of foreign ownership or the penetration of multinational capital. However, Britain's poor technological performance has led to some discussion of R&D spending, and in particular, the large share of it that was taken by defence. As a result, from the late 1980s, government policy has been to reduce Defence R&D spending.

The issue of defence R&D has been controversial in the UK. There was a growing perception that the high level of spending on defence R&D, over £2 billion per annum in the late 1980s was neither bringing a satisfactory success rate in defence projects nor yielding very much return for the civil sector. This caused the Government's Advisory Council on Science and Technology (ACOST) to investigate the issue and publish a report on Defence R&D, ACOST (1989). Defence R&D took about 25% of the national R&D budget, which amounted to about 2.3% of GDP, and about 50% of public funds devoted to R&D. However, there are substantial statistical problems with these numbers, in particular it is argued that these exaggerate the position, since much of the engineering expenditure counted in the MOD

Development figure would not count as true development expenditure under strict application of the OECD "Frascati definitions".

ACOST estimated that less than 20% of the R&D expenditure of the MOD is likely to have any applicability in the civil sector, and that while the evidence that UK defence activities absorb technical skills and financial resources that could be better used elsewhere in the economy was largely anecdotal, the corporate culture and industrial organisation that was required for the defence market was often very different from the civil market, and that there was evidence to suggest that the UK was relatively less successful in transferring technology from defence to civil applications than other countries. Over concentration on the protected defence market may have reduced companies ability to compete in civil markets. The structure of the defence contracting market reflects a corporate culture of high Government R&D support and the manufacture of high quality equipment containing specialised technologies which do not have much applicability in other sectors.

The report made an number of recommendations to the MOD, and while welcoming it in general terms, the Government emphasised that it did not see the Defence Budget as having an industrial sponsorship role or a responsibility for technologies unrelated to defence needs; such concerns would lead to muddled roles and inefficiency. This contrasts with European and US attitudes to defence R&D, which emphasise maximising civil spin-off. For instance, Yudken & Black (1990), cite the objectives of the US Defence Advanced Research Projects Agency (DARPA) as being in 1987 to develop technologies "that will help the US maintain qualitative superiority in defense systems and to retain its competitive position among the industrialized nations". Subsequently, such concerns with US competitive position by DARPA were attacked by free-market activists in the US and its activities in this respect were restricted.

The US and UK evidence suggests that the Conservative Government may be right. Defence R&D projects are a bad way target important civil technologies, and trying to meet multiple conflicting military and civil goals also produces ineffective weapons. The organisation, Defence Technology Enterprises, set up to spin-off defence research to the civil sector has also been relatively unsuccessful. The general issue of the balancing of military and industrial objectives in defence policy is examined in the next section.

Policy.

This section will examine the objectives and instruments of policy in defence procurement and then consider how the policy has been implemented. MODs have many objectives, but here we will focus on two. The first is to obtain the equipment required by the armed services at the best value for money. Value for money is not merely a matter of lowest procurement price but will reflect performance and reliability, life-cycle costs, security of supply and a range of other factors. A second possible objective is to obtain the maximum benefit for the wider economy from the spin-offs from the defence budget. It is the trade-off between these two objectives, value for money and economic spin-off that is often presented as the central policy issue.

Whether MODs take account of industrial repercussions or not, defence budgets are sufficiently large that they do have an impact on the wider economy. Whether, on balance, this impact has been beneficial or harmful is a matter of considerable dispute. Many have argued that industrial effects should be taken account of in procurement decisions. For the US, Gansler (1987 p45) argues "The government, as the only buyer of U.S. military equipment, has the responsibility to take the necessary steps to bring about these industrial changes." (Emphasis in original). For the UK, Taylor and Hayward (1989 pxiii) argue "for a more structured approach to procurement" .. "which, while stressing the importance of efficiency, is aware of the dangers of unrestricted competition" and which does not endanger British firms "by a seemingly heedless regard for a narrowly defined concept of 'value for money'". Geroski (1990) discusses the more general role of procurement in industrial policy.

Given either of the primary objectives, obtaining a particular industrial structure may be an appropriate intermediate objective. Government policy up to 1979 took responsibility for the structure of the defence industry and tended to encourage concentration, since monopoly may lead to reduced costs if there are economies of scale and large firms may be better equipped to compete on a world scale. Since then policy has tended to encourage competition, in order to create incentives for firms to become "leaner and fitter" and to cut costs and prices. Whether it is better to encourage concentration or competition depends on

the particular values of the returns to scale and incentive parameters. Which policy provides better value equipment and more economic spin-offs is an empirical question of some dispute.

