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# European Defence Policy: Prospects and Challenges

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## ABSTRACT

European defence policy offers opportunities for spending more and better where better achieves more from existing resources. Increased defence spending needs to be justified by the threats to Europe which have to be identified and defined. Higher defence expenditure usually focuses on inputs rather than final outputs in the form of greater peace, protection, security and the safety of a nation's citizens. The task is to show the opportunities for applying economic analysis to the complexities of European defence policy and collaborative defence projects. Economic efficiency criteria identify the contribution of final outputs, substitution and competition to the formulation of European defence policy, but the final outcomes are likely to be determined by military-political factors rather than economic efficiency criteria. The paper provides a critique of European defence policy.

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## Introduction: The Policy Issues

European defence policy is a classic example of the potential to 'spend more and better'. The policy has attracted considerable public attention but only limited achievements. It has been strong on rhetoric but weak on real military and resource commitments. This article presents an economic analysis and critique of European defence policy. It identifies the policy problem, the economics of the problem, future prospects and challenges for achieving more and better spending. A starting point requires a brief history of European defence policy.

## A Brief History

European defence policy embraces policies towards the Armed Forces and Defence Industries. A starting point was the Brussels Treaty and the Western Union created in 1948 for mutual self-defence, which expanded into NATO in 1949. A suggestion for a unified European Army was made in 1950. There followed a proposal for a European Defence Community (EDC or the Treaty of Paris) signed in May 1952 by six nations comprising the Benelux countries, France, Italy and West Germany. The EDC would have entailed a pan-European military capability, common arms, centralised military procurement and military contributions from Member States, but it was never ratified. Initially, the EDC was viewed as the defence arm of a European Political Community (EPC), which was proposed as a combination of the existing European Coal and Steel Community and the proposed European Defence Community. The EPC proposal failed in 1954, when the EDC was not ratified by the French assembly which feared a loss of national sovereignty reflected in opposition from the Gaullists and Communist political parties (the Communists rejected its broad anti-communist and anti-Soviet logic).

**Table 1.** European defence effort, 2021.

Country	Defence Spending (\$mn, 2021 prices)	Defence Shares (%)	Number of Military Personnel (000s)	Personnel Shares (%)	Equipment Shares (%)
France	58729	2.01	208.0	42.5	27.8
Germany	64785	1.53	189.1	41.7	18.6
Italy	29763	1.41	174.2	60.5	28.9
UK	72765	2.29	156.2	32.7	24.3
U.S.A	811140	3.52	1,351.5	37.5	29.4
NATO Total	1,174,240	2.65	3,317.0	NA	NA

i) Defence share is defence expenditure as share of GDP.

ii) Personnel share is personnel share of total defence expenditure, including pensions.

iii) Equipment share is equipment share of total defence expenditure.

Source: NATO (2021).

Following the failure to create an EDC, the Western Union was developed into the Western European Union (WEU) in 1954. In 1992, the WEU adopted the Petersberg Tasks, which involved Member States committing military forces to humanitarian, rescue and peacekeeping tasks (crisis management). By 1999, the development of a European Common Security and Defence Policy (CSDP) resulted in the organisation and capabilities of the WEU, including the Petersberg Tasks, being transferred to the European Union (EU).

There were also commitments to European defence industrial policy reflected in plans for European arms co-operation and the creation of a single European armaments agency. This led to the formation of the Independent European Programme Group (IEPG created in 1976) which in 1992 was replaced by the Western European Armaments Group (WEAG which was a subsidiary of the WEU). WEAG was tasked with promoting arms co-operation mainly by creating a single European armaments agency. One component of defence industrial policy was European joint defence projects. Initially, these were aerospace programmes involving aircraft, helicopters and missile systems. The first major co-operation agreement between European nations was the Anglo-French treaty of November 1962 for the development of the Concorde supersonic airliner. Admittedly, Concorde was a civil aircraft but its project management arrangements resembled a defence programme and it was a benchmark for the early generation of European collaborative aircraft projects (see Table 1; Hartley and Belin 2020).

## The Policy Problem

Europe's defence problem remains unchanged. It is reflected in 'too much' duplication and fragmentation, 'insufficient' industrial collaboration, technology gaps with the U.S.A., a failure to exploit scale economies, a need to strengthen the EU Defence Single Market and improve the competitiveness of the European defence industry. There is also a lack of 'pooling' of resources, especially in defence R&D: Member States are often unable to afford to fund some defence projects where there are potential benefits of joint funding.

