

'US-EU STRATEGIC TRADE: THE CASE OF CIVIL AERONAUTICS'

A Paper Presented at the Fifth Biennial Conference of the European Community Studies Association, Seattle May 29 - June 1, 1997

PROF. PHILIP K. LAWRENCE
Director Aerospace Research Group
Faculty of Economic and Social Science
University of the West of England
Bristol, UK, tel 01179763868, Fax 01179763870, email, pk-lawrence@uwe.ac.uk

Draft only: please do not quote or reference without permission.

... unlike automobile manufacturing, which could be sustained by a middle-class consumer economy, aviation was always a super-luxury endeavour that could not thrive without massive government aid, (Wayne Biddle, *Barons of the Sky*, Henry Holt, 1991, p. 13).

Introduction

According to orthodox International Relations scholarship the United States assumed the role of global hegemon after 1945 with a mission to spread the creed of free trade. In the US political elite there was a strong awareness that many of the causes of the hyper destructive war which had just ended lay in the economic failures and crises of the '20s and 30's. These in turn were linked to protectionist and beggar-thy-neighbour trade policies which were characteristic of Europe in the decades before 1939. In consequence of this understanding it has been widely assumed that after 1945 US leaders sought to use their hegemonic power to institute a global regime of free trade based on the principles of neo-classical economics. This was the burden of the Bretton Woods agreement of June 1944 and it informed the gradualist strategy adopted by the GATT in 1947. This historically grounded assumption has been further embellished by mainstream theories in International Political Economy which have posited the model of hegemonic stability in the post-War period. In this model a stable and liberal economic order was made possible because of US global dominance and its willingness to tolerate the costs of global leadership.¹

With regard to the post-1945 era the theory of hegemonic stability takes the value system which underwrites the liberal international economic order as being derived from the dominant US model of economics. In other words the self evident US commitment to unequivocal liberalism. The hegemon instantiates its values because it has the power to impose system characteristics. This model presumes that the actual empirical economy corresponds to a laissez-faire framework. Here there is no substantive role for the state and certainly nothing remotely approaching an industrial policy.

This paper takes issue with all the characterizations outlined above. In particular it challenges the idea that the US economy has corresponded to a laissez-faire model. Broadly speaking this lack of fit between the model and empirical reality results from ideology and culture. Liberalism has been and is a cornerstone of American identity. But the discursive practice of liberalism rarely fits aspects of social reality that sit uncomfortably with the liberal self image. In this case the features of US economic history and current practice which would challenge the plausibility of a liberal model. More broadly the liberal model of the state - qua minimalism - has not been able to accommodate several evolving features of the US political structure. These include:

- * The state's early role in accumulation, e.g. buying the land for railway construction,
- * The advocacy of mercantilism by leading politicians.
- * The state's advocacy of high tariffs at the end of the nineteenth century to protect infant industries,
- * The state's function in the National Recovery Administration and the New Deal,

* The state's security role in World War Two and its assumption of permanent post-War responsibility for global security.²

With regard to my thesis here this last point is really the key one. In the post-1945 era the US state has had an industrial policy in key sectors every bit as coherent and real as those of its European allies. The policy was funded by the Pentagon, its aim derived from security strategy, its beneficiaries the large manufacturers of defence and defence related equipment and its consequence the maintenance of huge corporations in high technology sectors such as aerospace. As Thornton notes, 'Indeed, the economic and organizational impact of these capital outlay and procurement policies was so great that the US government had a de facto industrial policy towards the aerospace sector'.³

This paper addresses the de facto industrial policy of the USA and its implications for the commercial aerospace sector. In the paper I argue that US trade in aerospace products is the sine qua non of strategic trade and that the success of this sector results from a powerful and effective industrial policy which subsidizes commercial aerospace manufacturing. In consequence I suggest that US complaints about subsidy and the role of the state in the European aerospace industry are ill founded and unjustifiable.

The liberal characterization of the US economy in the post-war period is exaggerated and overblown. Some sectors have felt the chill wind of global competition, others have not. Protection has been apparent in agriculture at one extreme and aerospace at the other. Today the neo-mercantilist aspects of

this are becoming more pronounced as the constraints on conflict with allies in Europe are loosened. Aerospace exports are now at the centre of an executive steered advocacy policy which is seeking the rents and externalities due to the state which bankrolled the West's Cold War security policy. As Van Scherpenberg notes, 'Linking military dominance with an aggressive pursuit of economic interests has since become a core element of the US economic policy agenda'.⁴

The Enduring Nature of Mercantilism

Mercantilism is the oldest of the theoretical traditions in Political Economy.⁵ In descriptive terms it arose as a characterization of the economic philosophy and trading practices of the states that arose in Europe after the treaty of Westphalia in 1648. In the states of European absolutism the old order was challenged by the rise of a class of mercantile capitalists whose trading activities enriched the treasuries of the centralized state. Mercantilism was closely associated with war, because the war chests of the European Absolutist Monarchs were swelled by the trading activities of the merchant bourgeoisie who pioneered the first world economic system. The system was also characterized by the acquisition of overseas colonies whose resources were often plundered for the benefit of the colonizing state.

In essence mercantilism amounts to economic nationalism. In the tradition's basic precepts military security and economic self interest are indivisible. Accumulated national

wealth is the foundation of a strong state and such wealth is best stored in bullion or precious metals. According to mercantilist theory trading surpluses are the means for national wealth to grow and are best converted to reliable stores of wealth such as gold and silver. As is doubtless clear mercantilism is closely associated with the realist tradition in international relations and it shares the realist conception of the global arena as anarchic and threatening. Here trade is essentially a zero-sum game where one state's advantage is another's loss.

