

HOW MUCH MONEY COULD PASSENGERS EARN IF THE U.S. HAD EUROPEAN AIRLINE CONSUMER PROTECTION LAWS?

Lance Sherry

Center for Air Transportation Systems Research at George Mason University, Fairfax, Virginia

Abstract

Whereas a deregulated marketplace for airline transportation has provided consumer benefits in reduced airfares, and options for amenities and quality of service, it has not exhibited improvements in the reliability of the transportation service with regard to on-time gate arrivals. For example, in 2016, U.S. domestic operations exhibited an 81 % on-time performance. Of the 27% of the flights that operated but were not on-time, 28% were attributed to “carrier delays.” These are disruptions that *cannot* be attributed to Extraordinary Circumstances (EoCs) such as extreme weather, national airspace system congestion, late arriving aircraft, or security.

To protect consumers and incentivize airlines to address disruptions under their operational jurisdiction, the European Commission has a Passenger Bill of Rights (PBR) law, known as EC-261, that requires airlines to compensate passengers when flights that are not under EoC are delayed by more than 180 minutes or cancelled without advance notice.

This paper estimates the financial impact of EC-261 if this law were applied to U.S. domestic and international flights that originate or terminate in the U.S. For the calendar year 2016, it is estimated that 0.4% of the flights meet the EC-216 compensation criteria. Compensation to passengers averaged \$299 per disrupted passenger or \$1.08 across all passengers. Under the assumption that every eligible passenger is compensated (i.e. no “breakage”), airlines operating these flights would be obliged to compensate passengers a maximum of \$955.7M (4% of pre-tax net income) or \$109 per flight. The methodology, results, and implications are discussed.

.Introduction

Government regulators of public resources (e.g. water, energy, and airspace) license operations

based on safety standards. With regard to operational quality of performance, regulators must walk a thin line between consumer protection and interfering in the marketplace.

One example, is the deregulated airline transportation industry. Despite reductions in airfares, passenger expectations remain high with regard to comfort amenities, cleanliness, and reliability of service. Whereas the airlines have “unbundled” their services to give their consumers more choice in comfort and amenities (e.g. seat selection, checked baggage, carry-on baggage, food and drink, entertainment, wi-fi), there has been no success in differentiating the reliability of the airline’s core service of origin to destination transportation. For example, in 2016, U.S. domestic operations exhibited an 81 % on-time performance [1].

The absence of differentiation in the reliability of transportation service has been attributed to factors not in the airlines control: access to airspace and airport resources in periods of congestion, weather impact on air travel, labor actions, political events and other factors outside of the airline’s operational jurisdiction.

Recent data on the causes of delays, provided by air transportation regulators in the U.S. show that of the 17.6% of the flights delayed in 2016, 5% of the flights (or 28% of the 17.6%) are attributed to “carrier delays” [1]. These are flight disruptions that are considered to be the result of direct airline operational decisions and actions.

To provide consumer protection and to incentivize airlines address “carrier delays,” several jurisdictions have introduced “Passenger Bill of Rights” (PBR) rules to that require airlines to compensate passengers for poor service reliability (e.g. Brasil, China, Israel, Saudi Arabia). The most comprehensive PBR rule is the European Commission (EC) Rule 261 that was introduced by the European Union (EU) in 2004 [2].

EC261 applies to all airlines domiciled in the EU, as well as all non-EU domiciled airlines that operate to or from an airport in the EU. The rules established mandatory monetary compensation to passengers for denied boarding, flights cancelled without advance notice, or long delay of flights (i.e. arrival delay > 180 minutes). Compensation is exempted when a flight is disrupted and the flight is affected by 32 different Extra-ordinary Circumstance (EoC) defined in the rule.

Due to the complexity of filing and providing proof of claim, several third party “claim management” (CM) enterprises provide “no-win no-fee” claim filing services with a (e.g. Airhelp.com)

This paper describes a methodology for estimating EC-261 eligible flights taking into account EoC, and calculating the compensation. A case-study for domestic and international flights operating from 32 major U.S. airports in 2016 showed that:

- 0.4% of the flights meet the EC-216 compensation criteria
- Compensation to passengers averaged \$299 per disrupted passenger or \$1.08 across all passengers
- Under the assumption that every eligible passenger is compensated (i.e. no “breakage”), airlines operating these flights would be obliged to compensate passengers a maximum of \$955.7M (4% of pre-tax net income) or \$109 per flight.

This paper is organized as follows: the next section provides an overview of the EC-261 rule, followed by a description of the methodology. The results of the cases study are provided along with implications of these results and the limitations of the method are discussed.

