

## **United States – Measures Affecting Trade in Large Civil Aircraft (Second Complaint): some comments**

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**Abstract:** This paper provides limited comments on portions of the Appellate Body (AB) judgment. With respect to the existence of a subsidy under contracts with NASA and DOD, we find the discussion of whether Boeing has received a financial contribution to be a distraction from the core issue – whether the mix of monetary compensation, access to government personnel and facilities, and IP rights ‘overcompensated’ Boeing for the services it rendered (or whether the government paid more for those services than they were worth to the government). The panel’s analysis of this core issue, which focused on whether Boeing was the principal beneficiary of the contracts, is flawed, but the alternative approach of the AB is equally flawed. The analogy between an R&D joint venture and equity infusion is dubious, and the existence of a benefit simply does not turn on how one dimension of the contract (the allocation of the resulting intellectual property rights (IP)) is specified. We also argue that even a contract that confers a ‘benefit’ (or economic rent) on Boeing could still be an efficient arrangement for the allocation of cost and prospective revenues between the two partners. With respect to adverse effects, we argue that the panel and AB failed to develop an adequate counterfactual with respect to product developments; that is, it is not implausible that if Boeing had not received a subsidy and would accordingly have developed the 787 later, Airbus would also have delayed the development of the A350. To determine the existence of adverse effects, the panel and AB should have considered the profit (or sales) of Airbus relative to what would have happened in this counterfactual world. Finally, we observe that the analysis of lost sales and ‘price suppression’ fails to consider the specific features of competition in the aircraft industry. Unlike what happens in the market with posted prices, when contracts are individually negotiated, whether the outcome of competition is affected by a subsidy depends on the relative cost position of the bidders. When Boeing is the lowest cost bidder, the only effect of the subsidy is to increase its rent, with no effect on sales or prices for Airbus.

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## 1. Introduction

The Appellate Body report in *US–Large Civil Aircraft* (hereafter AB Report)<sup>1</sup> is the latest chapter in the long transatlantic battle between Boeing and Airbus. In the course of its 617-page opinion, the Appellate Body reversed or modified a number of panel findings, but affirmed the core conclusion – that Boeing has been the beneficiary of a variety of subsidy programs that violate the Agreement on Subsidies and Countervailing Measures (SCM).<sup>2</sup> Most of the subsidies at issue are ‘actionable’ rather than ‘prohibited’ subsidies, and the panel found (and the Appellate Body affirmed) that these subsidies have had ‘adverse effects’ within the meaning of SCM Article 5.

The length and complexity of the AB Report make it impossible for us to discuss it in full. In addition, many of the issues are highly fact intensive, and their resolution has few general implications. In this commentary, therefore, we have chosen to focus on the issues that strike us as the most significant, either because of their broader legal implications or their interesting economic dimensions. We begin with some general remarks about the rationale for subsidies disciplines generally and about their application to the large civil aircraft industry.

Economic commentators have raised a number of doubts about the wisdom of WTO subsidies disciplines. Bagwell and Staiger (2002: chapter 10), for example, question the harsh treatment of export subsidies. They argue that export subsidies expand trade, and may well be (second-best) efficient in an environment where barriers to trade exist. Bagwell and Staiger (2006) also question the utility of disciplines on domestic subsidies. By constraining a domestic policy instrument with potentially constructive uses, WTO members may be pushed to use tariff protection as an inferior substitute.

Schwartz and Harper (1972) argue that ‘subsidy’ is not a well-defined concept, and that government expenditures resulting from a legitimate democratic process cannot be presumed to diminish public welfare, at least within the confines of the government’s jurisdiction. If the citizenry supports the expenditure of public funds to promote small business or family farms, for example, who is to say that those preferences are illegitimate? Sykes (1989) critiques the use of unilateral countervailing measures. He argues that they are almost certainly welfare reducing for the importing nation, and are unlikely to contribute to global welfare. Sykes (2010) also questions the utility of global disciplines on subsidies. Among other things, he argues that it is impossible as a practical matter to identify the net impact of governments on the competitive position of business through the myriad of tax and regulatory policies in place; that subsidies typically have positive externalities for other jurisdictions (rather than the negative externalities typically

<sup>1</sup> Appellate Body Report, *United States – Measures Affecting Trade in Large Civil Aircraft (Second Complaint)*, WT/DS353/AB/R, adopted March 23, 2012.

<sup>2</sup> Available at [http://www.wto.org/english/docs\\_e/legal\\_e/legal\\_e.htm](http://www.wto.org/english/docs_e/legal_e/legal_e.htm).

assumed in the strategic trade literature); that subsidies disciplines generally do an exceedingly poor job of distinguishing welfare-enhancing subsidies from welfare-reducing subsidies from either a national or global perspective; and that benchmarks for the identification of subsidies are often arbitrary or incoherent (especially with respect to tax policy). He concludes that the *laissez-faire* approach to subsidies found in the US Federal system may thus be superior to the elaborate disciplines of the WTO and EU state aid law.