The problems are reflected in Europe and US differences leading to 154 types of weapons in the EU compared with 27 in the U.S.A. The costs of what is known as 'Non-Europe in defence' are estimated at some Euros26bn to Euros130bn (EDAP 2016). EU-wide competition and increased co-operation are two means to improve the efficiency and innovative capacity of the European Defence Technology and Industrial Base (EDTIB). The economic benefits of EU defence spending are claimed to be substantial: each Euro invested in defence generates a return of Euros 1.6 through skilled employment, research and technology and exports (EDAP 2016). European defence policy-makers have concluded that without substantial increases in military spending, the European defence industry risks lacking the technological ability to build the next generation of critical defence capabilities. Questions also arise as to whether private markets will invest in defence. Typically, defence investments are long term and costly as well as high risk as operational needs change over

**Table 2.** Europe's major arms firms, 2021.

Company	Rank in SIPRI Top 100	Arms Sales (\$US millions)	Arms Share of Total Sales (%)
Lockheed Martin	1	60340	90
BAE Systems (UK)	6	26020	97
Leonardo (Italy)	12	13870	83
Airbus (European)	15	10850	18
Thales (France)	16	9770	51
Dassault Aviation Group (France)	19	6250	73
Safran (France)	24	5050	28
Rolls-Royce (UK)	26	4970	33
MBDA (European)	27	4960	99
Naval Group (France)	29	4740	99
Rheinmetall (Germany)	31	4450	66
Saab (Sweden)	34	4090	90
Babcock International Group (UK)	43	3100	55
KNDS (European)	44	3030	95
Fincantieri (Italy)	46	2980	36
CEA (France)	47	2940	45
ThyssenKrupp (Germany)	55	2390	6
Serco (UK)	61	1870	29
Hensoldt (Germany)	69	1610	92
QinetiQ (UK)	72	1510	83
PGZ (Poland)	76	1430	90
Melrose Industries (UK)	87	1190	12
Kongsberg Group (Norway)	88	1170	37
Navantia (Spain)	91	1080	70
Ultra (UK)	98	920	79
Meggitt (UK)	100	850	42
<i>European Average</i>		<i>4844</i>	<i>70</i>
<i>US Average</i>		<i>11206</i>	<i>65</i>

i) Table shows major European arms producers based on SIPRI top 100 arms producers for 2021.

ii) Arms producers comprise firms producing arms and military service companies, including Russian and Chinese arms producers.

iii) European averages based on firms shown in Table comprising the top 25 European arms firms. Arms dependency is a median value.

iv) Lockheed Martin is world's number one and is included as a comparator.

v) US average based on Top 25 US firms in SIPRI Top 100 for 2021.

vi) KNDS is an association between Nexter and Krauss Maffei Wegmann finally agreed in 2021.

Source: SIPRI (2022).

time: hence, private defence firms will not invest in military technologies without a commitment from governments to buy such technologies.

## The European Defence Institutional Structure

European defence policy involves a variety of institutions. These include the Directorate General for Defence Industry and Space (DGDEFIS) which is a Department of the European Commission, where some of its tasks were transferred from the Directorate General for the Internal Market, Industry, Entrepreneurship and SMEs (small and medium enterprises). Also, there is the European Defence Agency (EDA) formed in 2004 with responsibility for developing an EDTIB. Prior to the creation of EDA, there was OCCAR which was created in 1996 to manage European collaborative defence equipment projects. OCCAR is the Organisation for Joint Armaments Co-operation. Its members are Belgium, France, Germany, Italy, Spain and the UK, and it manages collaborative projects such as the A400M airlifter, Boxer, Cobra and the Tiger helicopter.

The European Commission has special responsibility in creating a Single Market for the procurement of defence equipment (European defence equipment market: EDEM). This is being achieved through a series of defence procurement directives aimed at promoting greater competition by opening national defence markets to cross-border competition. There are, however, major

constraints on the creation of the EDEM in the form of exemptions from the Single Market rules allowing protection of a nation's essential security interests in relation to the purchase of military equipment (defined as arms, ammunition and war materials). These exemptions were reflected initially in Article 296 which was replaced by Article 346 in 2009.

## The European Defence Action Plan

Another defence policy initiative known as the European Defence Action Plan was agreed in late 2016 (EDAP). The Plan addresses Europe's major defence problems in the form of the lack of interoperability, technology gaps and the failure to achieve economies of scale and learning. It has three components, namely, a European Defence Fund, investments in defence industry supply chains and reinforcing the Single Market for defence.

