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Arms and Autarky in Modern European History

CONVENTIONAL WISDOM TELLS US THAT military planners faced with a choice between self-sufficiency and free trade will choose self-sufficiency. The experience of Europe since the Renaissance, however, sets this piece of conventional wisdom on its head. Throughout the last four centuries, military planners have often supported freer trade in arms, in the hope thereby of securing greater quantities of superior weaponry either through their own increased production or by purchase abroad. The military has often had good reason to be suspicious of autarky since nearly every state faces the *autarky-efficiency dilemma*—the inescapable fact that greater autonomy can be bought only at the price of reduced efficiency in armament production. There have been times when the military supported a policy of autarky; but more often that support has come from the domestic economic interests involved in the development and production of armaments.¹

THE EARLY MERCANTILIST ERA

Early Arms Races

“War made the state, and the state made war,” observes Charles Tilly of early modern Europe. From about 1500 to 1700, as modern states emerged in Europe, their development was marked by mercantilist economic policies and an expanding capacity to organize military force that historian Michael Roberts has termed

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the “military revolution.” The invention of gunpowder and corresponding improvements in fortifications led to a ten-fold increase in the size of armies and the cost of war. The need to administer and finance the expansion of military power led monarchs to strengthen the bureaucratic and financial powers of the European states.²

European rulers attempted to extend the military revolution to arms production as well. They hired military engineers and opened state cannon foundries and shipbuilding establishments. Of greater importance, they encouraged private manufacturers, who were “the chief beneficiaries of the rise of standing armies.”³ Despite the convergence of military politics and mercantilist economics, however, self-sufficiency in armaments production proved to be an elusive goal, even for great powers. Even where rulers commanded adequate peacetime supplies, crisis mobilization often required surreptitious purchases from abroad. Moreover, in those areas where independence from the imports of weapons was achieved, the price was often a dangerous level of dependence upon imported raw materials and other components, as well as a need to export to potential enemies.⁴

From the Renaissance through the end of the eighteenth century, the four essential categories of armaments were warships, artillery, ammunition, and small arms. The efficacy of policies aimed at national self-sufficiency varied according to the type of weapon; but in no case were they entirely successful. Nations came closest to achieving self-sufficiency in the production of ships and gunpowder. Yet the production of such items often required crucial imports from other countries, sometimes from enemies. All the great powers depended on uncertain supplies of Baltic timber for shipbuilding. And saltpeter, an essential ingredient in gunpowder, was scarce everywhere and widely traded. Until the mid-eighteenth century, the Spanish provided iron to the English navy, and the English supplied lead to the French army.⁵

In the production of artillery, efforts to achieve import autarky were even less successful. Neither imperial Spain nor Portugal developed indigenous arms industries of significant size. Both depended on large imports of foreign ordnance, including many from private manufacturers in Flanders and England, their perennial Protestant adversaries. Beginning in the sixteenth century,

rulers sought the finest brass castings from private manufacturers in northern Italy, Flanders, Britain, and some of Germany's smaller principalities. Until destroyed by General Tilly in 1631, the largest gunmaking establishment in Europe was to be found at Suhl in Saxony, not in the territories of a great power. From there, cannon, pistols, and muskets were exported to France, Spain, and elsewhere. Saxony was soon supplanted by Sweden, which emerged in the mid-seventeenth century as the most self-sufficient of the great powers, having plentiful supplies of charcoal and high-quality iron and copper ores. By the 1650s, more than a thousand Swedish cannon annually were for sale in Amsterdam.⁶ After tolerating heavy dependence on foreign sources in the seventeenth century, Russia, under Peter the Great, briefly succeeded in establishing self-sufficiency in the production of sophisticated cannon only to see the quality decline by the nineteenth century.⁷

Whatever limited success states may have achieved in stimulating domestic cannon production, they were unable to block exports to potential adversaries. Beginning in the fifteenth century, the monarchs of Spain, France, and England repeatedly attempted to increase domestic supplies and to block the diffusion of technology by restricting arms exports, but it proved impossible "to organize an adequate national supply and at the same time ensure that none of it would spill over abroad."⁸ The fundamental problem was that productive capacity in major powers was often many times greater than domestic demand. In the seventeenth century, for example, England was a leader in the production of iron cannon. But orders from the English crown could barely sustain ten days of production a year, so English foundries sold most of their cast iron ordnance to domestic privateers or foreign governments. As a point of law, exports of such products required government approval; but if such approval was not forthcoming, the requirement was simply ignored. By the seventeenth century, the control of exports became so difficult that latecomers to the industry, including Holland and Sweden, did not even attempt it.⁹

The production and sale of small arms and ammunition remained almost entirely outside state control. Armies of the day were largely composed of mercenaries recruited by entrepreneurial captains, colonels, and princes, often from among defeated enemy troops. Recruit-

ers or recruits were responsible for supplying their own small arms and ammunition, which they procured wherever convenient.¹⁰ Producers outside the domains of strong monarchs remained the largest in Europe, successfully evading repeated attempts at subjugation. In the tiny bishopric of Liège:

Military occupations, of which there were several, had the immediate effect of disrupting gun manufacture. Hence, if rulers wished to avail themselves of the products of Liège gunmakers' skills—which rapidly became the best and the cheapest in Europe and the world—they had to withdraw their soldiers and let the market again come freely into play. . . . Their very weakness allowed the Liègeois to set their own prices.¹¹

As late as the mid-eighteenth century, the entire Kingdom of France produced twenty thousand muskets annually, while the artisans of Liège produced over *ten times* as many.

