The FAA's Impact on Small Businesses in the General Aviation Industry

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The evidence considers the rationale for the Federal Aviation Administration intervening in markets for general aviation, and looks specifically at public interest issues regarding safety, and the implications of policies to reduce accidents on the vitality of small businesses involved in general aviation. There is a focus on some elements of administrative costs of pursuing the social interest of increased safety. The evidence also offers some comments on recent and proposed legislation impacting on the way that the FAA handles regulations governing general aviation regulations and their reform.

Introduction

In the right context air transportation can provide a major economic stimulus to a region, city, or town. In a strict economic transportation sense it offers access to a larger market for local firms and can allow local residents to travel medium and long distances, albeit often not directly, for personal and business reasons. At a secondary level local airports, and the various aviation and non-aviation activities can provide local employment and generate income for the community. These benefits are clearly not true for all locations, there has, for example, to be a threshold of latent demand if any new airport is to be successful or an existing one expanded.

These benefits hold at any scale of aggregation, from for example the gains for the high- and bio-technologies areas of the National Capital Region from having a major hub airport at Dulles[1], to the economic advantages enjoyed by many of the smaller communities of Virginia that have local airports[2]. That airports, together with the air transportation associated with them, can, in an appropriate context, generate considerable economic gains for local residences and firms is a pretty consistent finding of academic and other studies.

The roles of general aviation, and the businesses associated with it, are numerous and vary across airports and aviation activities. The general economic advantages for a community of having a general aviation facility are not only from the direct aviation effects associated with the use of the airport that range from air taxi and charter services, pilot training, and crop-spraying through the access business jets provide to the commercial world, but also from the income that comes from

[1] K.J. Button, and S. Lall, 'The economic of being an airline hub city', *Research in Transportation Economics*, Vol.5, pp.75–106, 1999

[2] K.J. Button, 'The role of small airports in economic development' *Journal of Airport Management*, Vol. 4, No.2, pp. 125-136, 2010.

the maintenance of aircraft, fuel sales, and airport fees, and non-aviation sales that are often present at airports, such as parking and catering services. There are also wider, social benefits, often described as "public interest functions", that are associated with general aviation and with its role in supporting policing, medical emergency activities, fire fighting, and accessibility of small communities often being highlighted[3]. In addition, the general aviation sector is responsible for large numbers of jobs in the manufacture of aircraft and associated hard and software.

There is, however, an inherent danger in assessing these economic benefits because confusion may arise between correlations with causality. While general aviation can confer local economic benefits in terms of jobs and income, this causality in some cases may well run from the income levels and the interests of those living in an area to the development or enlargement of an aviation facility, rather than from the airport being the catalyst for local economic development. The few studies that have sought to separate out these causality effects, however, support the notion that by-and-large the general aviation facility is the driver, but these tend to use aggregate analysis and there may well be cases where causality is in the opposite direct.

The challenge, and a major one that is confronted by the legal duties of the U.S. Federal Aviation Administration, is to ensure that these benefits from general aviation when they accrue, and which can be very diverse in their nature, are obtained without excessive social costs. In particular there are costs of safety that come into play. The challenge can be further broken down in administrative efficiency terms by considering the benefit and costs imposed by the actions of the FAA in pursuing its duties; i.e. could any safety objective be obtained at lower "cost" to the general aviation sector?

The costs to general aviation of public interest interventions are diverse, and affect both the supply and demand side. They may involve direct costs to the manufacturers of hard or software in terms of standards and testing requirements, and periodical maintenance, and to airports in terms of the types of equipment needed to handle various forms and levels of traffic. These costs are in turn, and often in rather indirect ways, passed to the users of the hard- and software of the system. These users, essentially the pilots, also have to meet a variety of competence and health requirements, that can take both money and time to acquire, and often have to provide information on their activities, or at least are asked to do so. In addition, there are the costs of administering the system that is partly funded from taxation.