The theoretical hegemony of mercantilism was challenged by the classical laissez-faire economics of Adam Smith and the later liberalism of David Ricardo. Both advocated a drastic reduction in the role of the state in economic affairs and the removal of tariffs, quotas and other restrictive trade practices. Because the modern period in the Anglo-Saxon world is associated with the philosophical dominance of liberalism it is all too easy to believe that the ideas of Smith, Ricardo and other liberals were embedded in the dominant social practices of Western states after 1800. But of course nothing could be further from the truth. After 1815 Britain enacted the Corn Laws to protect its agricultural interests and to secure self sufficiency in food production. In the United States leading federalist politicians such as Hamilton also recommended the mercantilist creed:

It is well known ... that certain nations grant bounties on the exportation of particular commodities, to enable their workmen to undersell and supplant all competition in the countries to which those commodities are sent. Hence

the undertakers of a new manufacture have to contend not only with the natural disadvantages of a new undertaking, but with the gratuities and remunerations which other governments bestow.⁶

After the repeal of the Corn Laws and other reforms in the 1840s Britain attempted to liberalize the world trading system in order to benefit its strong industries. But as Stein has persuasively argued this was a matter of degree.⁷ Even in the heyday of lower tariffs in the 1860s Britain depended on import duties for 20% of its fiscal revenue.⁸ Contrary to the theory of hegemonic stability Great Britain could not 'impose' a liberal global trading system. Aside from any doctrinal causes this resulted from domestic considerations, such as tax revenue. More generally moves to or from free trade policies have always had political causes and cannot be deduced from some inexorable market logic. Bilateral deals on trade have always been linked to discrete and particular political objectives. Stein notes, 'It is important to understand, therefore, that political rather than commercial or philosophical considerations motivated Britain's shift in its commercial practices'.⁹

From Strategy to Strategic Trade

Another era of trade liberalization was sought after 1945, but again this was a matter of degree. The US did not unilaterally abandon all its trade protection legislation after the Second World War. In fact GATT enshrined the search for politically motivated bilateral deals. The US had a clear self interest in freer trade because of the strength of its own industries which produced half the world's manufactured goods.¹⁰ But security

loomed large in trade calculations. As Balaam and Veseth note, 'In many instances, the United States acted in a mercantilist fashion, when, for example, it used its trade and foreign aid as another weapon in the battle against communism'.¹¹

In the post-war era the philosophy and language of mercantilism has not been popular. US global leadership ensured at least a rhetorical commitment to orthodox economic liberalism. However, in Europe this was a socially engaged liberalism. For the sake of social order Keynesian demand management policies were pursued in order to smooth out the effects of the business cycle and to compensate the disadvantaged through the assorted policy levers of the welfare state. 'Embedded liberalism' coupled Adam Smith to the disciples of social democracy. In the United States government direction of economic affairs could not wrap itself in the social language of welfarism. Nevertheless, it existed in the way the federal budget privileged large corporations who were considered vital to US security. With regard to economic philosophy a strategic vision of economic interest was vital to a rational cold war policy. The central mission of the US government was the blunting of communist influence on the societies of the Western allies and the neutralizing of the general military threat from communist states, especially the USSR. Washington was in essence a military H.Q. As historian Ernest May remarked, 'The main business of the U.S. government had become the development, maintenance, positioning, exploitation and regulation of military forces'.¹²

A central contention of this article is that the United States has had a de facto post-1945 industrial policy in the form of a state directed orchestration of high technology production capacities and priorities in industries linked to defence. Pivotal here has been aerospace. Aerospace technology has been the physical backbone of a global policy which extended from the requirement of close tactical air support at one extreme to the capacity to wage inter-continental strategic nuclear warfare at the other. The same aerospace technologies also drove the systems integration that was the basis for the global command, communication, control and intelligence - C³I - functions which provided the critical systems integration for this multi-layered world security system. Even the internet itself was conceived in response to the Soviet missile threat. In US Air Force procurement strategy no possibility of falling behind the Soviet adversary was permissible, but such superiority had to be planned. As Hooks observes, '... the airforce could not rely on market forces to maintain the world's largest and most technologically advanced aircraft industry. National security had become equated with industrial policy'.¹³

During the Second World War the US economy boomed on arms manufacture. In 1940 Roosevelt had called for aircraft production goals of 50,000 planes a year.¹⁴ This was easily surpassed. During the War the US produced in excess of 300,000 aircraft and more than 800,000 aero-engines. As a matter of course corporations such as Boeing, Douglas, Martin and

Lockheed earned enormous profits.¹⁵ Between 1940 and 1945 the United States spent \$185bn on armaments, with a massive \$46bn bill for aviation weapons. Biddle notes, 'In order to win the war the United States spawned a weapons industry of titanic scope'.¹⁶ Boeing, which is frequently not perceived to have had a large defence portfolio, developed its main expertise in producing heavy bombers, such as the B17, B24 and B29, the last of which delivered the atomic bombs to their targets in 1945. The B17 flying Fortress, arguably the most important aircraft in US World War Two Air Strategy, was commissioned in 1932 when the US industry was in the doldrums.¹⁷ But huge earnings for Boeing began in 1938 when mass production of the B17 started. A process had been initiated which would transform the US aircraft industry. In 1939 the industry ranked 41st in output dollar value, in 1944 it was first.¹⁸

After 1945 the leaders of the US aircraft industry were fearful of cuts in federal expenditure. However, the dawning of the Cold War in 1947 and the Air Policy Commission of July of the same year promised a new cornucopia for the manufacturers. There were also new ingredients in the equation. The arrival of the jet engine required new levels of engineering precision and materials integrity as well as access to a raft of critical strategic minerals. Jet aircraft would also fly faster and higher, placing new demands on the airframe and the need for more complex structures and technologies to protect the crew. At the same time US acquisition of the research of European scientists, such as Werner von Braun, gave America the capacity

to develop missile technology and therefore to contemplate the future conquest of space. Then, finally, there was the atomic bomb. Airpower could now deliver a technology that by itself threatened the integrity and functioning of whole societies. With the arrival of the Hydrogen bomb in 1952 this expanded to possible global destruction. For the USA airpower and the state were tied together in the eschatological project of a life and death struggle with the USSR.

