IATA ECONOMIC BRIEFING

DECEMBER 2013

INEFFICIENCY IN EUROPEAN AIRSPACE

Summary and key points

- Delay and additional time loss: Eurocontrol estimates the flight delay and additional time lost to be 76.9 million minutes in 2012 (projected) and 86.8 million minutes in 2011.
- Cost of delay and additional time loss to airspace users and consumers: Total cost of the delay and additional time loss for airspace users and consumers is estimated at EUR 11.2 billion in 2012 and EUR 12.5 billion in 2011.
- In addition to inefficiencies due to delays and time losses there is also strong evidence of inefficiency due to suboptimal operational performance: this can be demonstrated through comparisons of performance among European ANSPs, between the US and European airspace and other regional comparisons.

Delay and additional time loss

- Eurocontrol projected for 2012 ATFM flights delays to be 10.8 million minutes. This is an improvement of 46% from 2011 when AFTM delays totaled 17.9 million minutes. However, the improvement in performance in 2012 needs to be seen in the context of a 2.7% traffic decrease year on year.
- In addition to flight delays, there were also time losses during taxi-out, en route and arrival (ASMA), these time losses were 20.4, 28.5 and 17.2 million minutes, respectively, totaling time losses of 66.1 million minutes in 2012. This marks a reduction in time losses of 4% from 68.9 million minutes in 2011.

Cost of delay and additional time loss to airspace users and consumers

- Eurocontrol estimates that due to the delay and additional time loss airspace users incurred costs of EUR 4.5 billion in 2012 and EUR 5.2 billion in 2011. ATFM delays account for 19% (EUR 850 million) of the delay and time loss costs in 2012 and 27% (EUR 1.4 billion) in 2011; with the remainder attributed to ANS related time losses.

Table 1: Cost to airspace users

		2011	2012
ANS	Taxi-out	950	950
	En route	850	800
	ASMA	1,950	1,900
ATFM	En-route and airport	1,400	850
Total cost		**5,150**	**4,500**

Source: Eurocontrol PRR 2012; Note: millions of Euros

- On top of the cost to airspace users, these delays and time losses also result in cost to consumers in lost time. As summarized in Table 2, the total cost to passengers amounts to EUR 6.7 billion in 2012 and EUR 7.3 billion in 2011. Passenger values of time may differ depending on where in the journey the time loss occurs as well as profile of travelers. This assessment uses the low end recommended value from Eurocontrol's Standard Inputs for Cost Benefit Analysis report as the average passenger value of time.

Table 2: Cost to passengers in lost time

	2011	2012
Total delay and time loss, million plane hours	1.45	1.28
Avg size of plane, seats	137	141
Avg industry load factor, %	78.3%	79.2%
Total passenger hours lost, million hours	156	143
Low end estimate value of time per passenger hour, EUR	47	47
Total cost to passengers in lost time, EUR million	**7,317**	**6,727**

Sources: Eurocontrol Performance Review Report May 2013 (delay and time loss), Eurocontrol Standard Inputs for Eurocontrol CBAs (passenger value of time), SRS Analyzer (number of flights and seats), IATA September 2013 Financial Forecast (load factors).

Other inefficiency due to suboptimal operational performance

US - European comparison

- Another way of looking at efficiency is by measuring operational productivity as a ratio of cost to output, in terms of either controlled flights (IFR) or flight hours controlled. With this measurement, the average European ANSP is significantly less efficient than the US system. While the two systems each exhibit distinct characteristics, they have many similarities that make them a relevant comparison. There are several distinguishing features associated with the US system such as a greater share of general aviation but also a higher relative density measure. Another key distinguishing feature is that the two systems are funded through very different approaches. The European system is set up so that ANSPs providing the service earn a return on the invested capital and expenses whereas the US system is run like a government program. Irrespective of these differences, an aggregate level assessment points to some clear conclusions about the relative efficiency of the two systems.
- As shown in Table 3, the US system has 23% less air traffic controllers but over 60% more controlled flights (IFRs). It also has over 37% of the work force as Air Traffic Controllers whereas in Europe Air Traffic Controllers make up less than 30% of the staff at ANSPs. When looking at cost per controlled flight the costs in Europe are over 34% higher compared to the US. Cost per flight hour are also over 32% higher in Europe. A US-Europe continental comparison of ANS cost-efficiency trends undertaken by Eurocontrol applied a different methodology for comparing the cost effectiveness of the two systems but results were largely consistent with this assessment. Eurocontrol found that in 2011 unit costs in the US were lower by 34% compared to Europe.
- Europe did experience moderate improvement in cost effectiveness relative to the US between 2010 and 2012 but this was in part explained by currency fluctuations for which this analysis does not adjust.