To meet its objectives, the MOD has a large number of potential instruments. In the mid 1980s, its expenditure amounted to about 5% of GDP and it accounted for about half of public financed R&D. During the 1950s and 1960s it used contracts to force the many small airframe and aeroengine firms to merge into larger groups culminating in their concentration into British Aerospace and Rolls Royce. Nationalisation and Privatisation of arms producers has had a major impact on the structure of the industry. State production has a long history in defence. The Royal Powder Mills at Waltham Abbey, the precursors of the Royal Ordnance Factories, date back to 1560 and by 1979 UK arms production was dominated by state-owned enterprises. Of the five largest defence contractors in 1979, only one, GEC, was privately owned. The other four were BAe, BS, ROF, and Rolls Royce. There were also two other smaller state owned defence contractors: British Leyland a car firm, and Short Brothers a Northern Ireland aircraft and missile producer. A decade later, all the nationalised arms industries had been privatised, the Royal Dockyards were operated by private contractors, and it is intended to convert the MOD research establishments to a more independent Defence Research Agency, run on more commercial lines. BAe and Rolls Royce were sold as independent firms; BS warship yards were sold off separately, one to GEC; ROFs tank factories sold to Vickers and the remainder of the Company to BAe who also bought Rover the successor to British Leyland. Shorts were sold to Bombardier of Canada. With the partial exception of warships, the firms were privatised in such a way that their domestic monopolies in the supply of particular systems were maintained.

The Government also has a range of regulatory powers. It investigates and approves mergers and, as in the GEC-Plessey cases, can take account of the implications for the structure of the defence industry. It promotes and controls arms exports and can restrict foreign ownership. The 15% limit on foreign shareholdings in BAe and Rolls Royce was increased to 29.5% in 1989 in response to pressure from the European Commission. The issue of foreign ownership also arose in the dispute over the purchase by United Technologies, a US company, of shares in the Westland helicopter company; a dispute which led to the resignation of two Cabinet Ministers.

Partly in response to a succession of notorious procurement failures, a new approach to defence procurement was adopted, emphasising competition and value for money. In recent years MOD has attempted to become more commercial in its purchases. This involves increased use of competitive tendering, the avoidance of cost-plus contracts, and tying payment to performance. The structure of the MOD Procurement Executive was also changed to make it a "more demanding, better informed" customer. MOD intends to adopt a more "hands-off" policy to its suppliers and to draw them from a much wider range of firms (SDE 1987 I Chapter V). The policy was announced in MOD (1983) but implementation was accelerated with the appointment of Peter Levene as Chief of Defence Procurement at the end of 1984. The efficiency savings claimed from this policy are described in Levene (1987) and SDE (1988 I, p37). The Government hoped that the incompatibility between budgetary constraints and military commitments which has bedeviled British Defence Policy and prompted recurrent Defence Reviews can be eased by such efficiency savings.

The policy produced a marked shift away from cost-plus contracts towards fixed-price contracts let after competitive tender. Competitive contracts rose from 30% of the total in 1979-80 to 46% in 1984-5, and 64% in 1985-6, before falling back to 53% in 1986-7 and 50% in 1987-8, though it is likely to rise to about 59% in 1988-9. This movements partly reflect a few large projects, such as Trident or EFA, for which competition at the prime contractor level is impossible. The percentage in the cost-plus category fell from 22% to 4%.

In the special circumstances of defence contracting, there is no theoretical reason to expect competition to improve outcomes, it depends on parameter values, and in the US there has been increasing scepticism about the value of competition. Because defence projects last a long time, it is still too early to provide an empirical evaluation of the full effects of the change in approach to UK procurement policy. The MOD claims that the increased incentives for efficient production have been reflected in: increased investment by arms contractors; estimated savings, sometimes over 30%, on existing or estimated prices; better export performance; and a widening of the supplier base. There is also some evidence of changes in procedures within the MOD, which are making it rather more commercial in its outlook. The range of firms that bid for defence contracts has been increased, and the firms have been allowed more scope to specify how the performance targets can be met in a cost effective way.

