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Fly me to the end of the world?

– The failure to see political opportunities in the aviation industry

- WORK IN PROGRESS, PLEASE DO NOT CITE -

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ABSTRACT

Confronted with a looming crisis of ecological deprivation and global resource depletion, the political response of most liberal regimes has been a complacent wait-and-see attitude, at best combined with piecemeal environmental reforms and moral support for international initiatives such as the Kyoto Treaty. Meanwhile, the theoretical discourse on sustainability seems to be oscillating between the unsound extremes of deep-green ecologism on one hand and neo-classical hopes of infinite growth on the other.

This paper takes on the aviation industry – perhaps the most extreme exponent of the fossil economy – in an attempt to show that radical sustainable policies do not have to be as politically unpleasant as many pro-market liberals may think. By reconciling the politics of scarcity with technological optimism, the paper explores how a new taxation scheme could be used to drive innovation while offering a path to sustainability that goes beyond just curbing consumption. It is concluded that such a policy orientation would allow social democratic and liberal parties to challenge the prevailing pessimistic discourse on sustainability at the same time as they remain consistent with their own historical roots.

Keywords: sustainable development, energy and environmental policy, political parties, aviation industry

Contents

1. Introduction

Taking to the skies for yet another international conference on sustainable development, I came to realize that the aviation industry could be a suitable empirical case for illustrating a theoretical point that I had been arguing in one of my recent articles (Karlsson, 2006b). Though clearly one of the most extreme exponents of the fossil economy, the airline business has this far been almost completely exempted from the kind of environmental taxation that is levied on other means of transportation. While aviation fuel (kerosene) has been kept free even from value added tax in most countries, air travel has grown much faster than technological advances to reduce its environmental impact have been introduced. Simultaneously, both in the US and in Europe, low cost carriers (LCCs) have transformed the industry into true mass transportation, a development which has enabled new leisure patterns, cultural integration, and economic growth but also taken a substantial environmental toll.

2. Theory and politics

With such an empirical landscape, the political response has been quite characteristic for the current disarray of progressive forces in the environmental field. On one extreme we find deep-green ecologists who see the curbing of aviation as an important first step towards a general reduction in personal mobility (Dobson, 2000, p. 91). Warranted as their environmental concerns may be, these idealists remain frustratingly incapable of garnering wider public support, at least as long as the ecosystems appear to be as resilient as today. On the other extreme end of the spectrum we find economists like Julian Simon, Robert Solow and Wilfred Beckerman who not only reject the notion of a looming ecological crisis but also insist that economic growth "is the surest – and probably the only – route to a general improvement in the quality of life and in the environment" (Beckerman, 1996, p. 21). Considering how vital the aviation industry has become for the functioning of the global economy and the fact that it by itself is a major engine behind economic growth (estimates vary but the industry may indirectly be responsible for as much as 10 percent of global GDP), attempts to restrict it would, or so at least this school of thought argues, in fact hamper our ability to improve the environment in the future.

Projecting this political spectrum it may at first come as a surprise that the leading social democratic and liberal parties throughout Europe have positioned themselves fairly close to the second extreme position, at least in terms of practical policy-making. Anxious to satisfy a median voter who has become increasingly accustomed to both weekend breaks in European capitals and longer vacations overseas, radical action against the aviation industry is not high on the political agenda for the governing parties in Europe (and even less so in the US). As governments acknowledge the public benefits of aviation and the access to global markets that it facilitates,

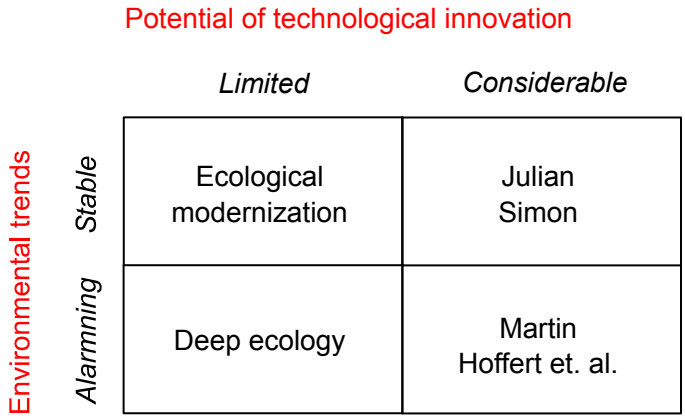
they are also unwilling to further undermine an industry which is already strained from the pressures of high fuel prices and fierce competition.