The real filip to the manufacturers came with the Korean War in 1950. Until then the Truman Administration had struggled to convince key sections of the US Congress that massive increases in defence expenditure were necessary. But now the picture changed dramatically. In 1950 Pentagon spending on procurement from the US aerospace industry was \$2.6bn, by 1954 it stood at \$10.6bn.¹⁹ Throughout the peak years of the Cold War Boeing Aircraft secured a string of orders that cross subsidized its civil manufacture. The table below indicates the massive scale of Boeing's military order book in the 1950s. A key point to note here is that Boeing's first successful large civil jetliner, the 707, began life as the KC-135 tanker first contracted by the Pentagon in 1955.

Table 1, Boeing Military Orders 1950-1959.

YEAR	AIRCRAFT TYPE	VOLUME
1950	B-47	82
	C-97*	14
1951	B-47/RB-47	590
	TB-50	24
	KC-97*	231
1952	B-47	788

	B-52 KC-97*	13 231
1953	B-47 B-52 KC-97*	864 43 262
1954	B-52	25
1955	B-52 KC-135	77 29
1956	B-52 KC-135	133 68
1957	B-52 KC-135	213 118
1958	B-52 KC-135 VC-137 CH-46 Chinook	101 130 3 3
1959	B-52 KC-135 CH-47 Chinook	39 81 5

(Source, United States Navy/Air Force Serials, ed Peter A. Danby, statistical analysis, Peter Cullen).

All told Boeing were contracted to produce 4,422 aircraft by the Pentagon in the 1950s; the period when the foundations of their future global supremacy in civil manufacture were laid. In the 1960s the B727, B747 and B737 followed the B707 giving Boeing a family of aircraft which which to achieve global dominance. In the early 1990s chairman Frank Schrontz acknowledged the benefits that the military contracts had brought, '[A] defense-commercial mix provides long term stability and a testing ground for new technologies lacking immediate commercial application. Financially there have been times when the defense side carried the commercial business'.²⁰

Defence contracts help to alleviate conditions in the aircraft industry which make profitability difficult to achieve. The huge development costs of aircraft make a large production run essential if profit is to be realised. Defence sales ease the burden when civil production has not reached the minimum economy of scale (MES) necessary for a particular aircraft's production run. Clearly the ability to sell an aircraft in overseas markets is also essential to realise the necessary scale of production. The US manufacturers have been the least affected by this because of the huge home market, but even they have required overseas sales. Thus a product which is essentially 'strategic' because of its links to issues of national security is also one which must be traded. Trade in aircraft is the sine qua non of strategic trade. For the US this trade has been essential as its oligopolistic advantages in aerospace allowed it to offset its growing trading weakness in other commodities, such as automobiles. Aerospace is the United States' biggest export earner and today Boeing is the top corporate exporter.

On the defence side US corporations also benefitted from the US role as provider of global security. With European industry shattered after the war and the Germans legally prevented from producing armaments, US dominance in NATO was an ideal spring-board from which to secure overseas sales of arms to friendly countries. With regard to aeronautics the Germans had been Europe's largest exporter of aviation products and had led the world in wing design, jet propulsion and missile

technology in 1939. At the end of the war all of the research upon which this was based fell into US hands.²¹ In the late 1940s and through the 1950s Britain and France attempted to build an aerospace industry to match that of the USA, but with defence comprising 70% of the market it was difficult to compete with the corporations funded by the Pentagon. On the civil side Great Britain had a great opportunity with the de Havilland Comet, the world's first civil jet liner, but a flaw in the design of the fuselage caused a number of fatal crashes which led to the plane being withdrawn from service. The potential of Britain's lead in jet propulsion on the civil side was thrown away because of a hasty move to put an inadequated design into production. For France the Korean War opened up possibilities for the newly restored industry and Dassault produced a number of fighter aircraft. But the writing was on the wall; the domestic market could not support a large industry on anything like the scale of the USA.

We have seen above the inventory of Boeing's military orders in the 1950s. In 1955 its civil supremacy was prefigured when PANAM placed an order for the B707, the civil derivative of the KC135. As the years passed and the civil market increased because the public became used to the new form of transport US manufacturers held sway, with Boeing establishing the dominant position. Quite simply airlines had virtually no alternative to US products. By the early 1960s in the biggest market, the USA itself, US airlines were operating 2,136 aircraft and of these 2,076 were American manufactured. The USA

had established global hegemony.

The European Response

By the mid 1960s it was clear that individual European nations lacked the resources to compete with the giant US aerospace corporations spawned by the Cold War. On the civil side the response was for Europe's major aerospace states to collaborate in partnership. After the mixed experience of the Concorde supersonic programme this move to collaboration bore fruit with the birth of Airbus Industrie in the late 1960s.²² But this was not without its mishaps and conflicts. At the start of the Airbus initiative the British had negotiated a 37.5% work share, but the Wilson government pulled out of the project to build the A300, leaving British participation to Hawker Siddeley who committed \$30m towards the development of the A300 wing.²³ Fortunately the German government, who were keen to have Britain on board, agreed to extend financial assistance to HSA and the project to produce the A300B moved towards completion in the early 1970s, with a roll out ceremony in Toulouse in September 1972.