Mercantilism Revisited

The industrial policies of Jean-Baptiste Colbert, Louis XIV's chief minister in the 1670s and 1680s, illustrate the difficulties that governments experienced in early modern Europe and provide a telling example of the curious political coalitions that efforts at autarky called forth. Colbert, like other mercantilists of his day, believed that French power and prosperity depended on state policies of export promotion and import protection. To that end, he created state arsenals in the capital-intensive area of shipbuilding and favored large private enterprises for gunpowder, shot, tar, pistols, pikes, swords, cannon, and muskets. He procured examples of foreign goods, hired foreign technicians, and granted domestic firms royal monopolies and large orders.

Scholars commonly contend that a primary purpose of mercantilist policies, such as those of Colbert, was to create an economy self-sufficient in armaments—a *Kriegswirtschaft* or “war-economy.”¹² Colbert's mercantilism, however, did not have a primarily military objective. Like other mercantilists of his day, he viewed domestic production and trade surpluses as the ultimate source of national power. He attacked “war expenditure and war undertakings because they undermined . . . the real source of power—economic activity” and hoped to replace traditional wars with trade wars.

Hence the most influential opponents of Colbert's protectionist measures proved to be those responsible for military policy, their objections resting on the attendant decline in the efficiency of arms procurement. The Marquis Le Tellier Louvois, a military officer and Colbert's successor as chief minister, considered Colbert's schemes for self-sufficiency to be bad military policy because they increased the price and reduced the quality of French arms. Indeed, while some of Colbert's projects were successful, most were disappointments. Domestic goods were often of mediocre quality and foreign imports continued. Even in shipbuilding, where Colbert's policies were most successful, France continued to import both raw materials and finished ships. After Colbert's death, Louvois opted for more efficiency and less autarky.¹³

Colbert's mercantilism, then, was a strategy for shaping trade, not for preventing it.¹⁴ The leaders of the seventeenth century, unlike their nineteenth-century successors, pursued mercantilist policies primarily to accumulate a surplus of gold and silver bullion. As Colbert observed in his celebrated but often misunderstood paraphrase of Cicero, "trade is the source of finance and finance is the vital nerve of war." Finance assured adequate stockpiles of arms, paid for foreign mercenaries, and subsidized allies. Accordingly, Colbert rarely justified state aid to national armaments industries on the basis that they would assure a wartime supply of weapons or would permit France to develop more advanced weapons than its enemies. He treated arms industries more or less as he treated civilian industries. Indeed, under his rule, the expansion of civilian industry outstripped that of the military.¹⁵ A century later, during the Seven Years' War, the foundations of naval power would still be defined in Colbert's terms. "The sinews of war," observed one eighteenth-century commentator, "depend more on gold than on steel."¹⁶

Why Autarky Failed

The failure of autarkic policies in the early modern period was partly a reflection of the limited administrative capacity of the absolutist state. Governments proved unable to administer export controls or to enforce blockades.¹⁷ But there was a more fundamental reason as well: European governments had little reason to hope that by supporting their home industries and by withholding technology

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from others they could achieve military superiority over their prospective adversaries.

During the first few centuries of the modern period, governments were not in a position to significantly shape technological developments in support of their military establishments. Cases in which governments deliberately planned and achieved innovation were rare. The naval gunnery of 1860 and the warships that carried them “differed in no essential characteristic” from those of 1560.¹⁸ If the cannon cast in one foundry proved more brittle than the cannon cast in another, this was simply one of nature’s unexplained mysteries. Existing technologies diffused far faster than new ones appeared. Accordingly, where technological superiority was achieved, it generally could not be maintained.¹⁹

From a purely military perspective, moreover, there was little reason to support the development of new technologies. Although armies occasionally held a technological edge, the advantage was rarely decisive in wars among the great powers. “Victory,” notes one military historian, “turned on the most skillful use of largely unchanging weapons and tactical rules known to everyone.”²⁰ Eighteenth-century monarchs, like Frederick the Great, adhered to the traditional view that superiority of personnel, leadership, tactics, and finance determined military success. Although the British navy established military supremacy over those of France and Spain in the late seventeenth century, the vanquished navies were considered technologically superior to the victor.²¹

By the eighteenth century, however, certain harbingers of change began to appear. The professional soldier was supplanting the mercenary. By mid-century, official prizes were being given for specific scientific and technological innovations, a practice that heralded greater state involvement in shaping the direction of technological progress. In France, Jean Baptiste de Gribeauval imposed the standardization of arms and in the second half of the century “reversed the trend and built up an important armaments industry.”²² In Britain, more effective policies were developed to limit imports and to promote exports, to promote a merchant marine, and to offer direct support to military-related industries, including iron, copper, brass, gunpowder, masts, tar, and hemp. Blockades became more efficacious.²³ Where arms production was concerned, the true

“military revolution” occurred only in the late eighteenth century; but its success was to be brief.

MERCANTILISM AFTER WATERLOO

The New Mercantilism

One of the issues that distinguished the nineteenth-century mercantilism espoused by Alexander Hamilton, Friedrich List, and other “national economists” from the mercantilist doctrines of the seventeenth century was its emphasis on the importance of self-sufficiency in armaments.²⁴ Hamilton believed the United States should be “independent of foreign nations for military and other essential supplies” in order to be “least dependent on the combinations, right and wrong, of foreign policy” of other states.²⁵

The lessons drawn by Hamilton from the “extreme embarrassments” suffered by the United States, due to their “incapacity of supplying themselves” during the Revolutionary War, accorded with the lessons drawn by European powers from the embargoes imposed by the rival powers during the Napoleonic Wars.²⁶ Two decades of such warfare left European states with a strong urge to manufacture their own armaments, in some cases by creating a comprehensive system of state arsenals. Exports of arms remained relatively low until mid-century, as arsenals focused on domestic production. The trend toward large-scale capital-intensive industry also marked a decisive historical shift in favor of larger countries: the era in which a small country such as Sweden or the Netherlands could bid for great power status was over.