As often with environmental policy, the choice seems to be between either unpopular radical reforms aimed at sustainability or a business-as-usual approach that can prove dangerously complacent in the long run. Though the deep green position clearly occupies a moral high ground in this debate its political potential remains limited by its idealism and unrealistic assessment of existing socio-economic dynamics. Unless triggered by some quasi-mystical "inner change" of humanity, it seems doubtful that the fundamental forces of modernity can be reversed in the manner envisioned by deep green ideologists, at least within a liberal and democratic framework (Wissenburg, 1998).

Trying to transcend this dichotomous reasoning I have come to believe that it can be fruitful to study how these opposing positions relate to technological innovation. Apparently it seems as if those who are most optimistic about the potential of technology are those whose economic framework rarely acknowledges resource scarcity or any significant environmental problems in the first place. Correspondingly, those who are most alarmed about global environmental trends are normally also the ones most sceptical to technological innovation (Cohen, 2006), regarding it merely as a source of useless electronic gadgets if not an outright threat to a sustainable life style.

It is tempting to think that sustainable development in general (and ecological modernization theory in particular) represents the appropriate solution to this mismatch of ontological assessments and remedial strategies. However, it is important to see that the technological optimism which can be found in government documents on sustainable development is normally quite modest and limited to the kind of advancements that can be expected to flow from a fairly autonomous technological development dictated by short-term capitalistic logic. In fact, grand research projects in fields such as high-energy physics, nanominiaturization and spaceflight are virtually absent from the contemporary policy debate. Also, texts written in the tradition of the Brundtland report tend to be far less alarmed about environmental trends than text written by authors within the deep-green camp.

However, in recent years this theoretical impasse has been challenged by some seminal works, most notably *Advanced Technology Paths to Climate Stability* published in *Science* by a large number of leading American researchers in the natural sciences (Hoffert, 2002). Far from ignoring the precarious nature of current environmental trends, Martin Hoffert and his colleagues took these trends as their very point of departure when searching for a reconciliation of the politics of scarcity with technological optimism. By doing so they took up an intellectual position that had been almost unheard of since the late seventies (Salmon, 1977) and, as I have been arguing, even rhetorically excluded from the growing discourse on environmental sustainability:



Instead of trying to constrain the basic forces of modernity, an approach based in the lower right quadrant would provide a unifying, proactive vision of the future which draws on existing patterns of social and economic interaction. Yet, it can be argued that in order to radicalize modernity in the fashion suggested, vast economic resources would have to be allocated away from other sectors which in turn probably would require rather different political institutions, especially on the international level (Karlsson, 2006a).

3. Empirical background

Before turning to how a strategy of this kind would translate into the world of aviation, we have to gain some empirical understanding of the specific case.

In 1999, the Intergovernmental Panel on Climate Change published a special report on *Aviation and the Global Atmosphere*. Expressing a consensus statement which has been approved in detail by a large number of experts working in the relevant fields, the report is well suited as an authoritative starting point.

Aircrafts affect the environment in numerous ways; globally by emitting greenhouse gases (GHG) and substances that deplete the ozone layer, regionally by acidification and eutrophication, and finally locally in the form of oxides of nitrogen (NO_x), volatile organic compounds and particulates (IPCC, 1999, p. 3). Moreover, as anyone who has spent an afternoon in Kensington Gardens when the planes line up for final approach to Heathrow Airport can testify, aviation can be a considerable source of noise, even in urban environments.