Overview of Passenger Bills of Rights

In the spirit of consumer protection with recognition that a portion of airline delays and cancellations are the result of airline choices, several governments have enacted “Passenger Bill of Rights” regulations (Table 1). The PBR with the most extensive scope is that of the European Commission EC-261 regulation introduced in 2004

[2]. This regulation, intended to establish common rules for the members of the European Union, provides compensation for flight delays of more than 3 hours, flights cancelled without advance notice, and denied boarding.

Brasil, China, Israel and Saudi Arabia all have explicit rules for passenger accommodation and reimbursement of tickets in the event of excessive flight delays and cancellation. The PBR regulations are summarized in Table 1.

On the other end of the spectrum is the U.S. consumer protection rules that are limited to compensation for passengers involuntarily denied boarding and establishes a maximum time (i.e. three hours for domestic flights and four hours for international flights) for tarmac delays. Violations of tarmac delay rules result in fines of the airlines, not to passengers. Note, EC-261 has discussed but not yet enacted rules related to extended tarmac delays.

The International Civil Aviation Organization (ICAO) has developed guidance material on consumer “interests”: conditions of carriage, fare guarantee, baggage, tariff disclosure and denied boarding. This guidance is contained in the “Policy and Guidance Material on the Regulation of International Air Transport (Doc 9587)” [3] and “Manual on the Regulation of International Air Transport (Doc 9626, Appendix 5)” [4] to assist governments in publishing or encouraging the publication of booklets intended to inform air passengers and shippers of their rights and obligations.

Extra-Ordinary Circumstances (EoC)

EC-261 provides explicit definitions of the types of events in which the airlines are exempted from providing compensation. An Extra ordinary Circumstance (EoC) must meet the following criteria:

- (1) unpredictable
- (2) unavoidable (by the carrier)
- (3) external (to the carrier)

The air carrier must provide proof of the circumstances alleged and it must also clearly demonstrate how these circumstances resulted in

TABLE 1: Summary of government Passenger Bill of Rights (PBR)

PBR	Delay Compensation	Cancellation Compensation	Missed Connections	Denied Boarding	Tarmac Delay	Source
Brasil/Resolution 141	1 hour: communications 2 hour: food 4 – hour: immediate reimburse ticket	Immediate reimburse ticket	None	Rebook on next available flight		http://www.anac.gov.br/biblioteca/resolucao/2010/R_A2010-0141.pdf
China/Decree #49 and #70 CAAC Provisions on the Management of Flight Regularity	< 6 hours: food 6+ hours: accommodation	Reimburse ticket	None		Max 3 hours in tarmac	http://www.lexology.com/library/detail.aspx?g=cb8a8fb9-858a-478e-af0c-b9e0dc9c1d86
European Union/EC-261	3 hours: compensation based on stage-length	Cancellation 7 to 14 days with rebook more than 2 hours early or 4 hours late: compensation based on stage-length Cancellation less than 7 days with rebook more than 1 hours early or 2 hours late: compensation based on stage-length	Missed connection resulting in 3+ hours delay: compensation based on stage-length	Compensation based on stage-length	Proposed not enacted	http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32004R0261&from=en
Israel/Airline Passenger Rights Law 2012	5 – 8 hours: replacement, reimbursement of ticket 8+ hours	< 14 days and rebook more than 8 hours delay then compensation	None	Compensation based on stage-length	None	http://www.tourism-law.co.il/pdf/AviationServicesLawENG.pdf
Saudi Arabia/General Authority of Civil Aviation Article 8	6+ hours: SR300 per hour not to exceed SR3000	< 7 days: rebook or reimburse ticket	None	rebook or reimburse ticket	None	
U.S.	None	None	None	Compensation	3 hours return to gate	https://www.transportation.gov/airconsumer/fly-rights

the flight disruption. After demonstrating the existence of EoC, the air carrier must also explain what reasonable measures it took to subsequently avoid the disruption. The Operating airline is liable for compensation (not the ticketing airline).

There are 12 categories of EoC conditions with 35 independent events (see Table 2).

TABLE 2: Summary of Extra-ordinary Circumstances (EoC) defined in EC-216

No.	EoC Condition	Description
1	War/Political Instability	Unforeseen disruption arising from war & political instability of any kind where travel is not recommended.
2	War/ Political Instability	Where the supply of aircraft fuel is limited or unavailable at short notice and without pre-notification.