The MOD has also been more willing to consider imports seriously.

One might expect the new competitive policy to have consequences for the pattern of supply: which firms get contracts. While it is possible that the same firms could continue to get the same proportion of contracts, but become more efficient as a result of the threat of competition; one might expect competition to open up the supplier base and change the number and distribution of firms in the market. Of course, there is no simple relationship between the number of firms and market structure. Quite large numbers of firms may collude as was the case in the international cartel running the export of explosives, while near competitive outcomes may result from a warring duopoly or an incumbent monopolist threatened by potential entrants. The dynamics of the process also matter. Removal of entry barriers may initially increase the number of competitors but also prompt an intense battle, from which only a few eventually survive; leaving the industry more concentrated than before. However, some quantitative calculations given in Smith (1990) suggest that concentration was reduced quite substantially.

This quantitative evidence of a shift in structure accords with the more qualitative evidence. Industry comment suggested that competitive tendering, fixed price contracts, the threat of imports, and the linking of payments to performance milestones were perceived as increasing the risk and reducing the expected return from defence contracting. This seemed to be accepted by the stockmarket where price-earnings ratios for defence contractors fell; though other factors were also involved including cut-backs in defence expenditure. The changing risk-return ratio provoked moves towards the restructuring of the industry, moves which took place prior to the major changes in the international strategic environment in 1989. Before examining the restructuring of industry the effects of the likely cuts in the defence budget will be examined.

The economic effects of reduced military expenditure.

The transformation of Eastern Europe in 1989 provoked in the UK, as elsewhere, a major reconsideration of strategic priorities. A review, labelled "Options for Change" was conducted and the results announced in mid 1990. The need for a review was reinforced by a

cash crisis within the Ministry of Defence and pressure from the Treasury for immediate cuts. Higher than expected inflation meant that £600 million had to be saved from the 1990–91 budget, irrespective of longer term trends. While making a range of changes – orders for 33 Tornado aircraft were cancelled, units withdrawn from Germany, and a number of older ships and submarines retired – the review was fairly cautious, cutting evenly and leaving the basic balance of British forces unchanged. This reflected the lack of any clear new vision of the role of the British armed services, now that the Soviet threat, their main justification, was reduced. The extent to which they should be redirected to new threats, in the Middle East or elsewhere outside the NATO area, remained undecided. The commitment to the new Trident nuclear submarines was re-asserted. Although, plans for a new tactical air-launched nuclear missile to replace the present free-fall bombs, new tanks for Germany, and the collaborative European Fighter Aircraft, were retained, all these large projects must now look very questionable.

While the Government was cautious and non-committal, outside analysts explored the consequences of much larger cuts in the defence budget and the distribution of a "Peace Dividend" as resources were transferred from military to civilian uses. For instance, Barker, Dunne and Smith (1990) investigated the economic effects of cuts which halved the real defence budget by the year 2000 transferring the savings to other forms of public expenditure. The exercise was conducted using the disaggregated Cambridge Econometrics model, which allowed the examination of the impact on individual industries.

Cuts of this size would involve, over a decade, would displace about 160,000 service personnel and 230,000 industrial workers in the arms industry, primarily in aerospace, electronics and shipbuilding. They would also improve the balance of payments by about £2 billion in reduced arms imports and the cost of forces in Germany, though this might be partly offset by reductions in arms exports. Although these numbers look large, they are small relative to the transformation of the British economy, which followed the massive contraction of the manufacturing sector in the early 1980s.

As with most other studies of the effects of reduced military expenditure compensated by appropriate demand management policies, it appears that the net effects of disarmament on the aggregate economy are rather small but on balance positive. The fear of the employment consequences of disarmament arises because the redundancies and job losses are relatively

concentrated and gain considerable publicity, whereas the greater number of new jobs created as a result of the alternative use of the money are relatively dispersed and do not attract attention. On balance as a result of transfers to the civil economy GDP would be 1.8% higher than otherwise by 2000 and unemployment 500,000 lower, arms manufacturing being less labour intensive than other sectors. The workers made redundant as a result of the contraction in the arms industry would have a very high probability of obtaining other jobs for a number of reasons. Firstly, they are relatively highly skilled and civil electronics and aerospace demand is likely to be relatively buoyant. Secondly, the mid 1990s is likely to be a period of relative labour shortage because of the large reduction in the number of young people coming into the labour market for demographic reasons. Thirdly, 60% of arms spending goes to the Southern part of England, which is an area of relatively low unemployment. Nonetheless, there will be some areas of considerable hardship, particularly in shipbuilding, where there is little alternative demand and where the yards tend to be concentrated in areas which are relatively depressed. The extreme example is the VSEL yard in Barrow, where there is virtually no alternative employment. Government sponsored community aid programmes, similar to those adopted for the towns hit by the closure of large steel works, like Corby and Consett, would be necessary in these areas.