The *European Defence Fund* has two components, comprising a research window and a capability window. The research window provides funds for collaborative defence research projects with plans to spend Euros 500 million per year post-2020. The research window aims to address the funding gap with the U.S.A. This is significant. Over the period 2006-2011, EU spending on defence R&T was some Euros 2 billion per year compared with a US spend of Euros 9 billion per annum with the EU spend being an aggregate total for all Member States. In addition, the capability window provides funds for the joint development of defence capabilities with eventual target spending of Euros 5 billion per year.

The EDAP also offers support for *defence industry supply chains* through providing access to finance for defence SMEs and support for the creation of regional clusters of excellence in the defence sector. Support is also available for supporting skills in the defence sector.

The third component of the Action Plan focuses on measures to strengthen the *Single Market for defence equipment*. These include competition and greater openness in EU defence markets which it is claimed '... should help suppliers to achieve economies of scale, optimum production capacity and lower unit production costs thus making European products more competitive on the global market' (EDAP 2016, 13–14).

## The Strategic Compass

The Action Plan was followed by the Strategic Compass which was agreed in March 2022 and covers all aspects of EU security and defence policy to 2030 (EU 2022). The Compass provides a collective EU threat assessment, including Russia's role in the Ukraine conflict. It commits to the development of an EU Rapid Deployment Capacity of 5,000 troops involving regular live exercises, with full operational capability to be achieved by 2025. There are also promises of more and better defence spending, including high-end naval platforms, future combat air systems and main battle tanks. Four clusters of work are identified comprising crisis management, resilience, capability developments and partnerships. Critical defence capability gaps for the EU were identified, including future combat air systems, Eurodrone, European naval vessels and main ground combat systems. Other gaps in EU defence capability include strategic airlift, space communications, amphibious capabilities, space, cyber and remotely piloted air systems. Some gaps offer a role for smaller EU nations providing military capabilities for the EU Rapid Deployment Capacity: for example, medical capabilities; cyber; force protection; training support; and the provision of military assets (e.g. small warships; patrol vessels).

Work on the Compass involved an original contribution identifying critical technologies where the EU is dependent on foreign nations for supply, especially China, Vietnam and Brazil. These critical technologies include some raw materials, pharmaceutical ingredients, lithium batteries, hydrogen, semiconductors, rare earths and magnesium, chemicals, solar panels, cyber security, cloud and edge IT software (EC 2022).

## An Evaluation

Overall, the European Defence Action Plan and the Strategic Compass contain lots of fine words and glossy documents with little operational significance. The Plan and the Compass are the latest in a long series of initiatives, all of which have failed to achieve real change in national behaviour and a willingness to sacrifice and pool national sovereignty. Both appear to be an improvement on previous policy initiatives. There are budgets for research capabilities and for collaborative production. But appearances are deceptive. Spending targets are voluntary with no penalties for failing to achieve targets. The collaborative research budget is small compared with the US equivalent and achieving the capability budget will be even more demanding. The source of these budgets needs to be identified: will they be new additional funds, who pays and how; or will they simply be a reallocation of existing military spending; and how has European defence funding been affected by the demands of the Covid pandemic and the Ukraine conflict? Interestingly, following the Covid pandemic, the European Defence Fund for 2021–2027 was cut from Euros 13 billion to Euros 8 billion which does not inspire confidence in the European commitment to defence spending.<sup>1</sup>

Before a European defence policy can be formulated, defence spending priorities have to be determined. Defence choices are the result of national preferences and views of the threat which will differ between European member states. Nations will also have incentives to free ride and shift costs to the larger nations. Final defence choices will reflect compromises and bargaining skills which will not necessarily be an assessment of the ‘true’ threats confronting Europe. Such behaviour and outcomes are unsurprising in the bargaining environment of a political club which is more appropriately analysed using public choice models rather than textbook economic models of market efficiency. Efficient European defence solutions require a single European state such as a federation. Without a single European state, the inefficiency of the existing national state solutions will continue to be reflected in the costly duplication and fragmentation of military capabilities and defence industries. Problems arise since Europe is applying a model of a non-existent single European state to a large set of independent national European states. Trust also prevents EU specialisation of military roles. For example, military role specialisation requires that all nations turn up in a conflict and provide their special military capability to the collective defence effort.