The particular features of general aviation

General aviation covers a wide range of activities. A standard definition is that it embraces all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire. It thus range from gliders and powered parachutes to corporate jet flights involving a professional pilot flying a business aircraft; about 11% of private flying is by business people on their way to meetings etc. It constitutes, in terms of aircraft and their movements, by far the largest component of civil aviation; there are around 19,000 airports, helipads, and seaplane bases of varying sizes serving general aviation in the U.S. and its territories; just over 2,900 handle the movements. These facilities vary considerably in terms of tower control, runway features and ground support facilities; although the FAA classifies them into four broad categorizations. There is nearly a quarter of a million general aviation aircraft; of

[3] For more comprehensive study of the various roles of general aviation in economic development, see U.S. Federal Aviation Administration, *General Aviation Airports: A National Asset*, FAA, Washington DC, 2012.

which the bulk is piston or turboprop aircraft, and the average age of small planes is about 40 years[4].

An emerging aspect of general aviation involves the use of unmanned systems (often termed "drones"); such aircraft are without an onboard human pilot being controlled either autonomously by computers in the vehicle or under the remote control of a pilot on the ground or in another vehicle. They take a variety of shapes, sizes, configurations, and characteristics and are being used in a small but growing number of civil applications, such as policing and firefighting, and nonmilitary security work, such as surveillance of pipelines. At present the use of drones is severely limited in the U.S., with the FAA developing a road map to allow their integration into the US airspace system.[5] We do not discuss the issues of the regulation of drones here, but their importance for small businesses, as suppliers of the hardware required, in operating drone services, and as customers for such services would seem to pose a variety of future regulatory challenges.

A large part of general aviation involves private activities that are of limited interest to policy makers. They involve actions of individuals that do not impinge on the general public or any large part of it, and the transactions between the individuals and companies involved – airports, pilots, maintenance companies, fuel providers, aircraft owners, aircraft manufacturers – take place in fairly simple markets, and involve standard forms of transactions and contracts. Since there is ample evidence that such markets, although often not completely perfect because of such things as market power and incomplete knowledge on the part of those involved, are the best way of allocating resources, there is little reason for any significant interventions by government.

There is significant governmental intervention, however, in this market for other reasons. The three areas of public interest, setting aside generic matters involving such things as commercial contracts between the various providers of general aviation services and customers, being largely in the realms of finance, security, and safety. The first two of these are hardly touched upon here.

- Financing the infrastructure of general aviation is important in term of its efficient use but raising money is largely outside of the remit of the FAA, which is the subject of the hearing[6]. The FAA has spending responsibilities for many areas of spending and this does affect small businesses in general aviation. The evidence here, however, is general aviation uses approximately 16 percent of air traffic control services but contributes only 3 percent of the costs[7]. Raising this money and whether the ratio of spending to revenue collection is socially efficient is an on-going debate.
- Security is largely within the purview of the Transportation Security Administration rather than the FAA, although there are inevitable interfaces between them.[8].

[4] General Aviation Manufacturers Association, *2012, General Aviation Statistical*, GAMA,Washington D.C., 2013

[5] U.S. Federal Aviation Administration, *Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap*, FAA, Washington, D.C. 2013.

[6] It was also the subject of a previous recent hearing, 112th Congress, 2nd Session.

[7] US Department of Transportation's Inspector General Office, Use of the National Air Space System, CR-2008-028, Washington DC, 2008.

[8] Some discussion of the main security issues are found in; U.S. Government Accountability Office, *General Aviation, Security Assessment s at Selected Airports*, GAO-11-298, Washington D.C., 2011.