In addition to these general criticisms of efforts to discipline subsidies, two additional concerns arise with respect to large civil aircraft. First, the large civil aircraft industry is a paradigm example of an industry with substantial economies of scale. Scale economies may be so large that the industry can support no more than two firms (Krugman, 1987). If so, the industry is a natural duopoly, and the distinct possibility arises that prices will rise significantly above marginal cost even absent collusion. If structural factors ensure a tendency for the industry to reduce output below the competitive level, the best policy response may well be subsidies designed to increase output in the industry. We are mindful that subsidies in an oligopolistic industry may also be employed for beggar-thy-neighbor profit shifting purposes as suggested by the ‘strategic trade’ literature (e.g., Krugman, 1987; Brander and Spencer, 1985), and that the welfare implications of subsidies ultimately turn on empirical issues. We offer no empirical judgment on these matters, and simply note that subsidies to a natural duopoly *may* enhance welfare.<sup>3</sup>

Second, the large civil aircraft industry (and aviation more generally) is among the most technologically dynamic industries. Steady innovation is important, and a question arises whether innovators can appropriate enough of the returns to innovation to provide appropriate incentives for investment in research and development. We again offer no opinion on this difficult empirical issue, and simply observe that if intellectual property (IP) rights are imperfect, investment in innovation may be sub-optimal without some additional encouragement. Once again, a subsidy can be an appropriate policy response. WTO law recognized this possibility for a time in its ‘green light’ subsidies provisions under SCM Article 8, which provided that certain research and development (R&D) subsidies would be non-actionable. Those provisions expired five years after the WTO entered into force, however, and have not been renewed.

In short, it is not obvious that subsidies to the large civil aircraft industry are undesirable as an economic matter. They may or may not enhance welfare depending on empirical issues on which we take no position at this stage. In the remainder of this commentary, we put these issues to the side and ask whether

<sup>3</sup> Neven and Seabright (1995) find that subsidies to Airbus are likely to have increased European welfare and reduced world welfare. However, these conclusions cannot be extrapolated to the situation of Boeing and are contingent on the information that was available at the time.

the AB Report is successful at identifying subsidies and their ‘adverse effects’ as defined in WTO treaty text.

## 2. The existence of research and development ‘subsidies’

The largest class of alleged subsidies at issue for Boeing (in dollar terms) involved various R&D programs undertaken in collaboration with the US National Aeronautics and Space Administration (NASA) and the US Department of Defense (DOD). The alleged subsidies took two forms: (i) money payments to Boeing to conduct research for these agencies, which sometimes resulted in technology that Boeing could incorporate into civil aircraft, as well as in patent rights for Boeing; and (ii) access for Boeing to important government-owned research facilities, and at times government research personnel, which contributed to technology with civil aircraft applications and patent rights for Boeing.

These programs raise a number of issues. First, how are they to be characterized under SCM Article I? Are they ‘purchases of services’ by the government? Research joint ventures? The provision of goods and services by the government? Second, do they confer a ‘benefit’ on Boeing? Finally, are they ‘specific’ under SCM Article 2?

### 2.1 *The characterization of the NASA and DOD programs*

#### 2.1.1 *Panel and Appellate Body findings*

In general, WTO law requires a ‘financial contribution’ before a subsidy may be found (SCM Art. 1.1(a)(1)). One category of financial contribution is defined in Art. 1.1(a)(1)(i) as ‘direct transfer of funds’, including, for example, an ‘equity infusion’. Another category is defined in Art. 1.1(a)(1)(iii) where ‘a government provides goods or services other than general infrastructure, or purchases goods’.

A natural characterization of the NASA and DOD programs is a purchase of R&D services by the US government from Boeing. Boeing provided personnel and capital infrastructure to work on R&D projects of interest to both NASA and DOD. In return, the government made various cash payments to Boeing, allowed Boeing to use NASA and DOD facilities and personnel, and conferred certain intellectual property rights on Boeing. Under this characterization, one might think that the existence of a subsidy should turn (subject to the specificity issue) on whether the total compensation to Boeing under these arrangements exceeded the fair market value of the services rendered by Boeing to the government. The amount that a private contractor would have paid for the services provided by Boeing could act as a benchmark for this fair value.

The difficulty with this view lies in the text of Art. 1.1(a)(1)(iii), which refers to the ‘purchase of goods’ by a government but not the purchase of services. On this basis, the United States argued that the R&D programs at issue could not confer subsidies. The EU countered that such a construction of Article 1 would create a gaping loophole in the SCM disciplines—a government could pay exorbitant amounts for services and escape any finding of subsidization (AB Report,

para. 560). It further argued that the US programs should be treated as a ‘direct transfer of funds’ (in the case of cash payments) or the ‘provision of goods or services’ (in the case of facilities and personnel) (AB Report, para. 555).

The panel accepted the proposition that any program ‘properly characterized’ as a purchase of services is excluded from SCM Article 1 based on its text and a review of its drafting history (AB Report, para. 562). It then constructed a test for determining whether the R&D work done by Boeing could properly be characterized as a purchase of services – it asked whether the research at issue was ‘principally for Boeing’s own benefit and use, or whether it was principally for the benefit of the U.S. government’ (AB Report, para. 551). The test was not grounded in the text of the SCM agreement, but was related to tests used in the past to determine what constitutes government procurement. It then applied the test to various NASA and DOD programs, and concluded that many of them were principally for the benefit of Boeing, and thus to be characterized as a direct transfer of funds rather than a purchase of services.