There has been some discussion within the Labour party of the need for a Government sponsored Conversion plan to transform the arms producing factories into ones producing civil products. Most of the recent evidence from the UK and the US during the run-down after the Vietnam war indicates that such attempts at conversion are unsuccessful. The corporate culture, management style, and attitudes associated with defence production are very difficult to change and obstruct the development of competitive commercial products and production processes. At a corporate level success at diversification will depend on the flexibility of the companies, the extent to which they can adjust to a more commercial and competitive environment and the extent to which they can transfer their technological defence resources into socially useful and profitable products. There is little evidence that the defence companies, which have grown accustomed to large protected bureaucratically organised government projects have such flexibility and skills. The one exception is Racal, who was an early and successful diversifier. Once largely dependent on defence, in the mid 1980s it moved

into mobile tele-communications, making its defence interests a small part of the company which it has been trying unsuccessfully to divest. But Racal was an exception among defence companies, since less than 20% of its business was with the MOD and most of its sales were in the more competitive export markets, where it maintained its commercial skills. The extent to which the companies can adjust will depend on the industrial environment, to which we now turn.

Restructuring the Industry.

Compared with other industries the structure of the international defence industry was rather fixed until recently, reflecting a stable equilibrium between the interests of the domestic incumbents and their national governments. Changes in technology and markets, particularly constraints on defence budgets, together with the more competitive policy in the UK, have put those traditional arrangements under strain. The reduction in concentration, the sharp increase in competition and the changing risk-return ratio provoked corporate restructuring: acquisitions, divestments and joint ventures, designed to re-establish dominant market positions and internationalise production; making monopoly a dialectic product of competition. This section discusses the consequent turbulence in the European defence market, the developing trend towards internationalisation and the possible policy response.

1988-9 saw major changes in structure and corporate strategy in the European Defence Industries. The successful GEC-Siemens bid for Plessey, the Daimler-Benz acquisition of MBB, the merging of Aerospatiale's avionics interests into Thomson CSF, were among the most notable of a range of acquisitions and divestments, national and international, which have tended to increase concentration. In electronics, Racal, Philips and Thorn-EMI have all taken steps to divest their defence subsidiaries, though Racal and Thorn-EMI could not find buyers. Ferranti had to sell a large part of its defence interests to GEC after it incurred an \$185 million loss as a result of suspected fraud by a recently acquired US subsidiary.

Given the speed of change any discussion of evolution can only be speculative and is likely to be rapidly dated, but there is a perception that the market will soon be divided into a core made up of a few large players and a periphery of specialist niche producers. Corporate

planners are asking what will the European Industry look like in 2000, and how many companies will be operating in it. Their answers may well shape the collaborative and competitive options available to MODs. Conversely, the answers the corporate planners obtain will depend on a forecast of the response of national regulatory authorities and MODs to foreign ownership, a new international division of labour, and other commercial developments.

The preference for domestic weapons produced a European structure apparently dominated by national champions, but below this super-structure was a proliferation of international corporate links. These include extensive subcontracting, offset purchases, cross-holdings of shares (GEC and Daimler in Matra), research cooperation, joint ventures and the like, often including US as well as European companies. Many joint ventures in defence production arose from collaboration. A group of governments would agree the specification of a system to be produced jointly and the work would be shared politically between each of their producers. Collaboration thus creates links between firms. These may be productive enough to promote closer union, or unpleasant enough to inhibit further contact, as has happened in some Franco-British projects. Since, commercial joint ventures tend to have a very high failure rate, politically driven collaboration may provide the glue that holds them together. Collaboration may allow fragmentation to persist, since political nomination of domestic producers and non-competitive work-share, may keep certain firms independently viable, whereas in a more commercial market they would be vulnerable to acquisition by foreign majors. The complexities of collaboration may inhibit acquisition by making it more complicated. A may find it difficult to acquire or value B, when a large part of B's work is with a competitor of A.