That safety, our main focus is important is of little doubt, but equally it is unrealistic (if not impossible) to have 100% safety; it is simply too costly even if a viable definition of absolute safety could be devised. What public policy is *de facto* concerned with is developing what is often called ALARP; "as low as reasonably practical" level of risk of an accident. This entails balancing the risks of, in our case, an incident involving general aviation against the social benefits that general aviation confers. In terms of a pilot and aircraft owner, if there were no-one else involved then a private market, possibly involving the activities of insurers, would suffice to offer the appropriate ALARP level of risk; safety is the sole concern of the pilot and the aircraft owner and any incident has no implications for third parties.

The public interest element comes in when there is collateral damage with costs inflicted on;

- third-parties involved in general aviation, including pilots and their aircraft and those working at airfields;
- when there are costs of remedial action, such as involved in search and rescue operations for a crashed plane, and
- when individuals and "hardware" on the ground are affected.

While some of these items, such as property damage from a crashed aircraft or the medical bills of injured people, can be directly expressed in monetary terms, there is also clear evidence that people do value in monetary terms their safety in broader terms, and place a value on reductions in the risk of being killed or injured in an accident[9]. They also value a feeling of safety that can extend beyond fears of direct personal harm.

From an economic perspective, the issue is one of whether the "private" costs to the general aviation sector of safety regulations, and their implementation and enforcement, outweigh the benefits to third parties of the regulations. This involves not simply issues of objective measurement but also societal perceptions; as with security, it is often as much about what the public thinks the net benefits of general aviation are as about the actuarial calculations of the costs and be benefits. This boarder perspective essentially requires some form of benefit-cost assessment of the sector, and *ipso facto* of the policies of agencies such as the FAA.

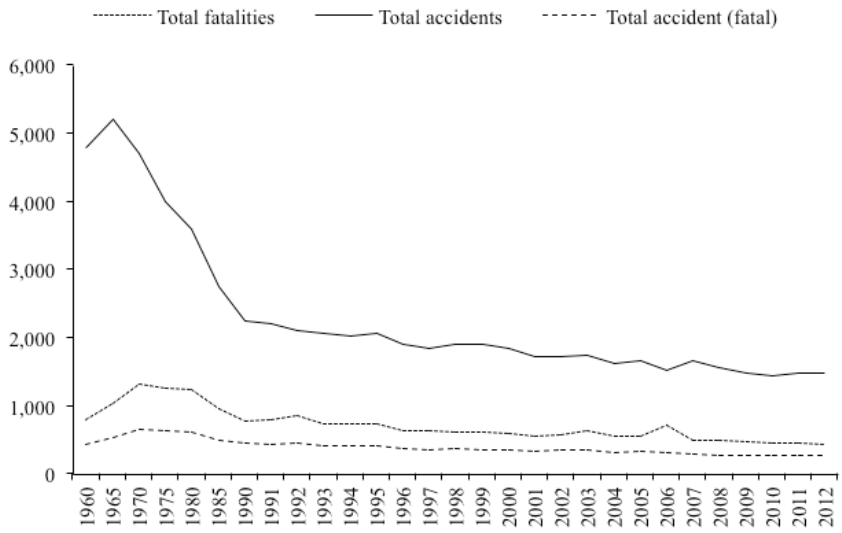
The safety situation

The data show that over 90% of fatal aviation accidents in the U.S. involve general aviation, although the proportion of fatalities and injuries is far less because of the small vehicles involved. In terms of trends in the safety record of U.S. general aviation, Figure 1 shows a substantial decline in accidents since the 1960s with some flattening out in the downward trend after the 1990s (Some caution should be taken when inspecting the table, in that the time intervals prior to 1990 are in five-year periods and in annual periods thereafter.) As a summary picture, the national Transportation Safety Board found that fatal accidents fell by 24% between 1999 and 2011, and non-fatal accidents by 29%.