In relation to climate change, aircrafts are especially problematic since their emissions of GHG take place on high altitudes. Thus they have an impact on radiative forcing causing a warming effect of 2-4 times that of carbon dioxide alone. However, there is currently a considerable scientific uncertainty about how this "uplift factor" should be calculated. The IPCC report finally settled for an uplift factor of 2.7 (IPCC, 1999, pp. 185-215).

There are today 22 000 commercial aircrafts in the world which, operated by approximately 900 airlines, transport close to 2 billion passengers every year (ATAG, 2005, p. 3). Despite these massive numbers, aviation is currently not a major source of pollution compared with for instance energy production or ground transportation. More alarming is that since 1960, air passenger traffic has grown at nearly 9 percent per year, 2.4 times the average Gross Domestic Product (GDP) growth rate (IPCC, 1999, p. 3). Growth is also expected to continue at 5 percent for the next 10 to 15 years (Bows, Upham, & Anderson, 2005, p. 24). In any case, demand for passenger traffic is projected to continue to grow at rates in excess of GDP (IPCC, 1999, p. 3).[1] While fuel efficiency improved 6.5 percent annually during the first decade of the jet age, recent years have seen the rate fall to below 2 percent (COM, 1999, p. 5). This means that the current strong growth of the industry outstrips any environmental improvements. As the existing technology matures, further improvements are also less likely to come from new engine and airframe technology but instead from operational improvements (better avionics, shorter flight patterns due to more effective Air Traffic Management and higher load factors). Finally, it is important to acknowledge that, left unchecked, technological development in the industry could in fact lead to *lower* fuel efficiency, especially if new supersonic aircrafts are introduced in the future. Following the demise of the Concorde it may seem as if supersonic transportation has fallen out of vogue. Yet, there are today a number of projects working on second generation supersonic aircrafts. This is environmentally problematic since supersonic aircrafts are intrinsically less fuel efficient than subsonic aircraft, consuming about twice as much fuel on a passenger-kilometre basis (IPCC, 1999, p. 220).

In the IPCC special report, a number of independent forecasts for air traffic demand growth between now and 2050 are presented. Though forecasts so deep into the future become increasingly uncertain as "the probability for unforeseeable major changes in key factors influencing the results steadily increases" (IPCC, 1999, p. 310), rough estimations indicate that air passenger traffic may grow tenfold over the next 45 years (IPCC, 1999, p. 311). With the introduction of LCCs, especially in China and India but also in Central- and Eastern Europe, such a future does not seem far-fetched.

The Tyndall Centre for Climate Change Research has evaluated the effects on European and U.K. climate policy in relation to these predications made by the IPCC. They conclude that if the EU settles for a stabilisation target of 550 ppmv carbon dioxide, which seems to be the emerging consensus level for avoiding dangerous and abrupt climate change, aviation would account

[1] Directly contradicting what an Environmental Kuznets Curve (EKC) would suggest, empirical studies indicate that with higher income levels, the demand for personal mobility increases rapidly. Far from behaving more environmentally responsible, German data shows that the best earning population group for instance flies twice as many kilometres for their holidays as the national average person (Spangenberg, 2001). The underlying microfoundations for such an argument seem irrefutable; ask any of your friends and they are likely to reply "travel more" to the question what they would do if they were given an extra 500 euro a month.

for more than the whole available EU25 emissions space by 2050, assuming that current trends continue and applying an uplift factor of 2.7 (Bows et al., 2005, p. 78).

4. The economic and policy context

Despite the unsustainable nature of these trends, international aviation has been able to remain virtually untaxed even as carbon and energy taxes have been imposed on other modes of transportation.[2] While many governments are currently in the process of enforcing fairly strict emissions standards on carbon-intensive industries in order to meet their targets as laid out in the Kyoto Protocol, aviation has been largely ignored (Meijers, 2005, p. 3). This follows a general tradition of tax breaks and favourable economic treatment for the aviation sector, ultimately going back to the Chicago Civil Aviation Conference of 1944 and the establishment of the International Civil Aviation Organization (Doganis, 2001, pp. 19-43).