In the past the creation of true Multinationals, which are typical of other industries, was obstructed by national governments and collaboration and the other types of joint venture acted as a substitute form of internationalisation. Whether they can continue to act as a substitute is unclear. The national champions are quite small relative to American competitors. Whether this matters is not clear since there is conflicting evidence on the relationship between firm size and success in this area. More importantly, national procurement does not provide production runs long enough to reap economies of scale or spread the large fixed R&D costs, and this problem will get worse with lower defence budgets. Thus

the economics force an internationalist policy on governments, whatever their nationalist preferences.

Collaborative procurement, which has been the characteristic international solution, does lengthen the production run and allows sharing of R&D. But their politically negotiated bureaucratically operated form generates inefficiencies which impose a substantial cost penalty. Were true European defence Multinationals to develop, it could reduce a lot of the administrative costs of collaboration, since they could organise the production on commercial grounds avoiding the politically acrimonious worksharing disputes. The collaborating governments would then need "only" to agree specifications and hold the competition.

European defence multinationals could be national companies with subsidiaries in other European countries; true Transnationals of the Shell and Unilever type; consortia for specific products of the Airbus and Panavia type; or ad hoc strategic groups in which an alliance of majors was linked to a collection of specialist subcontractors. Since, the circumstances, in particular the interaction with the civil markets, differ so much in the various sectors – aerospace, electronics, shipbuilding, armoured vehicles, software, etc – it is unlikely that a single type of structure will predominate.

European defence multinationals could only develop if governments are willing to surrender an independent national capability in areas where it costs too much, and develop an international division of labour. Capacity has already been surrendered in the UK in the case of the Nimrod, and the reciprocal purchasing agreements recently established with the French are a step in the direction of international specialisation. In general the UK position is fairly positive: "the Siemens involvement in the United Kingdom could be seen as relevant in the context of a move towards a more open European market in defence equipment which was consistent with MOD policy", MMC(1989 p43). However, progress is likely to depend on reciprocity between the allies. This is something that the Independent European Program Group has been trying to negotiate (IEPG 1987), and an "Action Plan" was approved in 1988. While progress is slow, there is some evidence that the UK is beginning to export the belief in a more commercial approach to its allies.

1992 and the completion of the European market may also influence the process. The UK MOD comment: "Although Community competence in matters relating to military

equipment is circumscribed by Article 223 of the Treaty of Rome, most of our suppliers also operate in the civil market and will therefore wish to structure themselves for the changed environment" (SDE I, 1989 p32). However, under Article 30 of the Single European Act the Community has the responsibility to maintain the technological and industrial conditions necessary for security, which provides an entry for Commission involvement. US firms have expressed fears that 1992 and IEPG proposals might result in the extension of the EC Common External Tarriff to weapons, but this seems unlikely.

Hartley (1987) and Walker & Gummett (1989) discuss the evolution of a European market for weapons in more detail. The latter emphasise "that various factors are tending to place greater market power in the hands of the large European defence contractors – which are acting increasingly in concert with each other – without any assurance that economies of scale or other economic benefits will result". They also point out the danger that the creation of European monopolies will reduce choice and flexibility. However, the degree of competition between European producers is already rather small. Currently, the alternative to domestic production or collaboration for most European countries is usually to import from the US, rather than from another European country, and that possibility will remain. Whether the threat of import from the US carries political credibility is another matter.

The large defence contractors have great lobbying power. Market Access (1989) describes their efforts in a number of cases. Because of the special status of defence, their claims about employment consequences, technological spin-off, export prospects and national prestige have enabled them to win procurement contests against foreign competition. Although such arguments carried little weight in others industries and were not substantiated by experience they were politically effective in defence. The political influence and pressure of the producers was emphasised by the MOD in their evidence on the proposed GEC-Plessey merger, MMC (1986 p65). Although this political power has been reduced somewhat in the UK by competitive policies, it may still be sufficient to enable the defence contractors to reduce the threat of imports. It may also allow them to "capture" any European industrial policy and to direct it in their own interest.