The Privatization of Arms Production

The system of state-regulated production and relatively low exports lasted barely three decades. By 1850 it was already breaking down under the pressures created by an acceleration in technological development. Liddell-Hart observes that “the forty years from 1830 to 1870 saw a greater change in the means of warfare, both on land and on sea, than during . . . all previous history.” For the first time in history, new weapons, such as breech-loading rifles, repeating handguns, iron ships, submarines, and steel artillery, became obsolete before they wore out. Expenditures on armaments procurement

became a much larger part of military budgets and secrecy became vital. Napoleon III, who wrote two treatises on artillery and established secret testing of new weapons systems, was not atypical of his age.²⁷

Much of the technological progress resulted from the extraordinary dynamism of private enterprise, which developed technology surpassing that produced by state arsenals. Beginning in the 1840s, state-owned industries began to adopt mass-production techniques and to employ proprietary civilian technologies, particularly in areas like metalworking, chemicals, transportation, and internal combustion engines. Even where state production continued, private firms increasingly acted as subcontractors, providing many of the parts for complete weapons systems.²⁸ Despite these efforts, public arsenals fell behind private firms. Younger military officers began to urge direct procurement from the private sector. Relatively poor and lacking the means to support sophisticated arsenal production, Prussia was among the first to privatize arms production, turning to Krupp in 1859. Within five years, Krupp was nearly the sole supplier of artillery to Prussia.²⁹ In Britain, firms like Armstrong and Whitworth supported the development of sophisticated armaments, relying almost entirely on export markets, while the Royal Arsenal at Wollwich, having redesigned its ships a number of times to match private competitors, fell further behind.

By the close of the nineteenth century, the freedom of private firms to trade internationally during peacetime had become firmly established. British law, for example, provided that limits could not be imposed on arms exports except in wartime. Alfred Krupp spoke for several generations of European arms manufacturers when he declared that "a strict interpretation of patriotism [is] injurious to business." True to his word, Krupp sold to both sides of the Franco-Prussian War. In the years up to 1912, Krupp exported over 50 percent of its production to buyers in fifty-two countries. On the eve of World War I, the firm filled Russian orders for the latest artillery pieces and French orders for specially designed anti-Zeppelin guns while soliciting British orders for warships. In the 1880s, Hiram Maxim sold the "Maxim gun," the first modern machine gun, to his adopted homeland of Britain and to its future enemies, the Boers of South Africa and the German Reich.³⁰

A liberal attitude also governed the exchange and sale of technology, which moved across borders essentially unchecked. The design-

ers of improved bullets and time fuses sold their technology to all buyers. When World War I began in 1914, every major naval power in the world—Great Britain, France, Italy, Japan, Germany, and the United States—utilized “Kruppized” steel, the world’s best, with the royalties being paid to Essen through an international trust. Property rights were honored, even among belligerents, with Krupp audaciously—but successfully—suing Vickers for royalties for wartime use of its patents.³¹

Governments tolerated such exports principally because of the imperatives of the autarky-efficiency dilemma. By expanding output, governments could bring down the costs of their own national requirements. High levels of production in peacetime also stimulated technological dynamism and laid the basis for adequate production capacity in wartime. In giving private producers their autonomy, however, European military establishments risked creating unregulated domestic monopolies, whose practices in the pricing of products and in the development of new technologies could damage the efficiency objectives of the military. To break the power of such monopolies, the armed services in Europe sometimes turned to foreign sources of supply—precipitating a major political row with the domestic interests involved. Efforts of the British admiralty in 1862 to acquire Krupp guns, for example, were blocked by Parliament in response to the complaints of Armstrong, Britain’s leading gun producer. On the German side, the Prussian admiralty, also eager to reduce the monopoly power of Krupp, immediately began to explore the possibility of purchasing from Armstrong. Only Krupp’s repeated interventions with Kaiser Wilhelm and Chancellor Bismarck blocked the military from considering the tenders of munitions manufactures in France and Great Britain.³²

The Military-Industrial Complex

Even before the outbreak of World War I, however, there were signs that the privileged position of large-scale armaments producers was being undermined. With growing hostility in the international system and with the acceleration of technological progress, the military importance of small technological advantages increased. The export markets of arms manufacturers shrank, as smaller countries demanded turnkey factories, thereby restricting opportunities to export.³³ After World War I, endemic overcapacity often further

increased the dependence of private firms on their home market. The period between the two great wars was one of high protectionism and diminished trade in Europe, including trade in armaments. World War I strengthened the resolve of statesmen to develop strong domestic industries with the "surge capacity" needed for a long war of attrition. Aircraft were supplanting artillery as the mainstay of modern armed forces, and small, relatively poor countries could produce aircraft simply by copying existing designs. Although dependent on foreign countries for the bulk of their procurement, Rumania, Yugoslavia, Poland, the Netherlands, and even Lithuania designed low-technology fighters during this period.

Yet exports of arms and military technology did not disappear. In the 1920s, France, a leading armaments producer, sold four hundred of its latest model tanks to Germany. The British government, short of funds and still convinced that free trade in armaments increased the wartime preparedness of its defense industries, allowed firms the freedom to trade. In 1934, British firms sold Hitler state-of-the-art airplane engines and sophisticated explosives. Purchases of military equipment in the 1930s permitted Japan and the Soviet Union to narrow the gap with the technological leaders. And France, Britain, and the United States enforced the comprehensive licensing of arms exports only with the rise of the Third Reich.³⁴

THE POSTWAR ECONOMY

The Legacy of World War II

In the aftermath of World War II, Britain and Sweden were the only remaining major European manufacturers of a full range of high-technology weapons. Attempts to reestablish and to promote indigenous arms industries proved far more difficult than in the 1930s, not simply because of the destruction wrought by the war but because of rapidly rising fixed costs of armaments production.