Table 3: Efficiency measures comparing US-European air navigation systems (2012)

	Europe	US
Geographic Area (million km2)	11.5	10.4
Number of Air Traffic Controllers (ATCOs in Ops.)	17200	13300
Total staff	58000	35500
Controlled flights (IFR) (million)	9.5	15.2
Share of General Aviation	0.039	0.21
Flight hours controlled (million)	14.2	22.4
Relative density (flight hours per km2)	1.2	2.2
Average length of flight (within respective airspace), NM	559	511
Total costs, EUR mil	8223	9806
EFFICIENCY MEASURES		
Cost per controlled flight (IFR), EUR	**866**	**645**
Cost per flight hour, EUR	**579**	**438**

Source: Eurocontrol and US FAA 2012 US/Europe Comparisons of ATM-Related Operational performance; Eurocontrol (Europe total cost), FAA (US total cost).

Intra-Europe comparison

- Another way of looking at efficiency is by measuring operational productivity in relation to costs. In particular, a study on Economic Efficiency of European Air Traffic Control Systems[1] considers input costs and key performance outputs to evaluate efficiency.[2] Their assessment reveals that there is a high degree of variance in the efficiency across European ANSPs. The difference between least efficient and most efficient ANSPs in most years amounts to about 70%. In the most recent year for which data was available (2009) one third of ANSPs performed at an efficiency level lower than 50% of the top performers. This suggests a high level of inefficiency build up among some ANSPs.
- This high variance may partly be due to the diversity of the operating circumstances of ANSPs. According to the same study there is a positive correlation between efficiency and the number of sectors each ANSPs handles, which suggest that there may be economies of scope and/or scale. More efficient ANSPs also tend to have lower ratio of overall staff employed to the air traffic controllers employed. This suggests that a leaner administrative structure can contribute to greater efficiency.

[1] Kenneth Button and Rui Neiva, Economic Efficiency of European Air traffic Control Systems, Journal of Transport Economics and Policy, January 2014, pp. 65-80.
[2] The two inputs to the production of ANS are: (i) gate-to-gate air traffic management, navigation and surveillance provisions costs; and (ii) other gate-to-gate costs of non-control services. The ANS outputs are measured through three variables: (i) IFR flight-hours controlled (ii) IFR airport movements controlled; and (iii) minutes of ATFM delays exceeding 15 minutes.

Of the five highest actual surplus recipients, as estimated by Eurocontorol PRB 2012, all five were identified in the Button and Neiva study as being less than 40% as efficient as the most efficient ANSP with four out of the five being less than 50% as efficient. However, the ANSPs generating the actual surplus ranked 6th through 10th were rated as some of the most efficient ANSPs and include the second, third and fourth most efficiently rated ANSPs in 2009. This suggests that there are significant efficiency gains to be realized across a wide range of ANSPs, including those that are considered efficient relative to their European comparators.

Global comparison

- A global comparison across regions raises greater concerns related to heterogeneity of ANSPs as well as lack of suitable data to develop fully comparable measures. Despite the methodological difficulties and shortcomings in undertaking such a comparison, Table 4 provides a summary of an aggregate assessment across regions while trying to explain the differences.
- The comparison is undertaken by using 2011 ATM revenue and/or budget data reported by ANSPs either through their annual reports or CANSO. ATM revenue/budget data is not available for all ANSPs, so the regional sample ANSPs for which data is available is used to fill the gap for assessing costs of air navigation services. Data on IFR flight hours controlled or IFR airport movements was not available across all regions so as proxy for aviation activity departing flights from relevant countries is used for scaling up cost estimates. Departing flights are also used as the basis to assess efficiency.

Table 4: Global comparison of air navigation service costs

	Euro	AsiaPac	Afr&ME	N Asia	LatAm
Sample size, %	100%	64%	38%	99%	53%
Total cost, EUR billion	7.97	3.68	0.64	0.16	0.89
Cost per departing flight, EUR	1135	775	363	55	315

Source: CANSO ATM Report and Directory 2012 (total cost), SRSAnalyzer (scheduled flights).

- There are several factors that make it difficult to compare the above data across regions. The figures for Asia Pacific may also be biased upwards given the presence of Japan in the sample. Japan makes up 30% of the 64% sample of all of Asia Pacific; the share of Japan's departing flights would otherwise be about 20%. Since costs per flight in Japan are significantly higher than the rest of Asia Pacific this may contribute to skewing upward the cost per departing flight. Africa and Middle East as well as Latin America estimates are based on a relatively low sample size which may not be representative of the entire region. Estimates for North Asia are largely driven by the Chinese market, where it may be that these estimate are either not reflective of the cost of providing these service, for instance if there military participation, or could also be explained by lower wage costs.
- Despite these observation and potential methodological concerns, the aggregated regional estimates point to Europe significantly lagging behind other region in terms of cost efficiency of providing air navigation services. This further support the suggestion that ANSPs across Europe have significant pent-up inefficiency.

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