Within Europe there are a number of possible objectives for policy. It should provide good value weapons, of a design acceptable to the military which can be standardised and

inter-operable through Europe. It should encourage the rationalisation of R&D and of production capability, which is in excess of that required by demand and strategic capacity. It should maintain competition. It should promote corporate structures that have the power to control costs, finances, and quality, and also the capacity to act entrepreneurially; characteristics lacking in the present European consortia. Given these multiple, conflicting, objectives, it is unlikely that a policy authority could specify the industrial structure required. But, even were such a structure feasible, it would also have to be implemented by a large number of countries interacting, perhaps through a central body like IEPG or the EC Commission, which is likely to suffer from the standard problems of international bureaucracies. The interaction problem might be helped if any proposed policy satisfied the criterion that were all the other countries to follow the same policy the outcome would be a desirable structure. Each country promoting their national champion does not satisfy that criterion, while competitive value for money procurement within an open European market might. However, a value for money policy faces problems of political feasibility, equity, and vulnerability to cheating.

Thus the basic question – should MODs be patrons using their considerable powers to implement an industrial policy or consumers buying on the basis of value for money – recurs, but at a European rather than a UK level. The arguments for some industrial policy are clear. There are externalities if technological spin-offs from defence are important; monopoly is prevalent therefore regulation is required; the MOD as an informed customer can take a longer term view than myopic market forces. The arguments for any particular industrial policy are less clear because, as this paper has emphasised, we lack hard evidence on crucial parameters.

The alternative is to try to establish "value for money" procurement at a European level, making fixed price contracts and competitive tendering within an open European market the norm and using the threat of US imports to offset monopoly power where necessary. The "value for money" policy faces many difficulties, but compared to a European industrial policy it is transparent and robust. Transparency makes it easier to specify the objectives and negotiate the procedures. Robustness makes it less sensitive to uncertainty about crucial parameters such as civil-military synergies and less prone to capture by the military industrial complex. The fear that an industrial strategy would be captured and that a Common

Armaments Policy would add a tank mountain to the butter mountain of the Common Agricultural Policy seems particularly compelling in the case of defence.

Conclusion: Production and Strategy.

Within the traditional defence policy of the larger states, arms production and strategy were closely linked. The state ensured that it had a domestic defence industrial base which could provide the equipment required to meet its strategic needs and the need to maintain the health and technology of influential weapons producers influenced the structure of its armed forces and on occasion its foreign policy. The emphasis on value for money and reliance on market forces means that in the UK under the present government that link is much less tight. The UK MOD's list of technologies for which it is essential to maintain a domestic technological base is very short and exclusively military, items for which it cannot rely on supply from its allies, such as nuclear weapons production and crypto-analysis. In principle, it is willing to import or allow foreign ownership over a much wider range than France, Germany or the US. In practice, lobbying reduces the effect of these principles somewhat, but they are still influential. Not only is acquisition and takeover by a foreign firm financially much easier in Britain than on the Continent, but it is politically easier. For instance, the MOD had no objection to Thomson acquiring Ferranti's defence interests, and GEC won primarily because it was willing to pay more. Mrs Thatcher may be fiercely nationalistic in political terms defending British sovereignty against European incursions, but her Government is internationalist in commercial terms.

Thus it is unlikely that British strategy will be driven by arms production in the near future. What it will be driven by is a more open question. Britain took a very long time coming to terms with the end to Empire, but eventually replaced its imperial strategy by one geared to its special relationship with the US and its contribution to NATO in Europe. Now that Britain is unimportant to the US and NATO is becoming increasingly redundant to Europe, Britain must find a new role. Given its reluctance to accept a role in Europe, the reconsideration may take a long time.

TABLE 1 Percentage Distribution of Defence Expenditure

By industry

	79-80	80-1	81-2	82-3	83-4	84-5	86-6	86-7	87-8
Oil	10	8	8	12	9	9	7	5	4
Ordnance	8	8	7	8	8	8	9	9	9
Electronics	21	23	23	22	25	23	24	24	24
Ships	8	8	9	7	6	7	8	9	8
Aerospace	28	29	32	30	29	31	29	31	27
Other									
Engineering	12	12	10	10	10	10	10	10	14
Other	13	11	10	11	12	11	12	13	14
TOTAL INDUSTRIAL EXPENDITURE									
£m	3986	5102	6180	6954	7096	8014	8128	7919	7933

Source: SDE.