To get a clearer picture of the risks associated with general aviation activities, accidents need to be set against the level of activity in the industry. A standard measure of this activity is flight hours, although other measures such as the number of flights may also form a legitimate basis for calculations; most accidents occur during take or landing. Figure 2 provides the details and again, although retaining the caveat about nature of the horizontal axis, a general downward trend is seen in all indicators of accidents, with some flattening out in recent years. The situation is

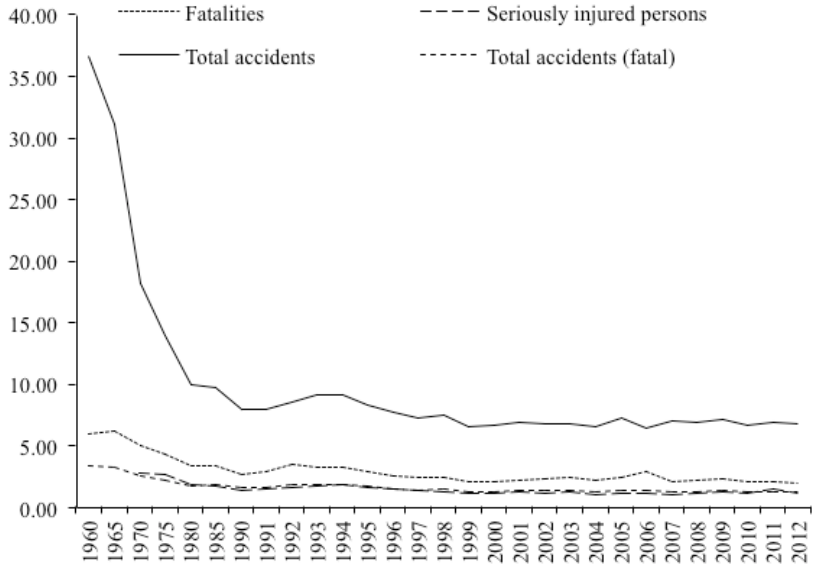
[9] Jones-Lee, M. and Looms, G. (2003) Valuation of Safety, in D.A. Hensher and K.J. Button (eds), *Handbook of Transport and the Environment*, Elsevier, Oxford, pp. 451-462.

somewhat better than in most other countries where general aviation plays a smaller role in the economy.



Source: Based on U.S. Department of Transportation, Bureau of Transportation Statistics, *U.S. General Aviation Safety Data*

FIGURE 1. Accident record of U.S. general aviation (1960-2012)



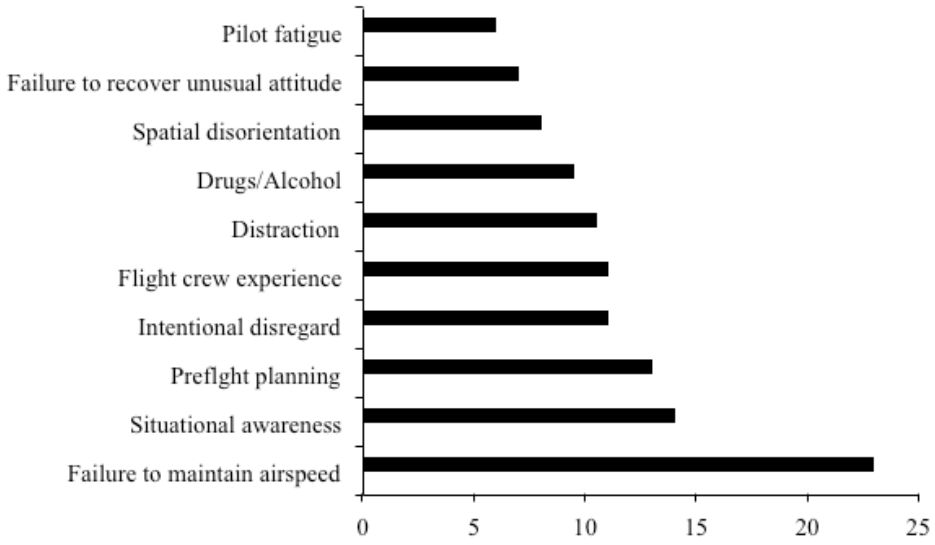
Source: Based on U.S. Department of Transportation, Bureau of Transportation Statistics, *U.S. General Aviation Safety Data*