It is worth pausing to consider Britain's lukewarm response to Airbus. Not only were the West Europeans inconvenienced by UK government ambivalence to the project, they were also frustrated by Rolls Royce's attempt to provide engines simultaneously for the Lockheed L1011 as well as the A300. Having originally insisted on a 75% share of the Airbus engine, work at the Rolls Derby plant soon prioritized the US

destined engine. In essence the UK was doing an excellent job of trying to ensure that Airbus was still born. In the US a unified state was fully behind its aerospace companies. In Europe strategy was fragmented as Britain continued its game of facing simultaneously across the Channel and the Atlantic. Compared to France, where the political elite had a coherent and integrated framework for industrial policy and a matching foreign policy, Britain had neither. Airbus did emerge and prosper, but despite rather than because of any British contribution. Not suprisingly dominance on the first Airbus project went to the French, '... consistent French support for and commitment to a truly European response to the American challenge in civil aerospace was translated into project leadership on the A300B'.²⁴ As a result Toulouse became the emotional as well as the physical home of the European aircraft industry.

The A300B was certificated in March 1974, a time that was extremely difficult for aviation as a whole. After the OPEC oil crisis of October 1973, which quadrupled the price of a barrell of crude, the West plunged into recession and the era of stagflation began. From 1975 on it was clear that Airbus would have an enormous fight on its hands to establish a market. The A300B was a new concept, a wide bodied two engined aircraft for short to medium haul. It was a concept airlines liked, but the market was flat. Between 1975 and 1977 promotional world tours helped to sell two aircraft. Then in 1977 Eastern Airlines agreed a deal to lease 23 A300s and a

further 25 of the new projected A310. A real market battle had begun.

In order to endure the costs of development the Airbus partner companies agreed loans with their governments known as launch aid. Such aid was a strategic commitment by the Airbus governments to the new collaborative venture. In the future these loans were to become highly contentious elements in the conflict which materialized between the EU and USA over allegations of unfair competition. But one thing needs to be crystal clear; without launch aid the consortium would never have stood a chance in the rivalry with US producers. As Thornton notes in his authoritative study of Airbus, 'Without loans and other forms of launch aid, the A300B (or any subsequent aircraft) would never have got off the ground.'²⁵

The EU/US Subsidy Dispute

The strategic nature of aerospace competition was evident in the late 1970s when Airbus was aiming to develop its second product, the A310. Concurrently the British government were seeking to merge the two largest aerospace companies, BAC and HSA. They were also reconsidering the decision to remain outside the Airbus consortium. As the newly merged British national champion emerged - British Aerospace - it was clear that its participation in Airbus would be welcomed in Europe. It was also clear that the new aircraft would require a different wing to the A300B, which British expertise could provide. Across the Atlantic Boeing saw an opportunity. Now

sensitized to the potential of Airbus, after the sale to Eastern Airlines, Boeing moved to recruit BAe as a major subcontractor on its rival to the A310, the B757. Boeing's aim was to, '... prevent the return of the British to Airbus and draw in the British airframer and engine builder in constructing the 757'.²⁶ In general this was a non too subtle move to tie up British engineering expertise and capital and keep the UK estranged from Airbus. The tactic failed and British Aerospace joined the Airbus consortium on the A310 project with a 20% workshare.²⁷

What the incident described above indicates is the high level strategic competition in the sphere of aircraft manufacture. But this was just a beginning. In the late 1970s Airbus's orders for its new aircraft signaled the start of a global sales competition with Boeing and MDC which became increasingly bitter. By 1979/80 Airbus was taking a 20% market share and the US was increasingly aware that it had a real competitor from Europe. Airbus also showed that it could outgun the Americans in the area of technical innovation. On the A300B the technology was not innovative, but the overall concept was. On the A310, though, Airbus pioneered significant technical innovations, such as the forward-facing cockpit crew, wing-tip fences and a rear fuel tank in the horizontal tail plane in order that fuel could be moved to reconfigure the aircraft's centre of gravity, allowing improved trim and fuel consumption. In Seattle some of these innovations were met with loud gaffaws, but they are now industry standards, as is Airbus's

innovative vertical acceleration instrumentation.²⁸

With a furious sales battle going on in sectors such as the Middle East the US industry chiefs began to take their concerns about Airbus to the federal government. On the US side a concerted effort was made to prevent the developemnt of Airbus's third product, the narrow bodied, twin engined A320. The politics of this bear consideration.

In order to develop the A320 Airbus began looking for customers and finance in new environments. One approach was made to the Canadians through the government of the province of Quebec. But Airbus were also hoping to secure Canadian industrial participation.²⁹ Although not public knowledge the US authorities had been shadowing Airbus activity for some time. When the Canadian initiative came to light the United States Trade Representative, William E. Brock, sent a letter to Canadian Minister of Industry, Trade and Commerce, Herb Gray. The letter had a tone that was clearly threatening, 'Any implied or actual commitment on the part of Canada to purchase Airbus products or encourage their purchase, as an adjunct to industrial participation, would be a major concern to the United States Government'.³⁰ Ironically, USTR Brock justified his intervention on the grounds that Airbus were using government to government politics to secure sales. Clearly, using the same methods to block sales was a different issue.