TABLE 2 Characteristics of Defence Companies
in the mid 1980s

	Turnover £m	Percentage of sales			ROCE
		Export	Mil	MOD	
B Ae	3137	50	76	32	12
Chloride	310	NA	8	8	13
Dowty	520	NA	42	19	18
Ferranti	485	NA	64	48	26
GEC	5969	20	28	22	25
GKN	2200	NA	5	5	16
Hunting Industries	233	15	52	52	15
Lucas Aerospace	1397	20	12	3	10
Pilkington El Op	1214	9	9	4	10
Plessey	1461	11	41	26	24
Racal	1270	20	32	10	27
Rolls Royce	1600	32	56	37	9
Short Bros	200	NA	25	20	6
Smiths Aero & Def	389	NA	23	14	20
Thorn EMI	2735	NA	12	9	19
Vickers	600	NA	15	3	12
Westland	344	34	71	58	7

Note "exports" include civil and military: "Mil" includes sales to MOD and military exports;

"ROCE" is return on capital employed. NA Not Available.

Source: ACOST (1989 p55) and company accounting data.

References

- Aben, J., Smith, R. (1985) Défense et emploi au Royaume-Uni, in *L'effort économique de défense*, Arès, Défense et sécurité, n° Spécial
- ACOST (1989), *A National Resource*, Advisory Council of Science and Technology, HMSO. London.
- Barker, Dunne, Smith (1990), The peace dividend and the UK Economy, *Supplement to Industry and the British Economy to the Year 2000*. Cambridge Econometrics.
- Fontanel, J. (1984), *L'économie des armes*, La Découverte, Paris
- Fontanel, J., Smith, R. (1985) L'effort économique de défense, *Arès, Défense et sécurité*, n° Spécial.
- Fontanel, J., Smith, R. (1985), La comparaison des dépenses militaires de la France et du Royaume-Uni, in *L'effort économique de défense*, Arès, Défense et sécurité, n° Spécial
- Fontanel, J., Smith, R., Willett, S. (1985) Les industries d'armement de la France et du Royaume-Uni, in *L'effort économique de défense*, Arès, Défense et sécurité, n° Spécial
- Gansler, J. (1987), Needed a US Defence Industrial Strategy, *International Security*, 12.
- Gerovski, P.A. (1990), Procurement policy as a tool of industrial policy, *International Journal of Applied Economics*.
- Geroski, P.A. (1987), Public Procurement and competitiveness. *Journal of Common Market Studies*, XXV, March
- Gerovski, P.A., Hussain, F., Smith, R.P. (1987), UK Defence Industrial Base, *Political Quarterly*, 58(1).
- HDC (1988), Fifth report session 1987-8, *The procurement of major defence equipment*, HC431. London, HMSO
- IEPG (1987) *Towards a Stronger Europe*, Brussels.
- Kurth, J.R. (1973), Why we buy the weapons we do? *Foreign Policy*, 11.
- Levene, P. (1987), Competition and collaboration UK Defence procurement Policy, *RUSI Journal* 132 (2). June.
- Market Assess (1989), *The Politics of British Defence Procurement*, Market Access International, London.
- MMC (1986), The General Electric Company PLC and Plessey Company PLC, *Monopolies and Mergers Commission*, London, HMSO.
- MMC (1989) The General Electric Company, Siemens AG, Plessey company, *Monopolies and Mergers Commission*, London, HMSO.
- MOD (1983), Value for Money in Defence equipment procurement, *Defence Open*. Government Document 83/01, MOD, London.
- MOD (1987), *The Procurement Executive*, London, MOD
- NAO (1985), *Profit formula for Non-competitive Government Contracts*, HC 243. February 23
- NAO (1985), *Production costs of Defence Equipment in Non-Competitive Contracts*, HC 505 July.

Smith, R.P., Fontanel, J. (1987), Weapons Procurement, Domestic production versus imports in *New Conventional Weapons and Western Defence* (Bellamy & Huxley, eds.), Frank Cass, ; London.

Smith, R.P. (1990), Defence Procurement and Industrial Structures in the UK, *International Journal of Industrial Organization*. 8

Taylor, T., Hayward, K. (1989), Britain and the European Armament Market. *International Affairs*, 65.

Yudken, J.S., Black, M. (1990) Targeting National Needs: A New Direction for Science and Technology Policy, *World Policy Journal*.