World War II had been a period of intense technological development in armaments production. The Manhattan project symbolized the new era of governmental research and development programs, employing large numbers of scientists to develop key technologies and design sophisticated weapons. Even more important than the existence of governmental facilities was the ability of firms to invest

immense amounts of capital. The fixed costs of new weapons, particularly of aircraft, had increased dramatically. Only with large markets in view could firms risk the resources required for the production of a new generation of weapons. The huge procurement budgets in the United States stimulated levels of technological innovation and industrial concentration that no single European state could match.³⁵ The decisive advantage of the United States did not lie in greater technological skills, an area in which it continued to lag behind Britain, but in the size of its domestic market and the level of its resources.

As part of the Cold War effort, the United States provided support to its principal allies: Britain received critical technology for its nuclear program; Germany participated in a number of high-technology cooperative programs; and the French aerospace industry received direct American aid totaling several billions of dollars. In the case of France, the US government launched the postwar rise of France's leading military aircraft company, Dassault, by buying the entire series of the company's first postwar model, 225 planes, and presenting them to the French air force.³⁶

From the moment in the 1950s when independent defense industries reemerged in France, Germany, and Britain to the present day, European defense industrial policies can be seen as responses to the overriding challenge of generating adequate economies of scale. With exponentially rising fixed costs, greater complexity of production technology, and the emergence of significant learning economies, the management of the autarky-efficiency dilemma became the preeminent concern of European governments. In the aerospace industry three solutions were tried: concentration, exports, and collaboration.

Concentration

The dilemma was particularly acute in the production of military aircraft. One response by European governments was to consolidate their existing aircraft producers into a smaller number of firms.³⁷ The importance of concentration can be seen by contrasting France and Britain. Due to prewar nationalizations, the French aircraft industry began the postwar period more concentrated than that of Britain, giving it a decisive advantage in world markets. While Britain began the postwar period with superior technology and an identical global market share to that of the United States, it was unable to emulate

France rapidly enough, largely due to the resistance of domestic producers to proposals for consolidation. In the 1950s Britain surrendered its export markets to the United States and by the early 1960s, disappeared as an independent producer of classical fighters. Belatedly, the number of British main contractors was reduced to five in 1960 and to one in 1970; but it was too late.³⁸ By 1990, the process of concentration in the aerospace industry had reached its theoretical limit in Britain and Germany, with the formation of British Aerospace and Deutsche Aerospace, while France was dividing civil and military production respectively between *Aérospatiale* and *Dassault*.

Exports

Although concentration was a necessary condition for industrial survival in the postwar period, it was not sufficient; national markets were simply too small to support aircraft production. This led European governments to revive the prewar policy of stimulating exports. Here again the French led the way. The French strategy was to create a unique market niche by producing mid-performance, low-cost fighters and offering them, no strings attached, wherever the United States was unwilling or unwelcome to serve as a source. In the 1960s and 1970s, when much of US production was being funneled to Vietnam, France began exporting between 60 percent and 90 percent of the output of its major aeronautic systems, mainly to the Third World.

Indeed, the basic strategy of the French government with regard to the maintenance of a defense industry was predicated on privileged access to Third World markets. But the French strategy of targeting these markets for the promotion of its exports was not without costs. France's leading producers were obliged to focus their attention on designing and marketing to suit Third World needs. As a result, not only was the delivery of weapons systems to the French military slowed at times by the need to fill export orders, but their design was unacceptable, being inadequate for battles on the European central front. Today, in a striking affirmation of the French military's discontent, the French navy proclaims its preference for the McDonnell Douglas F-18 over the new French *Rafale*.³⁹ The final irony of the French government's policy of promoting exports in the Third World has been its inability to capture the long-term loyalty of the

countries to which it has been directed. Such countries have been demanding production licenses and turnkey factories with insistence. And competitive offers from other sources have been on the increase, including offers of armaments produced by the collaboration of two or more countries. The French arms industry, it is widely agreed, is in crisis.

Collaboration

Cooperative armaments projects—"collaboration" or "codevelopment"—emerged in postwar Europe, especially in the aircraft field, as another means of addressing the autarky-efficiency dilemma. Through codevelopment, as in the multinational Concorde, Tornado, and Eurofighter projects, countries can amortize the enormous costs of development and the fixed capital required for high-technology weapons production. On the other hand, codevelopment projects require the participating countries to abandon some of the desired gains of autarky for an increase of efficiency.

The United States, with a lesser need for increasing the scale of production, has shied away from codevelopment programs in favor of "coproduction" programs, that is, programs in which foreigners license or buy the rights to produce American designs. But defense planners in European countries have not often had that option. Largely because of the proliferation of collaborative projects, no European nation remains self-sufficient in all weapons systems, and there has been a precipitous decline in the number of European nations self-sufficient in single classes of weapons. Even the French, while rhetorically asserting their independence, have participated in more collaborative projects than the United Kingdom. By the 1990s, 15 to 20 percent of French weapons were being codeveloped, as were all fighter aircraft being produced in Europe, except the French Rafale.⁴⁰

Today it is becoming evident that even widespread collaboration is insufficient in ensuring European nations a supply of sophisticated weapons at reasonable prices. Collaboration can be relatively complex and expensive to negotiate. While collaborative projects have defied their critics by producing large weapons systems like tanks and aircraft as efficiently as single-nation projects, the expense of collaboration appears impractical for thousands of smaller high-tech weapons.⁴¹ Moreover, some believe that the monopolies generated

by concentration and collaboration are increasing costs by stifling competition, a complaint voiced most loudly by the British government.