↓
As the decade wore on it was clear that the A320 would go ahead and American anxiety grew. In the market place blocking

tactics failed as the DC9 derivative, the MD80 series, and Boeing's 737 300 failed to blunt the attraction of the new Airbus. In fact after its launch in 1987 the A320 became the fastest selling commercial aircraft in history. In the US Boeing executives wanted a Cabinet task force to monitor Airbus and to coordinate export support in the United States. At the roll out of the 767 300 in Seattle in 1985, Boeing's Tom Bacher asserted that the company was, '... getting pretty damn mad'.³¹ He then went on to give Airbus some friendly advice regarding giving up the aircraft business, 'You build good train systems and things like that in Europe and we do not'.³²

This comment of Bacher's is a clue to the bitterness that has been widely expressed in the US concerning Airbus. When the consortium started manufacturing aircraft no one across the Atlantic was taking it that seriously. But as it began to eat into US market share, a sense of shock was apparent and a feeling was manifested that predominance in aeronautics was almost an American right. In consequence the assumption has been that Airbus's success must, by definition, represent some form of sharp or dubious practice. Thus, as the industry dragged government into the dispute a certain ideological zeal was evident.

As the tension grew the in the 1980s USTRs began to lobby European ministers directly on the Airbus issue. With the target now the A340/330 the US position was clear and hardline, '... the US government was not going to stand idly by and accept the unfettered subsidisation of Airbus, particularly

when that unfettered subsidisation was leading to displacement of U.S. exports by the number one export manufacturing industry in the United States'.³³ The tough line was echoed by Boeing, who began to crystallize their critique of Airbus's defects. In essence the US side began a process to try and undermine the consortium's credibility as a commercial organization and viable business. Using the assumptions of market economics and the legalese of GATT the US policy was to delegitimize Airbus through accusations such as the following: 'These subsidies lead to luanch of new programmes without viability, incorporation of technologies that cannot pay for themselves, building of whitetails that are offered at fire-sale prices and wide spread underpricing to gain market share'.³⁴

The Battle of the Reports and the 1992 Agreement

These accusations of unwarranted subsidy were taken around European capitols in the late 1980s in an attempt to blunt the A330/340 programme. Ultimately though the issue was to end up under the jurisdiction of the GATT Subsidies Committee.

An issue which had long troubled the European side was that aircraft were traded in dollars. Thus the European manufacturer faced a form of double jeopardy. On the one hand dollar depreciation meant that the revenue from sales was deflated, on the other dollar appreciation meant larger real payments to the extensive network of American sub-contractors used by Airbus. In this context it needs to be borne in mind that an Airbus can have up to a 30% US work share. In this

context what the Europeans wanted was dollar stability. In response to this the Deutsche Airbus concern, now owned by Daimler Benz, agreed a deal with the German government in 1988 which would give them protection from dollar fluctuation. This FOREX deal was worth DM2.6bn. From the US point of view this was the straw that broke the camel's back. The issue was taken to GATT.

Prior to this the US Department of Commerce had commissioned a report into Airbus's funding by Gellman Research Associates, of Jenkintown Pennsylvania. The report, issued in September 1990, was a damning indictment of Airbus financial arrangements. The brief had been to, 'deepen the understanding of the complex web of relations between the participating companies, the governments and the AI consortium'.³⁵ However, as Thornton points out, the report was in reality much narrower and dealt exclusively with the question of Airbus's credentials as a commercial organization.³⁶

Using 1990 dollar values the Gellman Report claimed that Airbus had been the recipient of more than \$13bn of government support since its inception in the late '60s. Not content with this it then suggested that the real commercial value of this subsidy was \$26bn. The report's conclusions were highly critical and indicated that Airbus had distorted the US industry because of its state subsidy and ability to pursue ventures without regard to commercial criteria. In a wider context this pattern of thinking then became reinforced as scores of economists jumped on the anti-Airbus bandwagon. US

textbooks on International Economics frequently cited Airbus as a clear example of the damaging effects of industrial policy and strategic trade.³⁶ The US position was also bolstered in early 1992 when the GATT Subsidies Committee found in favour of the US on the issue of German FOREX compensation.

Airbus Industrie did not take this assault lightly. In response to Gellman the Toulouse consortium commissioned a report by Washington Lawyers Arnold and Porter on government support of the US aerospace industry. Arnold and Porter identified 3 categories of assistance, DoD, NASA and benefits accruing from the US tax code. In the previous 15 years they estimated combined supports worth between \$33.48 and \$41.49bn in current dollars.³⁸ But more important than the specific identification of discrete elements of support was the overall and indisputable fact that the US industry was not a stand alone entity divorced from government policy and political supports. Arnold and Porter showed clearly that the US industry was embedded in an infrastructure for research and development, financing and commercial manufacturing assistance funded by the federal government, which greatly enhanced the competitiveness of American aerospace firms. As I have indicated above a key problem with this area of debate has been the presence of an 'idee fixe' in the US about the liberal nature of its economy. Hence the conviction that there was no corporate welfare, no industrial policy and no planning for strategic trade. Since the Arnold and Porter report this fairy tale, at least, has not been easy to sustain.

In the early 1990s there seemed every chance of a trade war between the USA and EU in civil aerospace. In the end, though, this was obviated by the 1992 Bilateral Agreement on the funding of Future Large Civil Aircraft. In article 4 of the agreement the EU accepted a cap of 33% government funding for development of future aircraft, with loans repayable over a maximum of 17 years. Conversely, article 5 put limits on indirect support in the USA. For the industry as a whole this was limited to 3% of turnover, while for specific firms it was permitted to be up to 4% of turnover.