The Appellate Body disagreed with this approach. It concluded that the joint R&D efforts between Boeing and the agencies involved the provision of monetary resources by the agencies, a pooling of non-monetary resources, and a sharing of the fruits of the research. The arrangements were thus ‘akin to a species of joint venture’ (e.g., AB Report, paras. 597, 609), a research joint venture in conventional parlance. The Appellate Body went on to conclude that the infusion of resources by the government was analogous to an equity infusion, and was thus to be viewed as a ‘direct transfer of funds’ under Art. 1.1(a)(1)(i). The panel’s finding that purchases of services are excluded from Article I was thereby mooted and left unresolved (AB Report, para. 625).

### *2.1.2 Analysis*

As a legal matter, we see merit in certain aspects of the approach of both the panel and the Appellate Body. Although the panel’s ‘principal benefit’ test seems legally and economically dubious, the panel did seem to grasp a core issue. It is logical to ask whether R&D arrangements are best viewed as contracts to produce research for the government, or whether they are instead really just grants to the private sector to support research with commercial applications. The R&D arrangements may also involve a pooling of complementary assets to undertake research more efficiently (relative to research conducted separately), in which case the Appellate Body’s characterization of the arrangements as research joint ventures is also plausible.

To say that the arrangements are research joint ventures, however, does not establish that government contributions to the venture are ‘direct transfers of funds’. On this front, we quarrel with aspects of the Appellate Body’s legal analysis. The provision of equipment and personnel to the venture, in particular, is not a direct transfer of funds. Even if these resources have an opportunity cost, the notion of a direct transfer of funds is too narrow to include such instances. The Appellate

Body's analogy to equity infusions could also be further qualified. On the one hand, there is a clear analogy in terms of mode of investment and risk sharing: equity infusion can in principle be undertaken by bringing assets to a new entity (as in the case of the R&D arrangement) as an alternative to a provision of funds. Equity infusion and the R&D arrangement also allocate risk in a similar manner as the holders of equity (and the partners in the arrangements) appear to be residual claimants. On the other hand, equity rights confer a share of the financial returns to a venture, often subordinate to various other sources of capital such as debt. The R&D arrangements at issue in this case yield no financial returns to the government at all, only a claim on the research output. Thus, although the Appellate Body is reasonable in suggesting that the R&D arrangements are akin to research joint ventures, its further suggestion that government participation in those ventures falls under 'direct transfer of funds' because of its similarity to 'equity infusion' at least requires substantial qualification. Moreover, it bears emphasis that government participation in a research joint venture is not a subsidy to Boeing – a key question remains as to whether that assistance provides any net benefit to Boeing that can reasonably be termed a subsidy.

The Appellate Body's insistence on treating the arrangements as joint ventures is perhaps understandable in light of the omission of services purchases from the text of Article 1.1(a)(1)(iii). This omission is puzzling, and we concur with the EU that the complete omission of services purchases from the coverage of SCM Article 1 could create a potentially gaping loophole in subsidies disciplines. It would indeed be peculiar if no subsidy could be found when a government agency pays a domestic industry \$100 million a day to empty the trash at its headquarters. We suspect, however, that such an arrangement would not escape unscathed even if the panel's conclusion regarding the scope of Article 1 were eventually upheld. A contract nominally for the provision of services, that contained clearly excessive remuneration, could be deemed a sham, and the excess remuneration treated as a grant rather than a services purchase.

The Appellate Body avoided this problem by re-characterizing the arrangements at issue as research joint ventures. That move seems fine as far as it goes, but it does not follow that all government participation in a joint venture falls under Article 1 as a 'direct transfer of funds'. More importantly, this characterization raises the complex problem of deciding whether the government's contribution to the joint venture is somehow excessive measured against an appropriate benchmark, and thereby provides a benefit to Boeing. It is on these issues that the Appellate Body's reasoning is woefully deficient.

## 2.2 *The existence of a 'benefit'*

### 2.2.1 *The findings*

The panel's findings of benefit followed from its 'principal benefit' test to rule out the claim that the R&D arrangements were a purchase of services. Because the

R&D arrangements were principally for the benefit of Boeing in the view of the panel, the panel concluded that no commercial actor would have entered the arrangements (e.g., AB Report, para. 633).

The Appellate Body disagreed with the approach of the panel. It noted that the principal benefit test conflated the question of financial contribution with the question of benefit. Further, the Appellate Body did not view the panel's approach as providing an adequate comparison to a market benchmark. It faulted the panel for not considering the evidence presented by both sides as to how private research contracts are structured (AB Report, paras. 641–43).

The Appellate Body then proceeded to consider evidence submitted by the parties regarding the terms of a number of private research contracts. The EU argued that in private research arrangements, the party that contracts for research services retains ownership of any resulting intellectual property (e.g., AB Report, para. 650). The United States argued in response that some private contracts provide for a different allocation of IP rights. The Appellate Body reviewed this evidence in sections of the report that are redacted due to business confidential information. The Appellate Body then observed that under US statutes, IP rights generated by government contracts with the private sector are generally allocated to the private contractor, with the US government taking a license to use all such technology royalty free. Accordingly, the Appellate Body concluded, there is no bargaining over the allocation of IP rights in US government research contracts (AB Report, paras. 661–663).