These concerns have generated growing support for further measures to increase efficiency at the expense of autarky. Britain and France recently created a program to promote up to \$200 million in annual bilateral trade of small defense purchases. In November 1988, the defense ministers of West European governments launched a plan for reinvigorating the Independent European Program Group (IEPG), a once moribund group created to increase coordination of West European procurement policies. The defense ministers proposed open bidding, public reporting of contracts, and more codevelopment projects. Their most innovative idea was to encourage the formation of competing multinational consortia in each weapons area, in the hope of combining the virtues of competition and collaboration.

These governmental initiatives have been accompanied by moves toward pan-European industrial rationalization and integration. In keeping with the spirit of Europe 1992, defense firms have moved to form multinational corporate alliances, tied together with exchanges of shareholdings.⁴² The trend has been particularly pronounced in sectors such as electronics, where "dual-use" technology means that military rationalization is tied to ongoing civilian rationalization. Although the efforts in this direction are still only incipient, the creation of truly pan-European firms would mark an epochal change, possibly leading to an industrial structure that would render autarky not only impossible to achieve, but impossible to define.

National Security and Domestic Interests

Yet, despite these changes, purely national systems continue to account for over 70 percent of the production of major weapons systems in Great Britain and France, and roughly 45 percent in Germany. Waste due to redundant defense industrial capacity in Europe remains high, being estimated at 27 percent of total European defense spending in 1987. There are numerous explanations for the persistence of such waste, usually stressing political, bureaucratic, ideological, or military factors. But the most plausible explanation is that national economic interest groups have succeeded in imposing major barriers to increased trade and collaboration in the European

armaments industry. Although it is sometimes difficult to distinguish military from economic motivations from the available evidence, a number of indications point in the direction of the latter.

First, the relatively low levels of collaboration among European nations are flatly inconsistent with the professed policies of the governments concerned. The UK government lists only three areas in which defense industrial autarky is indispensable, and none of these would be affected by the proposed collaborative projects that Britain appears to be resisting. Although France has not published a similar list of reserved areas, it hardly seems credible that defense planners would insist on a policy of autarky in fighter production as long as the AWACS command and control systems, without which the fighter planes cannot effectively operate, are American imports. Germany explicitly recognizes collaboration as an acceptable alternative for domestic production. The contradictions between stated policy and daily practice are consistent with the possibility that special interests are derailing government policy in individual cases.

A second hint that the pressures of economic interests may be the stumbling block in the procurement practices of European governments is that domestic sources dominate the supply of nonmilitary products far more than of military products with comparable technological requirements. According to my estimate, European governments have been procuring about 30 percent of their military products from foreign sources or sources in which foreigners collaborated. Yet such governments source only 3 percent of comparable civilian goods like telecommunications, transport, and power generating equipment from abroad.⁴³

A third clue concerning the role of economic interests is the seeming lack of coherence in national security terms in the choices of weapons systems in which European governments are prepared to collaborate. France has obstructed collaboration on fighter aircraft, yet has promoted it on main battle tanks, helicopters, conventional missiles, and nuclear weapons. Germany has resolutely resisted collaboration on battle tanks, but has favored it on aircraft and conventional missiles, including antitank weapons. Britain refused to collaborate in developing battle tanks, reluctantly participated in cooperative ventures in civil aircraft and helicopters, and was a strong collaborator in fighter aircraft and nuclear missiles. Governments tend to oppose collaboration in those areas in which domestic

firms have established a strong global export position, but welcome it in areas where they are weak.

Finally, the course of the negotiations over individual weapons systems points to the dominance of commercial interests. The projects discussed in the past two decades between France and Germany—including a main battle tank, a family of military helicopters, and a European fighter aircraft (the EFA)—provide instructive examples. Each of these weapons was an expensive, technologically significant system in which the potential for joint gains through collaboration was measured in hundreds of millions, sometimes billions, of dollars. In each case, the military and the political leadership initially reached compromises over the military specifications, only to see the negotiations stall over the industrial aspects of the collaboration, including the division of work shares, the design leadership, and the naming of subcontractors. The key factor contributing to success or failure in each case was the attitude of the most competitive firm—Dassault in airframes, Krauss-Maffei in tanks, Aérospatiale in helicopters.⁴⁴

On the basis of evidence such as this, it is plausible to conclude that state officials in Europe today, including the military, tend to support increased trade and cooperation, while the interests of arms producers and those who work for them remain the primary source of continuing pressures for protection.

CONCLUSIONS

The appeal that autarkic policies have had for both scholars and statesmen is too obvious to require much elaboration; in the *Realpolitik* school, the advantages that such policies purport to provide for governments have been taken for granted. The evidence presented here, however, belies the view that the major motivation for defense industrial autarky is the concern of military planners for national security. The European experience turns a simple set of propositions about the advantages of autarky into a much more complex phenomenon.

The added complexity begins with the fact that in the European experience, states that have striven for autarky have had a number of different goals in mind. At times, states have simply sought to free themselves from the need to import weapons, hoping to rely on

domestic weapons production alone.⁴⁵ At other times, countries have sought a second, more ambitious objective: to eliminate imports of crucial inputs used in the domestic production of weapons, including foreign raw materials, imported components, immigrant skilled labor, and crucial technologies. Finally, there has been a third autarkic objective, one commonly overlooked in a discussion of autarky. Some governments have tried to free themselves of the pressure—at times, the necessity—to export some of the output of their weapons producers. The pressure for such exports has often arisen out of the desire of defense planners to bring down costs and loosen budgetary restraints, but the consequence has sometimes been to place technology and weaponry in the hands of potential enemies.

When striving for any of these autarkic goals, European governments have usually been aware that they might have to pay a price for autarkic policies. Like any measures that limit international trade, autarkic policies in military procurement can deprive a national economy in the short run of the advantages that go with specializing in the production of a narrower range of products and in acquiring other needed armaments from abroad. This ineluctable fact creates among European states what I have termed the *autarky-efficiency dilemma*.