## European Defence Spending

European defence spending is concentrated in a small number of nations comprising France, Germany, Italy and the UK where the UK ceased to be a member of the EU in January 2020. These four nations accounted for 80.5% of total European defence expenditure in 2020/21 (EDA 2020; NATO 2021). However, published European data on defence spending is misleading since it presents aggregates of all Member States when each independent state represents only a small proportion of the aggregated total. The EDA sets *voluntary* targets for European defence spending. These include an equipment spending target at 20% of total defence spending; a collaborative equipment target at 35% of total equipment spending; and a defence R&T target of 2% of total military expenditure (EDA 2020).

Table 1 shows national contributions to European defence efforts. Typically, a nation’s defence effort is measured by standard performance indicators such as total defence spending, defence shares of national output, numbers of military personnel, and the shares of personnel and equipment in total defence spending. However, such indicators are really measures of *inputs* and not *final outputs* in terms of the contribution of defence spending to peace, protection and the security of the nation’s citizens. Even so, a focus on peace and protection fails to provide a money value of defence output. For example, what is the value of a national nuclear deterrent force; or of national rapid reaction forces; or of reserve forces? Traditionally, the solution to measuring defence output was to assume that *inputs* equalled *outputs* which is a far from satisfactory solution. More recently, nations have focussed on their defence capabilities, such as the ability to fight a war in, say, the Middle East

for 3 months; but whilst capabilities are an improved measure, they do not solve the valuation problem.

NATO also has defence targets. Its meetings in 2006 and 2014 agreed a 2% target for defence shares and a 20% target for equipment shares. Amongst the top four European nations in 2021, two failed to achieve their 2% defence share target (Germany and Italy) and Germany failed to achieve its equipment share target (see Table 1). Again, figures of defence effort are inputs. Data on defence shares do not reveal the allocation of resources between different defence activities (e.g. army, navy and air force); numbers of military personnel and their shares do not reflect different levels of training; and equipment shares do not reflect the age (technology) of the capital stock. This identifies a major problem with proposals for increasing defence expenditure (spend more), namely, the threats to Europe. What are the threats which justify spending more on defence: are these threats from other European states (e.g. Russia and Ukraine); or, are they terrorist-related and in which locations (e.g. Europe or Middle East); and what is the form of the threat? (e.g. cyber; chemical-biological?). Identifying the threat will allow a more efficient allocation of the increased defence resources as suggested by the Strategic Compass.

The task of measuring defence output remains. Within health services, efforts have been made to measure health output by using Quality Adjusted Life Years or QALYs which are used in policy formulation in parts of the UK health service. The defence equivalent would be Protection Adjusted Life Years or PALYs. If the experience of developing QALYs for health is any indicator, attempting to construct and apply PALYs to defence will involve a substantial theoretical and empirical research input. Developing PALYs will be costly and time-consuming (e.g. in resources needed to develop any PALY index).

From an Armed Forces perspective, proposals to spend more on defence are more attractive than spending 'better.' More spending is less likely to question the *status quo* which would provide more funding for all existing defence capabilities: more avoids questions of better. To understand the distinction, consider the application of three economic principles to European defence spending. These principles relate to final outputs, substitution and competition.

A focus on *final outputs* in defence spending shifts policy debates away from the traditional focus on *inputs* in the form of numbers of military personnel, numbers of infantry and armoured regiments, numbers of warships and numbers of different types of aircraft squadrons. Instead, the focus on final outputs requires policy-makers to justify the contribution of inputs to final outputs in the form of peace, protection, prevention of conflict, the safety and security of citizens. These are difficult to value, but they show the direction of the analysis. For example, the 2022/23 Russian-Ukraine conflict identifies the costs which need to be addressed. Some costs of the conflict are readily identified such as the loss of life and injuries to military and civilian personnel (e.g. the valuation of life), the loss of military equipment, the destruction of civil infrastructure, property and accommodation. Other costs of the conflict such as the loss of freedoms for the Ukraine people are difficult to value, including their 'forced' migration, loss of personal liberties, threats to life from bombing, starvation and massive changes in their future prospects.

The economic principle of substitution contributes to achieving better outcomes in defence spending. Better requires that the same output be achieved at lower resource costs or the choice of a better output could be larger or smaller where marginal costs are equated to marginal benefits (allocative efficiency). The substitution principle identifies alternative methods of achieving protection and security. There are many examples. Nuclear forces are substitutes for conventional forces; reserve forces can replace regulars; women can replace men; helicopters can replace tanks; and drones can replace manned aircraft in various missions. Some substitutes might be imperfect rather than perfect substitutes. Substitution might also have major implications for the traditional monopoly property rights of the Armed Forces. For instance, the Army's long-range artillery might replace the Air Force with its close air support operations and Air Force long-range maritime patrol aircraft might replace Naval frigates in anti-submarine roles.