The Appellate Body then made the following observation with respect to the DOD contracts in particular:

The United States also argues that the USDOD opened each of the assistance instruments to competitive bidding and that, if Boeing had been seeking non-market terms for its participation in the research, one of the USDOD's other suppliers of aeronautics research would have bid less. This argument, however, fails to recognize the fact that ownership of any intellectual property is not open to bidding; it is determined by US law. Because each bidder knows in advance that this particular aspect of the transaction will not be altered with respect to its competitors, ownership of any resulting intellectual property will not be a determinative element in how each bidder structures its proposals. (AB Report, para. 665)

Following this paragraph, the Appellate Body concluded that the R&D arrangements with NASA and DOD had indeed provided Boeing with a 'benefit' (AB Report, para. 666).

### 2.2.2 *Analysis*

The panel's principal benefit test is flawed. Not only does it lack legal foundation, but it suggests that the existence of a 'subsidy' somehow turns on the question of how an outside observer characterizes the subjective motivation of the government in entering the contract. We question whether the government's subjective

motivation is identifiable with any reliability, and question whether it is relevant in any event – the fact is that these arrangements generated technology that had some value to the government and to Boeing. Even if an outside observer concludes that the benefit to Boeing was somehow greater, it does not follow that Boeing received a subsidy. As we indicate below, one must still ask whether Boeing's contribution to the arrangements was inadequate in relation to the benefit received, or whether the government's contribution was excessive in relation to the benefit received.

The Appellate Body was thus right to reject the principal benefit test, but its alternative analysis is also flawed. Most importantly, the Appellate Body's premise that the allocation of IP rights in private research contracts can be used as a benchmark to determine whether the NASA and DOD contracts provide a benefit is unwarranted.

The allocation of IP rights is but one component of the total government 'payment' to Boeing for its assistance in conducting NASA and DOD research. The government makes monetary contributions to the research, and contributes equipment and personnel. Boeing, for its part, also makes monetary contributions, along with equipment and personnel. The question whether Boeing receives a net benefit is best answered by comparing what Boeing has 'paid' for the research in relation to the expected value it receives. In order to identify the existence of a subsidy, one might also compare this net benefit with the benefit that would have been obtained in a counterfactual involving a private investor (instead of the government). The mere fact that Boeing may have received IP rights that it may not have received in providing research services under contract with a private firm is not determinative. A private investor may well have granted a more generous allocation of IP rights in return for greater upfront payments or contributions of assets. More generally, the contractual arrangement chosen by the government may be efficient given the particular circumstances that it faces – unlike private investors, the government does not use IP rights to make a profit in any goods market, and it may well make sense for the government merely to take a license for its space and defense purposes in return for less of a monetary contribution from the government. Even if a contractual arrangement with a private investor would have allocated IP rights differently, therefore, that fact does not prove that Boeing received greater surplus, or 'subsidies', from its government contracts.

Note that an alternative approach to identifying a subsidy would involve the assessment of a benefit for the government, by comparing what the government has 'paid' for the research in relation to the expected value that the government receives. If this net benefit is negative, it might suggest that a private investor would not have entered into the contract in the first place. We are mindful, of course, that the benefit to the recipient is ordinarily the test for 'subsidy' and not the cost to the government.

Either approach raises daunting valuation issues, but the fact that they are challenging is no excuse for ignoring them. The mere fact that Boeing may have received IP rights that it might not have received in providing research services



under contract to a private firm proves nothing, and is no substitute for conducting the inquiry properly.

The AB also should have considered more carefully the process through which these contracts were awarded. The United States is correct to argue that if DOD contracts are subject to effective competitive bidding – a factual claim on which we take no position – then the allocation of IP rights under US law will be taken into account by private firms bidding to win the contracts. There may be a presumption that the winner of a contract is left with no rent (or at least no more rents than the difference in valuation with the second highest bidder). A more generous allocation of IP rights by statute (along with the opportunity to draw on government facilities and personnel) will result in lower bids on the contracts, allowing the government to obtain the same research for less monetary compensation. The final outcome of competitive bidding may depend on the details of the auction, but there is good reason to believe that competition for the contract will reduce the rent accruing the winner.

Finally, as suggested above, it is worth noticing that the private investor benchmark that can be used to assess the existence of a subsidy is not without difficulty. First, there are contracts provided by a public authority that would not be proposed by private investors. This may arise because of incomplete property rights, for instance when the benefit to the contractor would take the form of a public good. National defense may be a case in point; the DOD can arguably obtain benefit from R&D contracts in the form of technology that improves national defense. No private contractor would propose contracts that solely contribute to national defense so that there is no obvious private investor benchmark. Second, there are circumstances in which the government is inherently more efficient than private investors in providing a service, offering a further reason why the fact that a company obtains better conditions from the government than those provided by private investors should not be considered as evidence of a subsidy. Contracts with NASA offer a plausible illustration; it may be that, given its unique experience with space exploration, NASA is simply a more efficient joint venture partner for space-related R&D projects than any private alternative. The fact that Boeing obtains more favorable conditions for undertaking an R&D project in cooperation with NASA may thus reflect a reasonable division of the greater joint surplus from a contract with NASA rather than any ‘subsidy’.