Governments have responded to the autarky-efficiency dilemma in different ways at different times. An explanation for these variations cannot easily be found by studying the differences in their political and military objectives. Instead, economic and technological factors, along with the political pressures applied by domestic producers of armaments, appear to provide the strongest clues.

Long-term technological changes have decisively altered the costs and benefits of autarky. For one thing, an acceleration in the rate of technological change has meant that European governments have had new opportunities for developing weaponry superior to that of their rivals; but to execute such plans, governments have felt the need to nurture and protect facilities in their jurisdictions capable of developing the new weaponry. Because innovations so generated have entailed high development costs, European governments have been under particularly heavy pressure to export some of their national output after they have satisfied their own needs. Rising costs also have meant that smaller, poorer countries have been in a weaker position to adopt autarkic policies than larger, richer ones, partly

because of the size of their internal markets and partly because of the level of their available resources.

Changes in economic and technological factors also help explain why European countries have gone through three distinct phases in their responses to the autarky-efficiency dilemma.

In the early years of the modern era, from the Renaissance to about 1815, self-sufficiency in defense production was not always sought and almost never achieved since too many of the critical skills or indispensable materials of warfare lay outside the borders of each of the sovereign powers in Europe.

Between 1815 to 1945, there were some new shifts in the balance of advantage between autarky and open markets. During the early part of this era, technological change in weapons design continued to be slow. At the same time, mass-production techniques were being widely adopted. Meanwhile, state bureaucracies were developing new capacities for planning and administration. In combination, these trends increased the feasibility and desirability of national arms industries. The result was a widespread move among European nations toward autarkic military production, a move supported as much by industry sources as by the military. Even in this period, it should be noted, imports of essential raw materials and components continued at very substantial levels.

By the middle of the nineteenth century, however, the very forces that had briefly made autarky seem attractive were already undermining the policy. The relentless pressure of rising research, development, and production costs began to make autarky unaffordable, and the levels of output generated by the new mass-production techniques made access to foreign markets increasingly important. By the late nineteenth century, imports of technology and exports of arms between enemies were once again on the increase.

After 1945, the trend toward the globalization of markets and technologies gained force. At the same time, fixed costs placed autarky far beyond the means of any single country in Europe. The United States has remained the only country in the Western world that can maintain a defense establishment on the basis of its domestic industry without incurring prohibitive costs or a drastic decline in quality. Military establishments in most European countries continue to lean strongly toward liberalization, while succumbing from time to

time to the pressures of arms manufacturers to protect their positions in domestic markets.

The European record may carry a lesson for the United States as well. US attitudes toward autarky in the procurement of military products have been shaped by attributes that could have described some European countries a century ago: its relative size, its technological and financial preeminence, and its capacity for political leadership. But these are perishable qualities. With the costs of armaments rising inexorably, Europe's present may yet be the future of the United States.

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ENDNOTES

¹State policy toward European defense industries await their first detailed scholarly treatments. An indispensable survey is found in William H. McNeill, *Pursuit of Power: Technology, Armed Force and Society since A.D. 1000* (Chicago: University of Chicago Press, 1982). Three particularly useful overviews are Carlo M. Cipolla, *Guns and Sails in the Early Phase of European Expansion 1400–1700* (London: Fontana, 1975); Michael Geyer, *Deutsche Rüstungspolitik 1890–1980* (Frankfurt: Suhrkamp Verlag, 1984); and Maurice Pearton, *The Knowledgeable State: Diplomacy, War and Technology since 1830* (London: Burnett Books, 1982).

²Michael Roberts, "The Military Revolution," in *Essays in Swedish History* (Minneapolis: University of Minnesota Press, 1967); Geoffrey Parker, "The Military Revolution 1550–1660—A Myth?" *Journal of Modern History* 46 (1976): 195–214; and Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500–1800* (Cambridge: Cambridge University Press, 1988).

³John Brewer, *The Sinews of Power: War, Money and the English State, 1688–1783* (New York: Alfred Knopf, 1989), xviii, 138. The best general sources on this period are Cipolla, and John Rigby Hale, *War and Society in Renaissance Europe, 1450–1620* (Baltimore: Johns Hopkins University Press, 1985), 46–51, 220–31.