The economic principle of competition can also contribute to achieving better outcomes. Competition in the form of rivalry and contestability promotes efficiency. Defence offers massive opportunities for introducing competition into protected defence markets, where activities are often undertaken by monopoly 'in-house' units in the form of the Armed Forces. For example, there are lots of defence activities undertaken by the Armed Forces which could be subject to competitive tendering by private contractors. Possibilities include the training of military personnel and contractors providing transport, catering, cleaning, laundry and policing services together with contractors providing air transport and air tanker operations. Elsewhere, private contractors could undertake the repair and maintenance of military equipment. More radical options include promoting competition between the Armed Forces: for example, the Army with its land-based cruise missiles competing with the Air Force for long-range strike roles, or the Army with its surface-to-air missiles competing with the Air Force for air defence. The application of competition in defence allows an assessment of the limits of military outsourcing. Ultimately, the limit to military outsourcing might be front-line combat functions, simply because such functions involve complex contracts which are costly to negotiate. Consider the example of the Korean War in 1950: a contract might be awarded for the supply of military combat services to South Korea but what happens to the contract when China enters the conflict? The original contract would have to be renegotiated with possibilities that the original contractor might refuse to bid and withdraw from the contract. Transaction costs determine the limits of military outsourcing.

The three economic principles of final outputs, substitution and competition need to be applied to European defence policy (as well as any other nation's defence policy). Inevitably, there will be opposition from the groups likely to lose from applying such principles. More importantly, there is a lack of any measure of the value of defence output which remains an obstacle to applying such economic principles to European or any other nation's defence policy.

## European Defence Industries

Europe's defence firms are criticised for being 'too small' and unable to achieve the scale and learning economies available to their US rivals. The result is fragmentation and duplication of European research, development and production resources.

Comparing the top 25 arms firms in Europe and the U.S.A shows that the major European arms firms are considerably smaller than their US rivals (see [Table 2](#)). Within the top 25 averages, US firms are over twice the size of their EU rivals with a lower share of arms sales in their total sales. However, collaborative European defence projects, mostly in aerospace, enable European firms to achieve scale and learning economies to be more competitive with their US rivals.

## European Collaborative Projects

Europe has considerable experience of completing collaborative or joint projects, mostly in military and civil aerospace, comprising aircraft, helicopters, missiles and space systems. Examples include combat aircraft such as the Eurofighter Typhoon, helicopters such as the Tiger attack helicopter, a range of European missiles produced by MBDA, civil aircraft produced by Airbus, civil helicopters and collaboration in space systems (European Space Agency or ESA embracing rocket launchers and satellites).

## Economic Theory

The theory of international collaboration is simple and appealing. Consider the simple case where two nations combine as equal partners agreeing to share equally the total costs of development and production for a combat aircraft. Each partner nation contributes half of development costs and combines their production orders. For example, if each nation requires 200 units of an aircraft, the



total production order will be 400 units, where the doubling of cumulative output might reduce unit production costs by some 10% compared with a national buy (reflecting scale and learning economies for collaboration).

Reality departs from the simple case. Actual European aerospace collaborations lead to inefficiencies and cost penalties in both development and production reflecting work sharing based on politics rather than economic efficiency criteria. Each partner nation will demand its 'fair' share of the high technology work in development and a share of production work (*juste retour*). On development, each partner nation will require a share of the high technology work in the airframe, engine and avionics which is not the most efficient way to build an aircraft. Partner nations will also demand a national flight testing centre as well as their requirement for a national (duplicate) final assembly line where duplication means a loss of scale and learning economies which would be available from a single production line. In addition to the extra costs from these inefficiencies, there are collaboration costs from the transaction costs of managing and organising the procurement and industrial arrangements for collaboration. The partner nations will require a role in procurement, and their national champions will insist on a role in the industrial management of the joint project. The result will be complex and duplicate arrangements reflected in an elaborate committee structure each with different operating rules (e.g. decisions by unanimity or majority voting with each decision requiring approval from the national governments). Examples of European collaborative projects are shown in Table 3. It can be seen that there is a variety of types of projects (fighter, strike, trainer, transport aircraft and helicopters) involving initially a small number of similar nations (two nations from France, Germany and the UK) with a later involvement of Italy. The numbers of partner nations rose from two initially to larger numbers for the Tornado, Typhoon and A400M airlifter.