There are many reasons, both theoretical and practical, to why it has been difficult to devise working policies for taxation in the field of international aviation. First of all, the services airliners provide are not produced primarily in one country but in international airspace. Clearly, customers do not pay their tickets for a service consumed on the runway in one country but rather in the air *between countries*, making taxation schemes dependent on international coordination and agreement. Secondly, taxation on aviation fuel can in itself create numerous perverse incentives. Not only may aircrafts start bringing with them extra untaxed fuel when landing but they may also start refuelling in a third country underway. A plausible example of the latter practice would be if the EU imposed a tax on kerosene. Flights bound for Asia would then be likely to make technical landings for refuelling in for instance Russia.

Given the practical difficulties associated with kerosene taxation, other schemes of environmental charges may be more feasible to implement and require far less international coordination.[3] A number of alternative or complementary approaches have been suggested including (COM, 1999, p. 13):

1. A levy added to the passenger ticket, as already is the case for facility and security fees today
2. A levy based on the distance flown and aircraft engine characteristics to be collected via Air Traffic Control (ATC)
3. A levy associated with airport Landing and Take-Off (LTO) charges

[2] Though international aviation and shipping were excluded from the Kyoto Treaty, some airlines, like British Airways, have suggested that the aviation sector should be included in emerging emission trading regimes like the European Trading Scheme (ETS). However, if permit prices remain as low as today, calculations suggest that inclusion in the ETS would only bring a fare rise of approximate 1-2 euro for a short-haul flight. It also uncertain how the higher radiative forcing of aviation (the uplift factor) should be accounted for (IPCC, 1999, pp. 346-347).

[3] Different bilateral International Air Service Agreements (ASA) as well as the Open Skies framework also put legal constrains on fuel taxation.

All of these approaches carry their respective advantages and disadvantages. Depending on the size of the levy charged, they will also stimulate different kind of behaviour on behalf of the airlines. For instance could an LTO-charge, if considerable and calculated on a per-aircraft-basis, lead to the introduction of larger aircrafts which are generally more environmentally friendly (assuming that the cabin factor is kept constant). Yet, unexpected and perverse effects are never far away. Already today, airlines take overflying fees into consideration when planning their routes. Consequently, some airlines may start making lengthy detours in order to avoid ATC-charges if these are high enough. Finally, levies added to the ticket may cause some airlines to shift their operations between countries. Though this may only be possible at certain airports due to geographical limitations, there are real-world examples of such practices. In south Sweden, even a small fee of approximately 10 euro per ticket due to be introduced in July 2006, has caused Ryanair to leave Malmö-Sturup Airport in favour of nearby Copenhagen Airport (Gianuzzi, 2006).

However, the resistance among policy-makers worldwide to take action against the aviation industry cannot be understood from such practical considerations alone. Instead, it is necessary to recognize the highly important economic role that civil aviation plays. Air transport generates 29 million jobs worldwide (ATAG, 2005, p. 3) and is a fundamental *enabler* of global commerce as it boosts productivity through specialization in areas of comparative advantage, attracts businesses and drives processes of economic integration. Bearing in mind that 40 percent of all international tourists travel by air, the growing tourism sector is also utterly dependent on effective air transportation. Beside these economic motives, aviation brings numerous cultural and political benefits – promoting international exchange and understanding in general but also facilitating regional integration, for instance within the EU.

5. Political opportunities

Though acknowledging the multiple and vital roles that aviation plays in the modern society, it still seems irresponsible to simply ignore the unsustainable nature of its current growth trajectory. Having reviewed the environmental impact of the industry, John Whitelegg may well be right when he "sees the need for a radical new approach" (Whitelegg, 2001, p. 16). However, the policy measures he suggests are as expected as they are unlikely to win any wider political support. To merely impose inept and draconic taxes on aviation or, in the lingo of the greens, make it "accountable", may in the end be nothing but a recipe for a massive economic recession.