- ⁴See G. N. Clark, *War and Society in the Seventeenth Century* (Cambridge: Cambridge University Press, 1958), 61; he reports that “none of the states could supply itself within its own borders.” See also Hale, 224–5.
- ⁵Fernand Braudel, *The Structures of Everyday Life: The Limits of the Possible* (New York: Harper and Row, 1981), 381; and Clark, 61–62. On Baltic timber, see Paul Bamford, *Forests and French Sea Power, 1660–1789* (Toronto: University of Toronto Press, 1956), 207.
- ⁶Swedish arms production was established and initially dominated by Dutch capital, although the Swedish monarchy eventually established self-sufficiency around 1620. Sweden also imported British and Dutch artillery until the early seventeenth century and Denmark even longer. But the dependence was subsequently reversed, with the Dutch, among others, purchasing Swedish ordnance. See Immanuel Wallerstein, *The Modern World System II: Mercantilism and the Consolidation of the European World-Economy, 1600–1750* (New York: Academic, 1980), 209–11; Hale, *War and Society*, 225; and Parker, *Military Revolution*, 24.
- ⁷On Russian policy, see Thomas Esper, “Military Self-Sufficiency and Weapons Technology in Muscovite Russia,” *Slavic Review* 28 (2) (June 1969): 197, 207–8; and Richard Hellie, “Warfare, Changing Military Technology, and the Evolution of Muscovite Society,” in John A. Lynn, ed., *Tools of War: Instruments, Ideas, and Institutions of Warfare, 1445–1971* (Urbana: University of Illinois Press, 1990), 90–97. For a contrasting view, see Gunther E. Rothenberg, *The Art of Warfare in the Age of Napoleon* (Bloomington: Indiana University Press, 1978), 202–4.
- ⁸Clark, 62. He is speaking of saltpeter, but the conclusion holds for most other military supplies as well.
- ⁹Cipolla, 24–50; Braudel, 395; Hale, 224–31; and Clark, 124–5.
- ¹⁰Geoffrey Parker, *The Thirty Years’ War* (London: Routledge, 1984), 198; Hale, 219–20; and Parker, *Military Revolution*, 51, 64–65. On the recruitment of mercenaries, Thomas Ertman and Janice Thompson directed me to the classic work of Fritz Redlich, *The German Military Enterpriser and His Work Force: A Study in European Economic and Social History*, 2 vols. (Wiesbaden: Franz Steiner Verlag, 1964), esp. vol. 1, 321–2.
- ¹¹The quotation and production statistics are from McNeill, *The Pursuit of Power*, 113. See also Hale, 223–4; Rothenberg, 122; and Lee Kennett, *The French Armies in the Seven Years’ War* (Durham, N.C.: Duke University Press, 1967), 115.
- ¹²Edwin Meade Earle, “Adam Smith, Alexander Hamilton, Friedrich List: The Economic Foundations of Military Power,” in Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* (Princeton: Princeton University Press, 1986), 217, 219, 233. See also Jacob Viner, “Power vs. Plenty as Objectives of Foreign Policy in the Seventeenth and Eighteenth Centuries,” *World Politics* 1 (October 1948): 10.
- ¹³Eli F. Heckscher, *Mercantilism*, 2d. ed., vol. 1 (London: George Allen and Unwin, 1955), 48, see also, 18–20. The views of Louvois were also consistent with his preference for defensive, land-based warfare. See Charles W. Cole, *French Mercantilism, 1683–1700* (New York: Columbia University Press, 1943), 107–8;

Charles W. Cole, *Colbert and a Century of French Mercantilism*, vol. 2 (New York: Columbia University Press, 1939), 333–49; McNeill, *The Pursuit of Power*, 63–116, esp. 89, 93, 98–99, 114; and Bamford, 206–11. On the general failure of Colbert's schemes, see Roger Mettams, *Power and Faction in Louis XIV's France* (New York: Blackwell, 1988), 189–92, 288–306.

- ¹⁴Robert Gilpin cuts to the heart of the issue, observing also that international trade increased faster than domestic trade throughout this period. See his "Economic Interdependence and National Security in Historical Perspective," in Klaus Knorr and Frank N. Trager, eds. *Economic Issues and National Security* (Lawrence, Kans.: Allen, 1977), 27–30.
- ¹⁵Cole, *Colbert*, vol. 1, 347–55; and John U. Nef, *War and Human Progress: An Essay on the Rise of Industrial Civilization* (Cambridge: Harvard University Press, 1950), 220–2. Eighteenth-century English writings on mercantilism display a "surprising lack of discussion on the role of manufacturing in the war effort." See David Hoogland Johns, *Eighteenth Century British Mercantilists and War: Their Viewpoint towards the Effect of War upon Trade and Navigation, Colonialization and Domestic Policy*, unpublished M. A. thesis, Committee on International Relations, University of Chicago, 1960, 71, 95.
- ¹⁶Cited in Johns, 78.
- ¹⁷Clark, 62–64; Hale, 227.
- ¹⁸Cipolla, 71.
- ¹⁹John Francis Guilmartin, *Gunpowder and Galleys: Changing Technology and Mediterranean Warfare at Sea in the Sixteenth Century* (Cambridge: Cambridge University Press, 1974), 158–75.
- ²⁰Robert Osgood, "The Expansion of Force," in Robert Osgood and Robert Tucker, *Force, Order and Statecraft* (Baltimore: Johns Hopkins University Press, 1967), 51.
- ²¹Michael Lewis, "Armed Forces and the Art of War," in J. T. Bury, ed., *The Zenith of European Power, 1830–70* (Cambridge: Cambridge University Press, 1960), 274; Dennis Showalter, "Weapons and Ideas in the Prussian Army from Frederick the Great to Moltke the Elder," in Lynn, 189, 198; and Michael Howard, *War in European History* (Oxford: Oxford University Press, 1976), 100. For exceptions, see William H. McNeill, "Men, Machines, and War," in Ronald Haycock and Keith Neilson, ed., *Men, Machines, and War* (Waterloo, Ont.: Wilfred Laurier University Press, 1988).
- ²²Cipolla, 71. See also Kolodziej, *Making and Marketing Arms: The French Experience and Its Implications for the International System* (Princeton: Princeton University Press, 1987), 9; Brewer, 29, 137, 167–8; and Heckscher, 193.
- ²³See Redlich, vol. 2, 21–22, 95n, 80–81; David Chandler, *The Art of Warfare in the Age of Marlborough* (New York: Hippocrene, 1976), 75–79, 149–51; Rothenberg, 25–28; Michael Howard, *War in European History*, 54–74; and McNeill, *The Pursuit of Power*, 157–166, 177–8, 271.
- ²⁴Earle conflates the two, imputing to mercantilism in general the ideas of Hamilton and List. See Earle, 217. See also Klaus Knorr, *The Power of Nations—The Political Economy of International Relations* (New York: Basic Books, 1975),

210. Heckscher contrasts the earlier "politics of provision" with the new mercantilist doctrine; see Heckscher, vol. 1, 98–101. For a more subtle treatment, see Gilpin, 27–30.

²⁵Cited in Earle, 233.

²⁶Ibid. On Europe, see Rothenberg, 120–4, 140–1, 180–1.