Increasing numbers of partner nations raise the transaction costs of collaboration reflected in the costs of negotiating, agreeing, monitoring and policing complex international contracts. The 7-nation A400M involves larger numbers of nations but it is managed by the Airbus Group which

**Table 3.** European collaborative projects.

Project	Type	Start Date	Number of Nations	Total Output
Concorde	Supersonic airliner	1962	2: France/UK	20
Euromissile	Milan; Roland; HOT: Surface to air; anti-tank missiles	1962-64	2: France; West Germany	Milan: 360,000 Roland: 23000 HOT: 70350
Jaguar	Strike aircraft	1965	2: France; UK	543
Anglo-French Helicopter Package	3 types of helicopter	1967	2: France; UK	Gazelle: 1775 Lynx: 450+ Puma: 697
Alpha Jet	Trainer/Light attack aircraft	1969	2: France; WG	480
Tornado	Strike/air defence	1969	3: Germany; Italy; UK	990
Merlin	Helicopter	1981	2: UK; Italy	180+
Typhoon	Strike/air defence	1986	4: Germany; Italy; Spain; UK	571
NH90	Battlefield helicopter	1992	4: France; Germany; Italy; Netherlands	446
Boxer	Armoured vehicle	1993	2: Germany; Netherlands	1062+
Euro Torp	Torpedo	1993	2: France; Italy	NA
Horizon Frigate	Warship	2000	2: France; Italy	4
A400M Atlas	Military transport	2003	7: France; Germany; Spain; UK; Turkey; Belgium; Luxembourg	178
FCAS	Combat aircraft	2018	3: France; Germany; Spain	NA
Tempest	Combat aircraft	2020	4: UK; Italy; Sweden; Japan	NA

i) NA is not available.

ii) Output figures are approximations which can change over time (e.g. additional orders).

iii) FCAS is future combat air system.

as an international collaboration has been highly successful in developing a range of competitive civil jet airliners (Hartley and Braddon 2014). Whilst more partners add to costs, there are some offsetting benefits. Examples include the sharing of development costs and longer production runs leading to benefits from scale and learning economies. Ultimately, the optimal number of nations in an international collaboration requires an evaluation of the additional costs and benefits of extra partners (Hartley et al. 2018).

There is a further interesting feature of Table 3. It is dominated by military aerospace projects which raise questions about the relative absence of military land and sea projects with a few examples emerging from 1993: the Boxer armoured fighting vehicle, the European Torpedo and the Horizon frigate. Possible explanations for these features might be the costs of independence. Nations might regard the independent national development and production of military aerospace projects as 'too costly' leading to their international collaboration. In contrast, for many years, nations believed they could afford the national development of land and sea systems. Only in recent years has serious consideration been given to extending international collaboration from aerospace to other military projects. Part of this development has been industrial restructuring in the European defence industry.

Recently, European land systems firms have been involved in international mergers. The German firm Krauss-Maffei Wegmann (KMW) merged with the French company, Nexter in 2015 to create KMW/Nexter which plans to develop a new tank and artillery gun for the French and German armed forces. Similarly, the German firm Rheinmetall and the British BAE Systems agreed to a joint venture to work on the Challenger 2 life extension programme and the Mechanised Infantry Vehicle (MIV reflected in the Boxer project).

Similar European industrial restructuring has occurred in naval systems where two PESCO projects were announced in November 2019. The MUSAS project is planned to be a maritime unmanned anti-submarine system with France, Portugal, Spain and Sweden as participating nations. The second project is for a European Patrol Corvette planned to replace some 30+ ships in this class involving the Italian company Fincantieri and the French Naval Group (previously DCNS which was renamed in 2017). Both companies formed a joint venture known as NAVIRIS (October 2019) which is also associated with Navantia (Spain). Earlier, French-Italian naval collaboration occurred in the Horizon and FREMM projects. Horizon was an air defence ship which was originally a three nation project comprising France, Italy and the UK but the UK withdrew in 1999 leaving France and Italy to complete the project (4 ships). FREMM is a multi-purpose frigate for France and Italy (2005).