FIGURE 2. U.S. general aviation accidents per 100,000 flight hours (1960-2012)

A problem with this analysis, however, is that the data on fight hours for general aviation is poor, making genuine risk analysis, a core calculation for public policy making, difficult; similar data limitations seem to exist helicopter emergency medical services[10]. While there have been improvements in data collection, this inevitably comes at a cost to those engaged in general aviation and, in particular, in terms of additional documentation requirements. Further, in terms of data, to gain better insights into causes of accidents, the FAA has enhanced its collection and maintenance of data on each certified pilot's recurrent training; the costs presumably being bourn as part of the certification fee.

In absolute terms the number of fatal accidents is relatively small in the U.S. (as a reference point, there were 34,080 road deaths and 2,362,000 injuries in 2012), and, from a public policy perspective, the vast majority of those involved were not third parties. A similar picture emerges involving non-fatal incidents. The issue centers less on actuarial risk calculations, and more on the public perceptions of the risk of an individual being impacted by a general aviation aircraft falling from the skies; but it is this perceived risk that forms the basis for providing public policy.

Although accidents can seldom be attributed to any single cause, or to a particular contributing factor, the overall pattern of causes and primary contributory factors to general aviation accidents have tended to remain fairly constant in recent years. It is clear that pilot error and loss of control are the main causes of accidents (NTSB data does suggest about 70% of fatal accidents, and 59% of non-fatal are due to pilot error, with pilots having less than 100 hours in the accident aircraft being particularly prone to involvement), but the details of contributing factors vary considerably as seen in Figure 3. The long-standing problems of pilot errors has been attributed to a variety of factors, such as inadequate recurrent training and poor training in cockpit management and aeronautical decision making.



Source: U.S. Federal Aviation, Administration *Transforming General Aviation Safety Five-Year Strategy*, FAA Flight Standards Service General Aviation and Commercial Division, AFS-800, Washington, 2011.

TABLE 3. Main contributory factors to general aviation accidents (2008-2009)

[10] U.S. Government Accountability Office *Aviation Safety; Enhanced Oversight and Improved Availability of Risk-based Data Could Further improve Safety*, GAO-12-24, Washington, D.C., 2013.

In addition to the broad trends in accidents there are also micro-patterns to the incidents that differ according to the segment of the sector into which they fit[11]. Personal operations, for example have long dominated the accident statistics, and in terms of hardware, experimental, amateur-built aircraft contribute disproportionately (some 22% of accidents between 2009 and 2013 for only 5% of general aviation's flight hours), whereas corporate operations, while accounting for about 14% of flight hours, are only responsible for about 1% of fatal accidents. The last statistics largely reflects the more advanced technologies employed by most aircraft engaged in corporate operations and greater pilot experience. In terms of time trends, these differences are important to appreciate; for example between 2008 and 2010, when the economy was in serious recession, personal flying hours fell by about 4%, whereas safer, corporate operations fell by 15% and hence raw accident figures may to some extent be reflecting changes in the composition of general aviation as much as changes in safety.

Recent reforms to FAA oversight

The Federal Aviation Administration is essentially concerned with the public interest aspect of general aviation. It has the responsibility for administering aircraft and pilot certification, conducting safety oversight of pilot training and general aviation operations, and taking enforcement actions against pilots and others who violate federal aviation requirements and safety standards. It manifestly is a regulatory body.

Measuring the net effects of such regulations is, however, difficult. At one level there is the generic problem in assessing safety regulation of defining the counterfactual; just what would the accident situation be without the regulation. There is then the matter of assessing whether the actions pursued are the best given that interventions are justified to enhance social welfare. Finally, there are issues about whether the administrative costs of enforcing regulations are minimized; this is generally a contentious issue for those who have to conform with regulations because the costs on them are often focused, but the benefits extend across many parties.