### 2.3 *‘Joint production’*

Another perspective on the benefit question arises from conceptualizing the arrangements between Boeing and the government as a form of joint production. In particular, their R&D arrangements produce a ‘joint product’ – space/military technology for the government, and civil aircraft technology for Boeing. Under these circumstances, one might ask, to what extent does efficiency require that

Boeing contribute to the funding of the ‘joint product’, and how much should Boeing be required to contribute?

This turns out to be quite a difficult question to answer. Consider first the following hypothetical scenario. The government wishes to develop a military technology, and will invest in developing it regardless of whether it yields any benefits for civilian use. The government does so, and the technology turns out to have important civil aircraft applications. Is it efficient to require a firm that employs the technology, such as Boeing, to pay for the right to use it? The answer is no. By hypothesis, the technology will be developed regardless of whether Boeing uses it or not. And once it is developed, the marginal cost of permitting the technology to be used for civilian purposes is zero. It is then inefficient to charge for the use of the technology. Any positive price runs the risk of discouraging its use inefficiently.

Of course, from a global standpoint, it is inefficient to charge *anybody* for the use of the technology under these conditions (putting aside national security concerns, which concededly may be important here). If Boeing should be allowed to use the technology for free, so should its competitors. The allocation of IP rights to Boeing (indeed, the existence of IP rights) is inefficient.

Of course, one could run the hypothetical in reverse, switching the roles of the government and Boeing. It would then be inefficient for Boeing to charge the government anything for the use of the technology for military purposes, if it would have been developed anyway for civilian purposes. Here, however, it might be efficient for Boeing to hold IP rights in the technology, for without them the incentive to develop the civilian technology might be lost.

There are innumerable intermediate cases. One can imagine that neither party would be willing to conduct the research on its own, but that when the research output can be shared each party’s willingness to pay for the research adds up to more than its cost. Under these conditions, any financing arrangement that allows the research to be undertaken, and that ensures each party’s participation, is efficient. Subject to this constraint, any allocation of the up-front research costs and IP rights between the parties seems efficient.<sup>4</sup> It is conceivable that the cheapest way for the government to secure Boeing’s participation involves giving Boeing IP rights in the research output, but it is also conceivable that Boeing would participate at an adequate level if the government retained the IP rights.

The upshot of this discussion is that however one measures the ‘benefit’ to Boeing from its participation in the R&D arrangements with NASA and DOD, those

<sup>4</sup> One would have to appeal to other factors in order to select a particular allocation. For instance, under the assumption that public financing involves greater distortion (because of taxation) than private financing, one might argue that the party undertaking the commercial development should obtain no more than normal (risk adjusted) return. This would minimize recourse to public finance and taxation.

arrangements may have entailed no inefficiencies from a social standpoint. To return to a theme of Section 1, it is questionable whether subsidies disciplines under such circumstances serve any constructive economic purpose, and they may well be counterproductive.

## 2.4 *IP rights and specificity*

The panel and the Appellate Body both found that the collaborative R&D arrangements between Boeing and NASA/DOD entailed ‘financial contributions’ that provided a ‘benefit’. We have already criticized the analysis in this regard. Both then implicitly assumed that the benefits were specific, as the programs in question were obviously limited to certain types of aviation-related technologies (see AB Report, para. 730).

The EU nevertheless argued further that the allocation of patent rights to Boeing under these arrangements represented a further, specific subsidy. We note at the outset that the EU’s claim of an *additional* subsidy due to the allocation of IP rights is silly. IP rights were part of the benefit that Boeing received by participating in the R&D arrangements. As we have explained above, neither the panel nor the Appellate Body did a competent job of determining whether Boeing received *any* benefit from such participation. A proper determination would compare what Boeing received, in totality, to what it contributed (benefit to the recipient benchmark), or what the government gave, in totality, to what the government received (cost to the government benchmark). The value of IP rights given to Boeing would be encompassed within these comparisons. To suggest that the allocation of IP rights is a separate and distinct subsidy to Boeing is thus baseless. Rather than dismissing the EU’s argument on these grounds, however, both the panel and the Appellate Body assumed that the allocation of IP rights might constitute a distinct subsidy.

### 2.4.1 *Findings*

The panel was unsure whether IP rights represent a ‘financial contribution’ and assumed *arguendo* that they might (AB Report, para. 738). It then concluded that no ‘subsidy’ was present in any event because the allocation of IP rights to the government’s research partner was a pervasive policy in US government contracting, compelled by statute.

The EU appealed, arguing that the general policy of the United States to grant IP rights to research partners was not relevant. Rather, in the EU’s view, the ‘granting authority’ should be viewed as NASA or DOD, and the research contracts entered by these agencies should be deemed limited to ‘certain enterprises’ under SCM Article 2.

The Appellate Body sided with the panel, and held that because various US statutes and regulations established a general policy of allocating IP rights to government research partners, the allocation of IP rights to Boeing under NASA

and DOD contracts was neither *de jure* nor *de facto* specific (AB Report, paras. 789, 800).

#### 2.4.2 Analysis

We have already criticized the notion that the allocation of IP rights can be separated from monetary payments and the use of government equipment and personnel for purposes of determining whether Boeing received a ‘benefit’ from the NASA and DOD contracts at issue. If any ‘subsidy’ exists, it is because the totality of what Boeing received in this regard was excessive in relation to some relevant benchmark.