European collaborations often encounter a variety of problems which make their actual emergence a source of wonder and achievement. Consider the maze of problems. Partner nations have to be found which need a group of independent nation states to agree on their operational requirements for a project and its time-scale where differences are inevitable. Complexities are more likely with larger numbers of partners and the demands of different national champions. For example, the French aerospace company Dassault and British aero-engine firm Rolls-Royce will always demand design leadership on the aircraft and engine, respectively. Bargaining will produce some unexpected outcomes as the partners will be offered attractive work options (cf. bribes) for their involvement in the project. For example, firms lacking technology experience might be offered a share in high technology work with the partners bearing the entry costs. A recent assessment of European defence collaboration concluded that European member states remain unconvinced by European cooperation projects with member states favouring individual, non-EU off-the-shelf procurements over longer-term investments (EDA 2022). However, the EU commitment to more collaborative defence projects will involve SMEs especially from smaller nations (e.g. Belgium, Visegrad states) with greater numbers of partner nations increasing the transaction costs of collaboration.

## Prospects and Challenges

Prospects are promising, but challenges remain. The European Defence Action Plan offers a blueprint for future action but its promises need to be converted to real action with necessary European scale

funding and a European collective military response. All too often European defence plans fail to deliver on both their promises and funding. Three reasons explain these failures, namely, trust, free riding and nationalism. European defence policy needs a plan with appropriate funding for collective military action. Europe needs to exploit the potential economies for collective military action through specialisation by comparative advantage and pooling to acquire costly defence assets such as space communication systems, anti-ballistic missile defence and specialist military strategic transport aircraft. European collective military action requires trust between nations so that all partner nations will 'turn up' in a conflict. Also, nations in a military alliance have incentives to free ride, leaving other nations to pay more than their fair shares of collective defence spending. Furthermore, Europe remains a collection of sovereign nation states, each valuing its independence. European collective military action solutions need to address the independence issue. The EU will never achieve its economic potential in defence if it continues to ignore the absence of a European level political federation structure.

European defence policy comprises military forces and military capabilities as well as the European defence industrial base (EDTIB). For military forces, there are proposals for a European Army, but this concept remains an idea. European battlegroups exist and there are plans to create a small European command centre based in Brussels which might become a future European military headquarters. However, the vision of a European Army remains a vision. There are problems from different languages, tactics, funding, training, free riding and concerns about competition with NATO (e.g. duplication). There is also the more serious challenge of committing national armed forces to European conflicts with the likelihood of deaths and injuries of their personnel.

The problems of the EU defence industry are viewed as fragmentation, duplication, insufficient industrial collaboration, a need to strengthen the EU Defence Equipment Market (EDEM) and improve the competitiveness of the EU defence industry. Whilst the problems are clear, some of their solutions remain in conflict. Greater industrial collaboration and strengthening the EDEM might reduce industrial competitiveness whilst greater competitiveness involves choices between defence industries in different states (some are winners and others are losers). Nor can the challenge of long-run survival be ignored. Defence industries experience fluctuations in their workloads raising the challenge of maintaining design and production capacity during down-turns in their business. There are a range of possible solutions such as small-scale production orders and the purchase of technology demonstrators, but each involves funding and the question of who pays? All EU states might not be willing to fund collectively the retention of defence industrial capacity in a limited number of member states who receive direct economic benefits from the retention of their national defence industry.

The EU's future defence industrial base is likely to be determined by political factors. Public choice analysis predicts that agents in political markets will determine the structure, conduct, performance and ownership of the future EU defence industrial base. Groups will pursue their own interests with politicians acting as vote-maximisers, bureaucrats and the Armed Forces will act as budget-maximisers and producer groups as income-maximisers. These groups will introduce 'distortions' into efforts to achieve economically efficient outcomes. For example, efforts to create a competitive EDEM will be constrained by policies which allow nations to protect their essential security interests (Articles 296/346). Similarly, the current pursuit of two types of advanced combat aircraft by France and Germany and by the UK will be costly. An efficient solution requires that the three major partner nations collaborate to develop and produce one single type which will still be costly.<sup>2</sup> Assuming unit production costs of £100 million for current generations of Typhoon, a future replacement available in 20 years, say 2042, might have a unit production cost of some £1.5 billion (constant prices). Such unit production costs mean that procurement numbers will be considerably reduced, say 50–100 units for each of the major partner nations. Norman Augustine was a pioneer in forecasting rising unit costs of fighter aircraft (Augustine 1987).