Renewed Hostility

The 1992 Agreement did not end the tensions over trade in civil aerospace. Global recession and the end of the Cold War meant job losses and painful rationalization in the US. On the back of this the Clinton Administration chose to reopen hostilities with a series of provocative public statements about Airbus. After the July Agreement, USTR Mickey Cantor referred to the EU side as 'screaming pigs stuck in a gate'.³⁹ At Everett in 1993 the President promised enhanced support for Boeing and blamed Airbus for US job losses. What was also clear was that the new Democratic administration was going to pursue a more overt industrial policy, with strategies to bolster US high technology industries and a new brief for NASA to give its research more commercial relevance.

With regard to trade policy the Clinton era has seen more pronounced state involvement in export advocacy and more

unilateral interventions in global trade issues, such as the threat to impose penalties on firms trading with Cuba.⁴⁰ Through the aegis of the Trade Promotion Coordinating Committee, created in 1994, the Departments of Commerce, Defense and State have been orchestrating a neo-mercantilist policy to use executive level state inputs in a global strategy to enhance export sales in high technology sectors.⁴¹ The late Secretary of Commerce, Ron Brown, was tragically killed while on just such a mission to secure US export sales. In 1993 the Boeing Saudi deal included Presidential contacts with the Saudi authorities and was announced to the world media on the steps of the White House. More sinister were press reports that agents of the National Security Agency bugged the Airbus sales team at the time of the Saudi deal.⁴² Strategic trade now almost certainly includes industrial espionage.

The Rules of the Game

As I have shown the earliest problem with many of these issues in aerospace trade was a reluctance on the US side to see any government contribution to the performance of American aerospace companies. However, the trade discussions of the last decade and the proliferation of reports into government funding and supports has now created a dialogue where at least certain parameters are known. The 1992 agreement formalized a US acknowledgement that indirect support did exist in the US system. Nevertheless, the EU side is posed with a serious difficulty. The real value of indirect support to US

manufacturers is inherently contestable in terms of the precise contribution to the commercial viability of products that reach the market place. Moreover, the calculation of the worth of DoD and NASA programmes that benefit US firms is also difficult because some figures are hidden in black, high security programmes which are classified.⁴³ For this reason policing adherence to the 1992 agreement on the US side is problematic. Because of the methodological problems in these studies of indirect support in the US, reports often specify an enormous range between minimum and maximum figures.⁴⁴ In terms of establishing whether indirect supports are a given percentage of turnover the EU has one hand tied behind its back. Interestingly, in recent months the EU Competition Commissioner ,Leon Brittan, has been seeking to reopen the 1992 agreement. Not surprisingly, the US side are not interested.

A Qualitative Analysis

The search for a viable model of how to quantify the role of government support for the US aerospace industry will continue and is a necessary precondition for trade agreements which are fair and which can be policed. In the meantime it is also essential to establish a qualitative interpretation of the American situation. This can be done through a historical analysis of the development of the US industry, a reinterpretation of the post-war US economy and the examination of specific projects and initiatives where the value added benefits to commercial aerospace manufacturers of given

government funded activities are incontrovertible. A detailed contribution to this qualitative interpretation is beyond the scope of this article, but an indication of its character is not. The US aerospace industry is the jewel in the American industrial crown. It stands at the apex of national security, it is the largest exporter, it is a symbol of national prestige and it resonates with America's boundless optimism about the role of technology in society. The belief that there has not been a national strategy to protect and foster this industry, is, in Bentham's phrase, 'nonsense on stilts'. The only period when the US industry was left to the vicissitudes of market forces was the in the early 1920s when it nearly disappeared. In the late 1920s and through the 1930s air travel was subsidized in order to provide a market for larger and more comfortable passenger aircraft and to secure a national mail service.⁴⁵ In 1938 the Civil Aviation Administration was created within the Department of Commerce to provide, 'direct subsidies to promote passenger travel, economic regulation of the airlines, air traffic control, and safety'.⁴⁶ During the war, as we have seen, a massive industry was spawned and successful civil designs, such as the Lockheed Constellation, Lockheed Electra and Douglas DC6 were prefigured in military forerunners. At the same time Boeing developed the skill base for manufacturing large military aircraft which had dual use potential, such as the B-29 which formed the basis for the B-377 Stratocruiser. In 1954 Pentagon orders for the KC-135 allowed Boeing to utilize the benefits of its prior work on

swept wings and podded engines (engines hung on pylons; not directly on the wings) on the B-47 and B-52 bombers. From its inception the KC-135 was conceived as a dual use tanker and civil jetliner project.

Although the KC-135 story is 'old hat', it bears retelling. A key advantage for the US manufacturers are the synergies that exist between defence and civil aerospace technologies. As Eberstadt notes:

The single greatest means by which U.S. government policy has affected the competitiveness of the commercial aircraft industry is in the procurement of military aircraft and funding of the related R&D... In some cases whole systems developed for the military have been "spun off" to commercial applications, reducing development costs and risks to the commercial users.⁴⁸

The KC-135/B707 linkage is a clear example of this defence/commercial synergy. Production of the two aircraft shared then same plant and 20% of the parts and tooling.⁴⁹ Both aircraft were derived from a common prototype and had concurrent development programmes. In addition common production runs increased the speed with which progress was made down the learning curve and hastened the arrival of economies of scale.⁵⁰ Overall the simultaneity of the two programmes significantly reduced the commercial risk of the B707 launch, with Boeing ultimately selling 820 KC-135s to USAF. To this day Boeing officials deny the significance of the dual development, but in an authoritative study of the Boeing corporation by analyst M. J. Hardy we find the following:

Without the huge KC-135A programme there would almost certainly have been no Model 707, as its unit costs would have been too high, especially without the benefits of using some KC-135 jigs and tooling... and it was not until

1963, when just over 1000 of the 707, 720, and KC-135/C-135 series had been sold, that Boeing finally passed the break-even point on its jet transport programme.⁵¹

This is an old tale, but accusations against Airbus point to the massive early infusions of state aid that helped the consortium survive in its early days. The point about the 707 is that it was the commercial product which began Boeing's dominance of the world market. Arguably Boeing's most critical decision was to proceed with the development of the enormously successful B747. But even this product, Boeing's commercial trade mark, was originally conceived as a large military cargo aircraft. Development began in response to an Air Force procurement proposal. Although ultimately the contract went to Lockheed for the C-5, the Boeing design teams working on the new cargo wide-body jet gained the valuable experience that was necessary for producing a civil version.⁵² Clearly, another advantage of the defence/commercial mix is the creation of expertise that can be used on both sides of the divide. Even if military orders are cancelled or slimmed down, engineers will have been trained who can be transferred to commercial projects.