Nevertheless, we comment briefly on the specificity issue here. As one of us has argued before, the specificity test is a poor device for identifying ‘subsidies’ that are inefficient from an economic standpoint (Sykes, 2010). It has often been found that broadly available agricultural subsidies are not specific, even though there is little doubt that such programs can distort resource allocation. Likewise, highly targeted ‘subsidies’ may be economically desirable if they remedy some market failure, such as an inadequate incentive for innovation in some industry due to imperfect intellectual property rights. Hence, the specificity test is both under-inclusive and over-inclusive of government programs that distort resource allocation.

The debate in this case highlights another shortcoming of the specificity test – it can turn on silly formalisms. If a government-wide policy provides some benefit to a substantial range of private industries, it is not specific. But if the identical benefits are provided to the same industries as part of a piecemeal policy administered by various different agencies, it may be deemed specific. Similarly, if a subsidiary government jurisdiction provides some benefit to a wide range of industries within the jurisdiction, it is not specific. But if a higher level of government (say, the national government) provides identical benefits to the identical industries within the subsidiary jurisdiction, they can be deemed geographically targeted and thus specific. In short, government programs with identical economic impact can be deemed specific or not based on formalisms about their conception and administration.

In this case, the United States prevailed in the debate over silly formalisms with respect to the allocation of IP rights. In the next section of the AB Report, however, the EU prevailed – tax benefits given to Boeing in Washington State were deemed ‘specific’, despite the fact that many other, unrelated industries received comparable tax breaks (AB Report, paras. 851–52). The reasoning was that the various tax breaks were enacted at different times and for different industry-specific reasons (AB Report, paras. 847, 854).

We lament the fact that findings of subsidization turn on such baseless considerations. The problem lies not in the Appellate Body’s analysis in this particular case, however, but in a specificity test that is flawed in its conception, and hence inevitably in its application.

### 3. Adverse effects

The panel considers three subsidy measures (R&D subsidies, tied tax subsidies, other subsidies), three relevant product markets (100–200 seats, 200–300 seats, and 300–400 seats) and two mechanisms, namely subsidies that affect prices and subsidies that affect technology and thereby the characteristics of the 787 sold by Boeing or the timing of its introduction.

With respect to the latter mechanism, the panel and AB develop a counterfactual in which, in the absence of the R&D subsidy, Boeing would have introduced an aircraft with similar characteristics to the 787 (as effectively sold) but at a later date.<sup>5</sup> The panel and AB rely mostly on evidence regarding the structure, design, and operation of the subsidies, emphasizing for instance their commercial relevance.

With respect to the price mechanism, the Panel and AB contend that the (non-R&D) subsidies were decisive with respect to a number of deals for which Boeing and Airbus were competing. Given that the subsidies were allegedly affecting all Boeing products, these effects are felt across all the product markets. The panel and AB focus on the market segments other than the 787 (in which adverse effects were found because the R&D subsidies purportedly facilitated an earlier launch of the 787). The discussion of the adverse effects raises a number of issues.

#### 3.1 *No discussion of R&D incentive effects*

In order to identify an adverse effect, the Panel and AB need to show that in the absence of the subsidy, the behaviour of Boeing would have been materially different. This cannot be taken for granted. For example, with regard to the R&D ‘subsidies’, it is entirely possible that the effect of any such subsidy is simply to increase the return on R&D investments that would have been undertaken anyway by Boeing in the absence of any subsidy. In other words, it may very well be that the R&D subsidy is a pure transfer from the government to Boeing shareholders, which does not affect competitors and consumers.

In order to determine that the subsidies had a material effect on Boeing’s R&D strategy, the Panel and AB might have considered a cash flow analysis of the R&D projects concerned, with and without the subsidy. Vague references to the operation of the subsidy do not suffice. To undertake a cash flow analysis, the Panel and AB should have evaluated the significance of the subsidy in quantitative terms, i.e. they should have evaluated the returns to Boeing from undertaking the R&D programs relative to the returns that would have accrued if the R&D joint venture partners had been a private investor.

<sup>5</sup> The panel also briefly considers an alternative counterfactual in which, in the absence of the subsidy, Boeing would have developed an upgraded version of the 767. This alternative is not however discussed at length.

Table 1. Illustrative payoff matrix without subsidy

	T1	T2
T1	(2.5, 3.5)	(4, 3)
T2	(3, 4)	(5, 5)

This is clearly a demanding exercise but presumably Boeing has undertaken a financial analysis of its R&D projects so that at least part of the necessary information should be available. An assessment of incentive effects using a cash flow analysis (or similar methods) is also routinely undertaken by the EU in the implementation of state aid controls (at least for large projects).

### 3.2 *Simplified counterfactual analysis*

In evaluating adverse effects, the panel and AB concluded that subsidies allowed Boeing to introduce the 787 earlier and then turned to evidence from buyers suggesting that Airbus had lost some orders because of such early entry. However, this approach assumes that in the absence of the subsidy, Airbus would have introduced the same products. This should not be taken for granted. Indeed, if the 787 had been introduced later, would Airbus have developed the A350 XWB as early as 2006? Maybe it would have found it more profitable to develop an upgraded version of the A 330 (like the original design of the A350 that was abandoned). The incentives of Airbus to undertake marginal improvement of the A330 would also have been affected. With a delayed 787, Airbus would have had a longer production run on the A330 and hence more incentive to improve quality.<sup>6</sup>

This is easy to illustrate with the following payoff matrix. T1 corresponds to early introduction of the two aircraft, T2 to late introduction. Boeing is player 1 (rows) and Airbus is player 2 (columns). The payoff matrix before the subsidy is as shown in [Table 1](#).