In the latter context, and in relations to general aviation regulation, there have been concerns expressed about the burden of regulations, including the time and money costs of conformity and administration. Much of the discussion, however, has tended to be focused on anecdotal evidence and the collective views of those in professional and trade associations, capturing the views of the third parties affected is less easy[12].

The FAA has also itself responded to some of these concerns, pointing to streamlining certification processes that have been initiated since 2005[13]. The challenges highlighted by the FAA in its responses include the problems posed by increases in the flow of new "aviation products"; technologies, new rulemaking and fleet-wide safety initiative, and the migration of

[11] U.S. Government Accountability Office, *General Aviation Safety: Additional FAA Efforts could help Identify and Mitigate Safety Risks*, GAO-13-36, Washington D.C., 2012.

[12] The FAA does have general guidelines for values to be put into its decisions making (e.g. see GRA, *Incorporated Economic Values for FAA Investment and Regulatory Decisions. A Guide*, FAA, Washington DC, 2004) although this does not cover the costs imposed on the regulated of meeting such things as pilot certification. .

[13] US Federal Aviation Administration Aircraft Certification Service, A Report from the Aircraft Certification Process Review and Reform Aviation Rulemaking Committee to the Federal Aviation Administration, *Recommendations on the Assessment of the Certification and Approval Process*, Washington DC, 2012

technologies from large transport airplanes to general aviation aircraft, but there is an acceptance that increased efficiency is still possible. A clear problem is that of public accountability, regulatory agencies are naturally risk averse because any failure regarding any individual application can affects others seeking certifications.

The Administration has also adopted a multiple faceted approach, largely based on changing the culture within general aviation, to improving the safety record of general aviation, with the stated goal of reducing the accident rate by 10% between 2009 and 2018[14]. A number of GAO reports suggest that progress is being made to improving the record of general aviation, although not without some criticism regarding the pace of change, and a number of remaining deficiencies in data collection[15]. It is also unclear how such a general target can easily be translated across such a diverse range of activities and technologies as general aviation, and where the safety record is so variable.

One issue is the difficulty in assessing the effectiveness of various initiatives because of inadequate informational bases. While the traditional data offers some general guidance as to safety tends, and there are efforts being made by the FAA to improve data, the industry is fragmented geographically, in terms of the services offered, and the by the types of suppliers involved making more issue specific statistics important to evaluate other than generic reforms.

Added to this, data collection of some types of information, such as on flight-hours (which have traditionally involved self-reporting) and on good indicators of a pilot's experience (which are important in assessing both the wider costs and the benefits of general aviation) has not been completed, and is time-consuming for users of the system to contribute. (This, or a lack of appreciation of the importance of the information, may explain low response rates to surveys). The collection also impacts on the FAA budget with, presumably, costs being passed on through certification fees. The GAO, for example, has pointed explicitly to this issue.[16]. There is thus the age-old trade-off between data quality and the generalized costs of its collection; in this context it is important to up-date collection methods and what information is gathered as circumstances change.

One such area regarding data collection and comparability that may reduce some burden on users of the general aviation, is that the FAA and NTSB seem to be improving cooperation[17]. Combined data banks and data collection should offer provide some opportunities to reduce surveys and reporting requirements. There may also be opportunities to combine data banks with the TSA.

In terms of policy initiatives to reduce burdens on the general aviation sector, the Small Airplane Revitalization Act into law in November 2013 initiating moves on the adoption of new

[14] U.S. Federal Aviation Administration, *Fact Sheet – General Aviation*, FAA, Washington, January 27, 2014

[15] U.S. Government Accountability Office, *Aviation Safety: Certification and Approval Processes Are Generally Viewed as Working Well, but Better Evaluative Information Needed to Improve Efficiency*, GAO-11-14, Washington, D.C., 2010; and U.S. Government Accountability Office, *Aviation Safety: Status of Recommendations to Improve FAA's Certification and Approval Processes*, GAO-14-142T, Washington D.C., 2013.