Careful to avoid such a development, a few countries like Sweden and the Netherlands have none the less begun to introduce minor environmental taxes on tickets. Yet, commendable as this may seem from a green perspective, the initiatives in question are unlikely to have anything but a

marginal impact on travel patterns. Furthermore, as no meaningful alternative is offered in most cases, these initiatives seem to be driven more by a general desire for easy tax money than any genuine ambition to actually solve the environmental challenges that aviation poses.

Growing out of the Enlightenment tradition, social democratic and liberal parties were in the past highly optimistic about the potential of technological development. Today, it seems as if the same parties have lost their faith in radical progress and instead become ever more pragmatic, short-sighted and re-active in their policies. As Stephen Eric Bronner has argued, this passive stance is by no means restricted to the technological domain but just as prevalent when it comes to social justice, international relations or civil liberties (Bronner, 2004). Limiting the discussion to technology, the consensus view seems to be that politically initiated rapid progress of the kind that brought forth the atomic bomb or the lunar landings is a thing of the past. Without trying to determine if this view is an expression of a post-modern outlook on science, or even more pessimistic notions suggesting "the end of science" (Horgan, 1997), it is still confusing how it has become so fashionable in a world of omnipresent technological progress.

In this paper I will now try to sketch what a pro-active alternative to this wait-and-see paradigm could mean in the aviation sector. As I hold no expert knowledge, focus should remain on the direction and not the precise details of the vision. In other words, the vision I am suggesting should be interpreted in a regulative and not a constitutive manner (Karlsson, 2005). As a political strategy it calls upon us to look beyond incremental improvements and instead seek radical engagement. Recalling how difficult it is for a single government to intervene alone (Holden, 2002), it is first now with the emergence of a supranational body in Europe that an active European policy on aviation has become feasible. Therefore and despite that my argument would play out pretty similar in an American context, I will in the following use Europe as my point of reference.

Suppose that the EU would impose a ticket tax of 40 euro, to be paid by all passengers who depart from a community airport.[4] With 650 million annual passengers in the EU25 countries, this would add up to 26 billion euro per year, assuming a constant number of passengers. Of course, that is to assume a lot. In fact, such a move would send shockwaves through the industry, effectively hitting the revenue base for LCCs which normally allude to passengers with high demand elasticity. In plain English this means passengers who fly because it is cheap; lager louts going to Prague for beer and satellite broadcasted Premier League football, exchange students taking an extra trip home over the weekend or ordinary tourists who fly to a European capital for some Saturday shopping. Yet, most passengers with a genuine need to travel would still travel, often by air but

[4] One possible risk with schemes based on a ticket tax for each take-off is that hub-and-spoke networks with high load factors are replaced by point-to-point networks with lower load factors. Thus, to avoid that the tax makes connecting flights more expensive than direct ones, it seems appropriate to limit the tax to the first segment of any multi-segment same day journey.

perhaps more often than today with the excellent network of trains and buses that already exists in Europe. Taking into account how much air fares now fluctuate between seasons and other factors such as the time advantage of flying, the drop in passengers may not be particularly dramatic after all. Since the tax is thought to be EU-wide it will also be difficult for the airlines to avoid it by moving their operations to any nearby country. Of course, it is possible to imagine that the scheme would trigger a surge in travelling to and from non-EU countries like Russia.[5]

The 40 euro tax would differ from the fees that air travellers pay today. First, all the money collected would go directly into a fund for research in the aviation field. Secondly, the tax would be conditional and waived for those aircrafts that meet a predefined environmental profile or set of criteria. A reasonable such criteria would be no, or at least very minimal, carbon dioxide emissions. Utopian as this scheme may sound it would clearly trigger a massive effort to develop technologies that today exist only on the drawing table, including liquid hydrogen propulsion (IPCC, 1999, p. 258), solid state aircrafts (Beringer, 2002) or airframes made up of carbon nanotubes. As development costs even for ordinary aircrafts can be rather prohibitive, serious breakthroughs depend on a continuous flow of funding. This is why the raised taxes have to be channelled into a dedicated fund and made available for R&D activities of the kind that the industry itself cannot support.