Augustine forecasts a future of high technology weapons in the form of drones, stealth aircraft and unmanned systems resulting in inter-generational cost escalation reflected in rising unit costs

over time. Augustine presented an example of high performance fighter aircraft where costs per aircraft increased by a factor of four every 10 years. Similar trends applied to civil aircraft, helicopters, ships and tanks but with a lower growth rate of a factor of two every 10 years (Augustine 1987, 140). Inevitably, rising unit costs lead to smaller and decreasing quantities. By 2054, Augustine predicted that rising unit costs will lead to the purchase of just one aircraft (and by 2064, the purchase of just one advanced military helicopter: Augustine 1987, 143). Other commentators have suggested a future of a single ship navy, a single tank army and Starship Enterprise for the air force. Questions arise as to whether Augustine's forecast was a source of humour or was to be taken seriously. As serious propositions, recent evidence casts doubts on the validity of Augustine's original claims. Unit prices have not increased by a factor of four every 10 years, nor will unit costs overtake the defence budget but combat aircraft will become costlier and their volumes will continue to fall (Johnstone 2020). The focus on rising unit costs also neglects the *output* implications of new technology. Nor should trends be viewed as evidence of causation.<sup>3</sup>

Norman Augustine's Laws have major implications for the future of Europe's defence industries. The Laws focus on the features of new weapons in the form of high technology, high and rising unit costs (real terms) with small and declining quantities. Using the standard performance indicators, the results of Augustine's Laws will be smaller defence industries with declining employment, greater technology-intensity, fewer production plants and fewer opportunities for obtaining economies of learning. However, whilst employment numbers are expected to fall, labour will be more highly skilled and more R&D-intensive.

There remain opportunities for more efficient international collaboration. The criteria for selecting partners can be addressed. Currently, partner nations are based on those nations with a military requirement and an industrial capability but such criteria do not mean that partners should be restricted to European nations: firms in the rest of the world might be willing to join an international consortium of buyers. Once a consortium has been formed, development work can be allocated on the basis of comparative advantage and competitiveness rather than politics. Similarly, production work based on a single production line would allow full exploitation of scale and learning economies without the political need to create duplicate final assembly lines. Examples of international collaborations which have been successful include the Airbus Group and the F-35 jet fighter. But again, efficient collaboration will be constrained by the political requirements of each partner nation for the sharing of development and production work.

## Conclusions

Future European Defence Policy will have to adapt to Augustine cost impacts and other constraints in the form of limited defence budgets, new technology, demands for greater social welfare spending (e.g. health; community care; education; pensions for the elderly) and pressures for nationalism and independence. Augustine forecasts mean higher technology equipment, continuously rising unit costs and smaller volumes with limited defence budgets meaning that 'something' has to be sacrificed in the Armed Forces and national defence industries. For the Armed Forces, the sacrifice might mean the end of a manned bomber and fighter aircraft fleet or the end of a land armoured division or the end of a navy carrier fleet with similar sacrifices of such capabilities in the defence industrial base. If nations refuse to accept such sacrifices, they will have to bear the rising costs of independence. Alternatively, nations might choose to import costly defence equipment or accept that there are economic benefits from collective action.

The European Union provides an obvious base for collective defence action. Such action requires that the EU commits its national Armed Forces to combat with the acceptance of casualties in the form of deaths and injuries amongst its citizens. Collective action in defence offers economic benefits from specialisation based on comparative advantage. Within an economic union, member states will specialise in land, sea, air and space-intensive forces making commitments to provide forces in conflicts (i.e. to turn up and provide military forces for EU-determined conflicts). Such defence

collective action offers benefits from pooling and sharing costly defence assets. For example, developing the next-generation combat aircraft will be costly in both development and production so providing economic incentives for *efficient* international collaboration embracing France, Germany, Italy, Spain, Sweden and the UK (and other nations). Here, the challenge will be achieving economically efficient industrial collaboration, where all the pressures are for politically attractive work-sharing with each partner nation awarded its ‘fair’ share of development and production work. Work shares are politically attractive but economically inefficient, but they are a necessary price for collaboration. In the circumstances, collaborative work sharing is most appropriately analysed using public choice models of political markets.

## Notes

1. The Fund will allocate Euros 2.7 Bn to collaborative defence research and Euros 5.3 Bn to collaborative development projects.
2. The UK Tempest currently has three partners for the development of the aircraft comprising UK, Italy and Japan. The major partner companies will be BAE Systems, Leonardo and Mitsubishi HI with similar partnerships for aero-engines and avionics.
3. Consider a famous assertion. A trend is a trend; but the question is will it bend and alter its course through some unforeseen force and come to a premature end!

## Disclosure statement

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