[16] U.S. Government Accountability Office *Aviation Safety FAA Efforts Have Improved Safety, but Challenges Remain in Key Areas,* GAO-13-442T, Washington, D.C., 2013.

[17] U.S. Government Accountability Office *Aviation Safety FAA Efforts Have Improved Safety, but Challenges Remain in Key Areas,* GAO-13-442T, Washington, D.C., 2013.

certification regulations intended to increase safety and reduce the certification costs of new Part 23 general aviation airplanes.

The law requires the FAA to creation of a new category covering aircraft parts and other products aimed at streamlining the certification process for light airplanes and related aviation products. This would allow for the swifter adoption of new aircraft designs and safety equipment as well as cut costs. In particular, it aims to reduce certification costs by half for general aviation aircraft that weigh less than 12,500 pounds with the FAA implementing recommendations of the Aviation Rulemaking Committee, composed of aviation authorities and industry representatives. Basically, these aircraft will not have to be designed and certified under the same regulatory requirements as heavier, more complex and higher performing aircraft.

From the industrial and users perspective, this should cut production costs and certification costs; in particular, for practical reasons, components are currently certified at the level of their highest customer base making them costly for lower end aircraft. The new regulations are also intended to reflect the lack of need for some equipment in the light general aviation market, and particularly in the experimental and light sports segment.

The concerns, and at this point they are concerns, are that the change is unlikely to make a difference because the bureaucratic nature of the FAA is unlikely to give up its power quickly, or to make certification easy, and that the issue of modifications of used planes, to update them with new safety equipment, autopilot, etc. is left unaddressed. Given the number of older aircraft, the impact on users is likely to be limited in the short run, although the measure should help manufacturers.

There is also the General Aviation Pilot Protection Act that has been under consideration, and is aimed at reducing bureaucracy relating to pilot activities, It would allow pilots to fly aircraft weighing less than 6,000 pounds, with six seats or less, flying under visual flight rules below 14,000 feet, and at speeds less than 250 knots as long as they meet the medical standards involved in attaining that current state driver's license, one argument being that a small plane is similar in size to an SUV and accidents due to "driver impairment" should be treated on a similar basis.

The aim is to reduce the hassle and cost of obtaining the Class III medical currently required. The evidence that large numbers of people are deterred from flying because of this requirement does not, however, seem strong. The more worrying aspect from a policy perspective is the two years or so that the FAA has taken to consider the matter.

Conclusions

That general aviation is important in a country as large, diverse and economically advanced as the U.S. seems difficult to question. That, by and large, the market has been effective in ensuring an efficient development of the sector, and allowing many of its benefits to be enjoyed also seems true. The challenge is that there is a public interest in general aviation that extends beyond those involved in the provision of the infrastructure and operational hardware, and those that make use of these.

In particular, matters of safety extend beyond individual flights to accidents involving others either in the air or on the ground; in effect to third parties. There is also a public perception, in part brought about by rare, but highly visible accidents, that general aviation is unsafe. In response to the safety reality, together with heightened public perceptions, the sector has been the subject to a variety of regulations. This has resulted in a variety of additional costs being introduced into the sector. Any additional costs are an obvious impediment to the growth of a

sector, and need to be monitored to ensure that at least commensurate public benefits result.

That there is a need for some forms of regulation in the public interest seems reasonable, but it also needs to be focused on elements that generate the greatest safety risk otherwise there is a danger the development of the sector may be stymied by an over reaction by the public. In particular, given the number of accidents involving pilot errors of various types in smaller, older privately operated aircraft it seems efficient to focus attention on these rather than less accident-prone corporate operations. In sum, the degree and the ways that the FAA intervene in general aviation should be specific to particular issues so as to minimize the costs of its actions.