Fortuitously for American manufacturers downturns in commercial orders, such as at the beginning of the 1980s, have frequently coincided with upturns on the military side. In short the Pentagon gives the US market stability and helps to subsidize commercial production, either when times are hard or early in production runs when particular products are not profitable. According to analyst Wolfgang Demisch, this process

sustained Boeing through its loss making first 20 years of jet aircraft manufacture.⁵³

In recent times the synergies between defence and commercial products have probably reduced. Indeed, Boeing president Ronald B. Woodward, has recently asserted that there are none.⁵⁴ He has also posed the question that if defence helps the commercial side then why have Lockheed and MDC failed on their civil programmes? But this is a fatuous argument. The underwriting of the industry by the Pentagon did not guarantee which US manufacturer would come out on top in commercial manufacture. In the late 1960s all three US giants were seeking a successful, new high capacity wide-bodied jet. In Lockheed's case the launch was delayed because the development of the engines for the L1011 fell foul of Rolls Royce's bankruptcy. Meanwhile Douglas's DC10 suffered a number of catastrophic accidents and arguably was an aircraft which the FAA should never have been certificated, due to faults in the locking system of the cargo doors and the vulnerability of the 3 hydraulic control systems to buckling of the cabin floor because of depressurization. In other words the 747 came out on top in the US because of errors made by Boeing's competitors, not because Boeing was less involved in defence work. Regarding Mr Woodward's recent comments one wonders why the acquisition of MDC is such a good idea if defence is such a handicap. MDC can probably provide an answer. At the end of the life of the DC10 the company was helped through to the launch of the MD11 by military orders for the KC-10 tanker.

Today US aerospace is heavily integrated and consolidated with economies of scale and scope being attained. Spin-on is certainly in evidence and defence is less lucrative than previously. The days of cost-plus are gone.⁵⁵ But synergies remain. In its work for the B2 Boeing developed new machinery for the manufacture and testing of composites which were used for the 777. Some of the funding for this came from the USAF Mantech programme. Additional funds are available through the Pentagon's Independent R&D Recovery programme which allows non-product specific research to be partly recouped through contractors making an addition overhead on military orders.⁵⁶

In the main this paper has dealt with the DoD contribution to US commercial aircraft manufacture. But less us not forget that NASA's official aim is to promote the supremacy of the US aeronautics industry. NASA provides research facilities for US firms, it institutes invaluable demonstrator programmes, it pays US firms to do research and it increasingly seeks the optimum routes to commercial applications of new research. In FY 1995 Boeing was NASA's largest contractor with \$1.44bn of contracts awarded. In a political climate where Congress is seeking budget cuts, NASA is more frank than previously concerning its ultimate aims:

Future U.S. competitiveness in aeronautics... is dependent on sustained NASA advances in aeronautics research and technology. The aeronautics Enterprise will pioneer the identification, development, verification, transfer, application and commercialization of high-payoff aeronautics technologies. activities pursued as a part of this enterprise emphasize customer involvement, encompassing U.S. industry, the Department of Defense and the Federal Aviation Administration.⁵⁷

Paradoxically sensitivity in the US about corporate welfare is increasing the openness of the industrial policy in aerospace. NASA now explicitly links its R&D to the issue of US national interests. As pressure on budgets increases, so too does the need to have a clear and logical rationale for public support of commercial aeronautics. In the US Congress there is a very clear understanding of the implications of NASA's programmes for strategic trade:

NASA undertook these efforts [HSR and HST] largely in response to fears that the U.S. aircraft industry was falling behind Airbus in its technological capabilities, as well as to help the industry address the gap that had emerged in its commercialization of new technologies... In addition, NASA is trying to make its own research efforts more responsive to the commercial manufacturing cycle by timing the development of new technologies to coincide with the onset of new U.S. commercial programs.⁵⁸

Conclusions

The fact that NASA and DoD programs clearly involve an industrial policy for commercial aerospace does not obviate the problem that the precise benefit of such activities cannot be ascertained. An urgent need in this area is for a model which can act as a test of the commercial value of the huge DoD and NASA inputs. In the meantime a clearer understanding of the history of the US industry and an appreciation of the neo-mercantilist strategy of the Clinton Administration points to more meaningful conclusions regarding US commercial aerospace. In the past firms producing aircraft for the commercial sector benefited from synergies and cross subsidization between defence and civil. Major risks could be taken on the commercial side because the defence contracts strengthened the capital

base of the companies.⁵⁹ In the 1990s defence and commercial have moved to integrate and synergies now go both ways. But the newer large aerospace units can now receive more focused political support precisely because the competition is overseas. With the Cold War long over competition with allies in high technology sectors can be more aggressive and aims, in my view, at recouping some of the vast investment in defence that the US previously made on behalf of the Western Alliance.