²⁷The quotation is from B. H. Liddell Hart, "Armed Forces and the Art of War: Armies," in *The Zenith of European Power, 1830–1870*, vol. 10 of the *New Cambridge Modern History* (Cambridge: Cambridge University Press, 1957–1979), 302. See also Bernard and Fawn Brodie, *From Crossbow to H-Bomb*, rev. ed. (Bloomington: Indiana University Press, 1973), 137–71; Bernard Brodie, *Sea Power in the Machine Age* (Princeton: Princeton University Press, 1941), esp. 118–19; McNeill, *Pursuit of Power*, 223–61; and Kolodziej, 9–18.

²⁸Robin Higham, "Complex Skills and Skeletons in the Military-Industrial Relationship in Great Britain," in Benjamin Franklin Cooling, ed., *War, Business, and World Military-Industrial Complexes* (Port Washington, N.Y.: Kennikat Press, 1981), 10; Mollin, *Auf dem Wege zur "Materialschlacht": Vorgeschichte und Funktionieren des Artillerie-Industrie-Komplexes im Deutschen Kaiserreich* (Pfafenweiler: Centaurus Verlag, 1986), 234ff; and Lewis, "Armed Forces and the Art of War: Navies," 288–94.

²⁹Peter Batty, *The House of Krupp* (London: Secker and Warburg, 1966), 46–47, 50, 71; and William Manchester, *The Guns of Krupp 1987–1968* (Boston: Little, Brown, 1968), 89–93, 176–7. For debates over the role of state armories in Prussian production, see Geyer, 34.

³⁰Batty, 76; Manchester, 98–100, 217–18, 275; Helms Engelbrecht and Frank Hanighen, *Merchants of Death: A Study of the International Armament Industry*, Reprint (New York: Garland, 1972), 47, 86–89, 103, 124–6, 133–4, 145, 151–3; and Basil Collier, *Arms and the Men: The Arms Trade and Governments* (London: Hamish Hamilton, 1980), 71–72.

³¹McNeill, *Pursuit of Power*, 231, 292; Clive Trebilcock, *The Vickers Brothers: Armaments and Enterprise 1854–1914* (London: Europa Publications Limited, 1977), 119, 133; Engelbrecht and Hanighen, 52–55, 81, 163–72; Manchester, 221, 224, 341; and Collier, 71–72.

³²Manchester, 170–4, 212–17; Dennis E. Showalter, *Railroads and Rifles, Soldiers, Technology, and the Unification of Germany* (Hamden, Conn.: Archon Books, 1975), 163, 188; Dennis E. Showalter, "Prussia, Technology and War: Artillery from 1815 to 1914," in Haycock and Neilson, eds., *Men, Machines and War*, 144; and Batty, 70. Wilhelm's flagrant favoritism led many to suspect that he was in the pay of Krupp.

³³Michael Howard, "The Armed Forces," in F. H. Hinsley, *Material Progress and World-Wide Progress, 1870–1898*, vol. 11 of *The New Cambridge Modern History* (Cambridge: Cambridge University Press, 1962), 206, 218; Dennis E. Showalter, "Prussia, Technology and War," 143; and Geyer, 57–60.

³⁴Control of arms exports had been on the books in Britain since 1660 and was strengthened in response to scandals in the 1920s and 1930s, but had never been backed by effective bureaucratic enforcement. See John Staley and Maurice

Pearson, *The International Trade in Arms* (New York: Praeger, 1972), 24–30. On the 1930s, see Robert Harkavy, *The Arms Trade and International Systems* (Cambridge: Ballinger, 1975), 93, 146–8, 169–72, 188, 197.

³⁵Keith Hayward, *The British Aircraft Industry* (Manchester: Manchester University Press, 1989), 128; and McNeill, *Pursuit of Power*, 355–60. On routes where they faced stiff competition, British airlines flew American civil aircraft.

³⁶French manufacturers also licensed British designs. See Kolodziej, 40–49; Harkavy, 53–54; and Collier, 273–4.

³⁷Hayward, 36, 40, 53, 56–61. In the mid-1950s, the break-even point for an airliner passed from fifty, a number that could be supported by a European domestic market to over one hundred.

³⁸Harkavy, 64. In 1964 and 1965, the new Labour government cut all existing British classic fighter programs, led by the TSR-2, leaving only the vertical-lift Harrier, later codeveloped with the United States.

³⁹Kolodziej, 102–6; and Andrew Moravcsik, “Armaments among Allies: Franco-German Armaments Collaboration, 1975–1985,” in Robert Putnam, Peter Evans, and Harold Jacobson, eds., *Diplomacy and Domestic Politics* (Berkeley: University of California Press, forthcoming).

⁴⁰Andrew Moravcsik, “The European Armaments Industry at the Crossroads,” *Survival* (January-February, 1990), 65–86.

⁴¹Collaborative projects have an unjust reputation for inefficiency. See Moravcsik, “The European Armaments Industry,” 73, 75, 83, from which the following section is drawn.

⁴²Examples include the Siemens-GEC takeover of Plessey, the creation of Eurocopter (a subsidiary of Messerschmidt-Bölkow-Blohm and Aérospatiale), and links between Thomson and British Aerospace.

⁴³See Moravcsik, “European Armaments Industry,” 66; and EC Commission, Directorate-General for Economic and Financial Affairs, “The Economics of 1992: An Assessment of the Potential Economic Effects of Completing the Internal Market of the European Community,” *European Economy* 35 (March 1988).

⁴⁴Moravcsik, “Franco-German Armaments Collaboration.”

⁴⁵Trevor Taylor and Keith Hayward, *The U.K. Defence Industrial Base: Developments and Future Policy Options* (London: Brassey's, 1989), 102–3.