The only Nash equilibrium is T2,T2. Hence in the absence of a subsidy to Boeing, both wait until a later date to introduce a replacement, respectively of the 767 and the A330. This payoff matrix has the property that the best reply of Airbus to an early entry of Boeing is to match it ( $3.5 > 3$ ). But the best reply of Boeing to early entry by Airbus is to delay entry ( $3 > 2.5$ ).

Now consider the effect of subsidies that increase the payoff of Boeing from early entry (it increases its payoff by 1.5, whatever the strategy of Airbus) (see [Table 2](#)).

<sup>6</sup> See Neven and Seabright (1995) on the incentive to upgrade quality with longer production runs.

Table 2. Illustrative payoff matrix with a subsidy to Boeing

	T1	T2
T1	(4, 3.5)	(5.5, 3)
T2	(3, 4)	(5, 5)

The only equilibrium now involves early entry by the two firms. T2,T2 is no longer an equilibrium. As a result of the subsidy, both firms are worse off (because it has triggered premature entry of both firms).

Essentially, what the panel does is to compare the payoff (T1,T1) for Airbus in the presence of subsidies, i.e. 3.5, with the payoff (T2,T1), i.e. 4, with or without subsidies – it assumes that Airbus would have developed the A350XWB as early as 2006 in any scenario. This is not the appropriate comparison (if this payoff structure is realistic) – it should have compared the payoffs (T1,T1), i.e. 3.5 with (T2,T2), i.e. 5.

Of course, it is still the case in this example that Airbus is worse off as a consequence of the subsidy awarded to Boeing. However, the example does not depend on this characteristic. Indeed, assume that the payoff of Airbus is 5.5, for an early entry of both firms (T1,T1). Then the effect of the subsidy to Boeing is to increase the profit to Airbus. In this instance, there is no adverse effect but rather a positive effect from the subsidy on both firms. The payoff structure that would lead to such an outcome is one in which Airbus would greatly benefit from a simultaneous early entry (rather than moving first) but in which Boeing would have preferred to move later if Airbus were to move first.

Note also that even if the profit of Airbus falls as a result of the subsidy, the identification of an adverse effect may now depend on the particular variable used to capture ‘adverse effect’: for instance, a test based on the change in profit may indicate that there has been an adverse effect on Airbus. However, it is not clear that a test based on sales would go in the same direction. In the counterfactual, Airbus could have made fewer sales. In this hypothetical scenario, the effect of the subsidy to Boeing is to trigger an early product development by Airbus that expands sales but reduces profit.

We do not take a view on whether these scenarios are realistic, although it is worth noting that they may be plausible – Airbus showed a lot of hesitation before launching the A350 (it changed design and even temporarily reversed its decision to develop the aircraft in 2005). We merely want to emphasize a methodological point that casts doubt on the evidence discussed by the Panel and AB. The observation that Airbus lost some orders following the development of the 787 may not indicate that Airbus lost market share because of the subsidy. Had the 787 been developed later, Airbus might also have developed the A350 later and its market share (and profit) could have been lower in that scenario.

### 3.3 *The effects of subsidies on prices*

As mentioned above, the analysis of price effects focuses on market segments other than that of the 787 (namely the 100–200 and above 300 seats segments). The subsidies at stake are related to the FSC programme and B&O taxes in Washington State. The FSC subsidies are prohibited export subsidies, and we do not focus on them. The various state taxes at issue in the case include a mix of income taxes, property taxes, and sales taxes.

Income and property taxes are not equivalent to a tax that directly affects marginal cost, at least not in the short run. If a subsidy has no impact on marginal cost, it will have no impact on price in the short term. Taxes that do not affect short-run marginal cost may nevertheless affect the rate of return on investment over the long run, and induce some net expansion of an industry (and thus reduction in price) if the subsidies raise the returns to marginal expansion above a critical level. In a duopolistic industry such as large body commercial aircraft, which likely earns supra-competitive profits in equilibrium, it is not obvious what that critical level will be. Without going into any great detail, the panel and the Appellate Body essentially ignore this broad set of issues, lumping all of the various tax subsidies together without regard to their affect on short-run marginal cost or their potential to induce industry expansion over the long run.

Moreover, the extent to which a change in marginal cost will affect pricing incentives depends on the type of competitive interactions. In a standard framework of posted prices, a reduction in marginal cost (for a particular firm) will be passed through to some extent depending on competitive conditions (a lower number of firms and lower product differentiation will lead to a higher pass-through). The matter is different if firms compete in a series of independent ‘auctions’, as would seem to be the case in the aircraft market. In those circumstances, the lowest cost firms (or the firm with the best product) will win the auction by charging a price that is just below the level of cost (or the reservation price) of the second most efficient competitor. That is also to say that if Boeing is the lowest cost firm, then the ‘equilibrium’ prices are determined not by its own marginal cost, but by the marginal cost (and reservation price) of its competitor – namely Airbus. In those instances, the marginal cost (and reservation price) for Boeing is not relevant. Any subsidy to Boeing will merely increase its margin.