⁶⁰ Mergers in US aerospace cannot simply be seen as the play of market forces; they represent strategic calculations and include Pentagon and executive input. In the Clinton administration economic strength is recognized as the foundation of national security and pre-eminence in high technology is regarded as the bedrock of economic strength. Neo-mercantilist support for Boeing and other aerospace giants is an attempt to guard those sectors that can withstand globalizing pressures. What's good for aerospace is good for America.

Notes and references

1. See Arthur A. Stein, 'The Hegemon's Dilemma; Great Britain and the International Economic Order', *International Organization*, vol. 38, No. 2, (Spring, 1984), pp. 1-2.
2. See Alan Wolfe, *The limits of Legitimacy*, (Free Press, New York, 1977), Ch. 1.
3. David Weldon Thornton, *Airbus Industrie: The Politics of an International Industrial Collaboration*, (Macmillan, London, 1995), p. 25.
4. Jens Van Scherpenberg, 'International Competition and European Defence Industries', *International Affairs*, Vol. 75, No. 3, (1997), p. 107.
5. Steven Gill and David Law, *The Global Political Economy*, (Harvester Wheatsheaf, Brighton, 1988), p. 28.
6. Quoted, David Balaam and Michael Veseth, *Introduction to International Political Economy*, (Prentice Hall, New York, 1996), p. 23.
7. Stein, op-cit, pp. 6-7.
8. Ibid, p. 8.
9. Ibid, p. 9.
10. Paul Kennedy, *The Rise and fall of the Great Powers*, (Unwin Hyman, London, 1988), p. 368.
11. Balaam and Veseth, op-cit, p. 28.
12. Ernest May, 'The U.S. Government: a Legacy of the Cold War', in Michael J. Hogan, (ed), *The End of the Cold War: its Meaning and Implications*, (Cambridge University press, Cambridge, 1992), p. 218.
13. Gregory Hooks, *Forging the Military Industrial Complex*, (University of Illinois Press, Urbana, 1991), p. 235.
14. Michael A. Sherry, *The Rise of American Airpower: the Creation of Armageddon*, (Yale University Press, New Haven, 1988), p. 57.
15. Wayne Biddle, *Barons of the Sky*, (Henry Holt, New York, 1991), p. 270.
16. Ibid, p. 270.
17. Bruce Franklin, *War Stars*, (Oxford University Press, 1988), p. 113.

18. Biddle, op-cit, p. 271.
19. Thornton, op-cit, p. 25.
20. Quoted, *Wall St Journal*, (July, 30, 1991), p. 1.
21. Thornton, op-cit, p. 63.
22. These difficulties were outlined to me personally by Concorde's British Chief Test Pilot, Brian Trubshaw, (Interview, Bristol, 6/11/96).
23. Thornton, op-cit, p. 72.
24. Ibid, p. 80.
25. Ibid, p. 96.
26. Jean Picq, *Les Ailes de l'Europe*, (Fayard, Paris, 1990), pp. 116--117.
27. Some of the details were given to me in an interview with former Prime Minister, Sir James Callaghan, (Swansea, 17/12/92).
28. Dr Mike Bagshaw, 'Human Factors in Aviation Safety: the Strongest or Weakest Link', paper delivered at Aerospace Research Group, UWE, Bristol, (19/3/97).
29. Ian McIntyre, *Dog Fight: the Trans-Atlantic Battle over Airbus*, (Praeger, Westport, Conn. 1992), p. 162.
30. Ibid, p. 162.
31. Quoted, *ibid*, p. 167.
32. Quoted, *ibid*, p. 167.
33. Ibid, p. 176.
34. Letter from Boeing to Dept of Commerce, quoted *ibid*, p. 176.
35. Quoted Thornton, op-cit, p. 138.
36. Ibid, p. 138.
37. A good example is the work of Paul R. Krugman. See, Paul R. Krugman and Maurice Obstler, *International Economics*, (Harper Collins, New York, 1994), pp. 278-286.
38. See, Arnold and Porter, 'U.S. Government Support of the U.S. Commercial Aircraft Industry', (Washington, DC. Nov,

1991).

39. Quoted, Wolfgang Pillar, 'The Airbus Issue from the European Point of View', Presentation to the American Advisory Board, (DASA, Oct 25, 1993), p. 9.
40. Van Scherpenberg, op-cit, p. 108.
41. Ibid, p. 108.
42. *Manchester Guardian*, (March, 26, 1997), p. 3.
43. Arnold and Porter, op-cit, p. 95.
44. This has been characteristic of some of the studies commissioned by the EU. Many do not enter the public domain.
45. See George Eberstadt, 'Government Support of the Large Commercial Aircraft Industries of Japan, Europe and the United States', report prepared for the Office of Technology Assessment of the Congress of the United States, (May, 1991), p. 95.
46. Ibid, p. 12.
47. Eberstadt, op-cit, p. 32.
48. Ibid, p. 39.
49. Ibid, p. 39.
50. Ibid, p. 39.
51. M. J. Hardy, *Boeing*, (Beaufort, New York, 1982), p. 66.
52. John Newhouse, *The Sporty Game*, (Alfred Knopf, New York, 1982), p. 113.
53. Wolfgang Demisch, cited in Eberstadt, op-cit, p. 56.
54. *Financial Times*, (December, 27, 1996), p. 19.
55. See Van Scherpenberg, op-cit, p. 101.
56. Eberstadt, op-cit, p. 59.
57. NASA FY 1997, Congressional Budget Agency Summary: High Speed Research Program Goals, p. 11.
58. United States Congressional Budget Office, Council on Competiveness, (February, 1995), p. 152.
59. Van Scherpenberg, op-cit, p. 101.

60. Ibid, p. 107.