Even with such funding, truly brave leaps in technology may take decades. Therefore, and to provide more immediate mitigation, it may be reasonable to create less stringent interim targets. This would allow the introduction of technologies closer to market readiness, as for instance Blended Wing Body (BWB) aircrafts which promise substantial improvements in fuel efficiency (Hibbert, 1999).

Despite such pragmatic concessions, a tax of this magnitude would undoubtly send chills down the spines of many pro-market liberals. But as the 21st century wears on and fossil fuels become less abundant, the price on kerosene, and hence flying, is likely to rise sharply anyway (Heinberg, 2003, p. 231). At such a time, the economic space for innovation which currently exists in the untaxed aviation market would be a lot smaller. With insufficient time and resources to develop new technologies, the airliners would have no choice than to charge a lot more for air travel (Campbell, 2006). If peak oil is indeed upon us, a scheme of the kind proposed here can be seen as a novel way of interpreting the precautionary principle. By seizing the current window of opportunity, a far more dramatic and for

[5] Yet, if the tax is kept around 40-50 euros, it is unlikely that tax avoidance in this manner will pose any serious challenge to the scheme. For most European citizens, the costs and time associated with travelling to a non-EU country are too high to make such a strategy worthwhile. After all, the aviation sector is far more protected than most other industries, making it suitable for environmental taxation. For instance, while manufacture industries are inclined to seek out pollution havens, a flight between London and Amsterdam simply cannot be replaced by a flight between Hong Kong and Shanghai.

anyone seriously concerned about the world economy definitely more frightening future may be possible to avoid.

A steep increase in air fares with the purpose of paying for advanced aeronautic research is in essence an investment for the future and as such it will hopefully generate numerous spin-offs for society. This differentiates it from what seems to be the alternative, namely increased monetary transfers to oil-rich countries in the future. Finally, taxation in the aviation sector would mean new possibilities for high-speed trains and intermodality solutions aimed at replacing short-haul flights.

Instead of leading to permanent job losses and an economic downturn, a scheme of this kind is likely to be neutral or even positive in terms of GDP growth as innovation replaces consumption while the modal shift towards ground transportation generates new jobs in these sectors. However, it is not certain that the science community will be capable of absorbing the increased funding quickly enough without causing inflationary pressure; thus it may take some years until the full effects in R&D become visible. Yet, taken together, I believe that the proposed taxation scheme would offer an attractive vision of what environmental sustainability can mean beyond just curbing consumption. Following radical improvements of its emissions, aviation could in fact become an environmentally friendly mode of transportation as it requires far less infrastructure than traditional modes of ground transportation.

If delivered in the proper political package, as a new Apollo Project, a scheme of this kind may bring together diverse interests and stakeholders, ranging from aircraft manufacturers to an environmentally concerned public. For social democratic and liberal parties this could represent a grand opportunity to take vigorous political action, effectively challenging the negative narrative of the greens and their mantra of reduction, moderation and conservation.

6. Conclusions

Achieving environmental sustainability represents perhaps the most important task for the 21st century. Through science we are learning of the challenges ahead: climate change, biodiversity loss and increased toxification of the biosphere. Yet, the political response has this far been fairly myopic; trying to solve the problems of tomorrow with the primitive tools of today. The results, especially in the field of aviation, have often been disappointing and amount to little but bad environmental consciousness among the public.

Though certainly erroneous in its details, I have in this paper given one suggestion of an alternative policy orientation. Instead of trying to suppress preferences for increased personal mobility, it shows how the same preferences can be used to drive technological innovation. By building on the tradition of technological optimism, social democratic and liberal parties

may here have a golden opportunity to reconnect to their past while taking seriously the challenge of environmental sustainability.

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