If Airbus is the low marginal cost provider, it should in principle win the sales at a price that reflects the marginal cost (reservation price) of Boeing. If the subsidy reduces the reservation price of Boeing, then two effects can arise: (i) If Airbus remains the low cost producer, despite the reduction in the marginal cost of Boeing, the effect of the subsidy is simply to lower its margin (without affecting the quantity of sales). (ii) However, if the subsidy is such that Boeing becomes the low marginal cost producer, it will allow Boeing to obtain the sale at the expense of Airbus. However, the shift of profit between the two companies will be small;



only marginal sales in terms of profits will be shifted away from Airbus and they will be marginal to Boeing.

From an empirical perspective, a focus on particular transactions in which a small price difference may have allowed Boeing to obtain sales (the approach of the Panel and AB) may not be revealing as to the effects of the subsidy. Indeed, one would expect that in the final run up of an auction between Boeing and Airbus, differences in bids will be narrowed down.

In principle, the Panel and AB should have tried to identify sales in which the ranking between reservation prices of Airbus and Boeing have been reversed by the subsidy or such that Airbus was forced to reduce its margin (relative to situations in which the subsidy merely increased the margin of Boeing). It is also worth noting, however, that the probability that the reservation prices were reversed very often is small given the size of the subsidy (acknowledged to be equivalent to a reduction in sales taxes by less than 1%). In addition, as mentioned above, the effect on profit of both firms induced by a shift in the ranking of the reservation prices is likely to be limited.

Of course, it is not unreasonable to assume, given the market shares and past commercial success of both firms, that in a large sample of deals there will instances in which Boeing was the low cost bidder (and merely increased its margin) as well instances in which Airbus was the low cost bidder (and either experienced a reduction in margin or a loss of sales). Still, given the short time window during which the effect of the subsidy is considered and the small number of transactions in that window, the importance of cases in which Airbus may have suffered adverse effects could be small.

#### **4. Conclusion**

We have provided some limited comments on the Appellate Body (AB) judgment. With respect to the existence of a subsidy, we find the discussion of whether Boeing received a financial contribution to be a formalistic distraction from the core issue – namely, whether Boeing received net benefits from its government contracts that would not have arisen in contracts with private sector entities. The legal test developed by the panel, which focuses on whether Boeing is the principal beneficiary of the contracts, is not a sound basis for determining whether Boeing received a financial contribution and is flawed as a test of the existence of a benefit. The approach proposed by the AB is not a convincing alternative – the analogy between an R&D joint venture and an equity infusion is lacking, and the existence of a subsidy simply does not turn on how one dimension of the contract (the allocation of the resulting intellectual property rights (IP)) is specified. Bidders for a government contract will simply require less compensation under a contract that offers more favourable terms for the allocation of the resulting IP, and there is no presumption that the winner will have greater benefit when the contract is specified in those terms.

We also observe that contracts between Boeing and the government can be seen as facilitating the joint production of civil as well as military output. A contract that confers a ‘benefit’ or rent on Boeing could still be an efficient arrangement for the allocation of cost and prospective revenues between the two partners. This issue is entirely sidestepped by the panel and AB.

With respect to adverse effects, we first observe that the panel and AB have failed to develop a counterfactual with respect to product developments; that is, it is not implausible that if Boeing had not received a subsidy and accordingly developed the 787 later, Airbus would also have delayed the development of the A350. At least the panel and AB should have considered this alternative, in light of evidence that Airbus decision to launch the A350 was contingent on Boeing’s decision. Hence, to determine the existence of adverse effects, the panel and AB should (possibly) have considered the profit (or sales) of Airbus relative to what would have happened had Boeing and Airbus both developed new aircraft later in time. Second, we observe that the analysis of lost sales and ‘price suppression’ fails to consider the specific features of competition in the aircraft industry. Unlike what happens in market with posted prices, when contracts are individually negotiated, whether the outcome of competition is affected by a subsidy depends on the relative cost position of the bidders. When Boeing is the lowest cost bidder, the only effect of the subsidy is to increase its rent, with no effect on sales or prices for Airbus.

## References

- Bagwell, K. and R. W. Staiger (2002), *The Economics of the World Trading System*, Cambridge, MA: MIT Press.
- (2006), ‘Will International Rules on Subsidies Disrupt the World Trading System?’, *American Economic Review*, 96: 877–895.
- Braner, J. and B. J. Spencer (1985), ‘Export Subsidies and International Market Share Rivalry’, *Journal of International Economics*, 18: 83–100.
- Krugman, P. R. (1987), ‘Is Free Trade Passé?’, *Journal of Economic Perspectives*, 1: 131–144.
- Neven, D. and P. Seabright (1995), ‘European Industrial Policy: The Airbus Case’, *Economic Policy*, 10(21): 313–358.
- Schwartz, W. F. and E. Harper (1972), ‘The Regulation of Subsidies Affecting International Trade’, *Michigan Law Review*, 70: 831–858.
- Sykes, A. O. (1989), ‘Countervailing Duty Law: An Economic Perspective’, *Columbia Law Review*, 89: 199–263.
- (2010), ‘The Questionable Case for Subsidies Regulation: A Comparative Perspective’, *Journal of Legal Analysis*, 2: 473–523.