3	Unlawful act	Unlawful acts (for example terrorism)
4	Sabotage	Acts of sabotage to the aircraft scheduled to operate the flight or the air carrier's fleet.
5	Security	Closure of the airport of departure or the airport of arrival without pre-notification for security reasons.
6	Security	Bomb discovery or bomb scare either onboard the aircraft or at the airport of departure or the airport of arrival.
7	Security	Hi-jacking of the aircraft.
8	Security	Removal of unaccompanied baggage due to a serious security concern.
9	Security	Removal of an unruly passenger from the aircraft for security reasons - thereby causing either a flight delay or diversion.
10	Meteorological	Weather conditions incompatible with the safe operation of the flight. These weather conditions may be forecast to arise at either the airport of departure, the airport of arrival or along the intended flight path of the aircraft.
11	Meteorological	Closure of either the airport of departure or the airport of arrival due to meteorological conditions.
12	Meteorological	Weather conditions resulting in capacity restrictions at either the airport of arrival or the airport of departure.
13	Meteorological	Damage to the aircraft which could affect the safety of the flight or the integrity of the aircraft and requires immediate assessment and/or repair and caused by other meteorological events (for example: lightning strikes, hailstones, thunderstorms, severe turbulence etc).
14	Meteorological/De-icing	Extreme weather conditions which result in the elevated consumption and subsequent exhaustion of what would usually constitute ample de-icing stocks due to third party supply failures - with the result that the aircraft cannot be de-iced for departure.
15	Airport Closure	Closure of either the airport of arrival or the airport of departure for non-security and non-meteorological reasons.
16	Medical Grounds	Passenger or crew member becomes seriously ill or dies on-board or during the flight.
17	Bird-strikes	Bird-strikes to the aircraft during a flight which might cause damage which requires immediate compulsory checks and possible repair.
18	Manufacturing Defects	Discovery of a hidden manufacturing defect by the air carrier (this is often noted by unusual failure of the same aircraft part)
19	Unexpected flight safety shortcomings	Damage to the aircraft primary or secondary structure (e.g. metallic or composite structure) caused by third parties on the ground prior to the departure of a flight and requiring immediate assessment and/or repair. For example a collision between an airport vehicle and an aircraft.
20	Unexpected flight safety shortcomings	Unexpected flight safety shortcomings In-flight damage to the aircraft during the preceding flight, caused by a foreign-object,

		and which requires immediate assessment and/or repair.
21	Unexpected flight safety shortcomings	Any technical issues which cause the pilot to carry out an aircraft turnaround or diversion.
22	Unexpected flight safety shortcomings	Failure of the bleed-air system/environmental control system on an aircraft (which had been properly maintained) either immediately prior to departure or in-flight.
23	Unexpected flight safety shortcomings	Premature failure of life-limited parts (as referenced in applicable maintenance data, contained within the aircraft maintenance manual, or Maintenance Planning Document (MPD), or Maintenance Review Board Report (MRBR)) prior to their scheduled inspection/removal/retirement date (where those parts had been maintained in accordance with the required maintenance program).
24	Unexpected flight safety shortcomings	Failure of on-condition/condition monitored parts i.e. parts which should not require unscheduled maintenance or replacement during normal operational service (for example propeller oil-temperature gauges. The premature failure of these parts during normal operational service when maintained in accordance with the maintenance program is unpredictable).
25	Unexpected flight safety shortcomings	Failure of necessary or required aircraft systems (for example the cooling system, avionics system, flight control system, flaps, slats, rudders, thrust reverser, landing gear) either immediately prior to departure or in-flight (where those systems had been maintained in accordance with the required maintenance program).
26	Unexpected flight safety shortcomings	Any other technical defects which become apparent immediately prior to departure or in-flight (where the system or part had been maintained in accordance with the required maintenance program) and which require investigation and/or repair before the aircraft is airworthy for the intended flight.
27	Unexpected flight safety shortcomings	Smoke, fire or fumes on board the aircraft unless the problem has been caused by a part not being maintained in accordance with the required maintenance program or due to a failure to follow appropriate operational procedures.
28	Industrial Relations	Issues Strikes that affect the operation of an air carrier. For example strikes undertaken by Air Traffic Control
29	Air Traffic Management	Where Air Traffic Control suspends or restricts operations out of the airport of departure or into the airport of arrival.
30	Air Traffic Management	Where Air Traffic Control suspends or restricts operations into or out of a block of air-space through which the air carrier must travel in order to operate the flight.

For clarification, the EC-261 identifies 5 circumstances in which an aircraft may not be able to operate that are deemed to be under the jurisdiction of the airline and not an EoC (see Table

3). These factors are related to airline responsibilities for aircraft maintenance, flight crew scheduling and aircraft maintenance documentation.

TABLE 3: Summary of non- Extra-ordinary Circumstances defined in EC-216

<u>No.</u>	<u>NOT EoC</u>	<u>Description</u>
	Technical Issues	Technical issues which arise as a result of the air carrier's failure to maintain its aircraft in accordance with the required maintenance program.
	Technical Issues	Technical issues which were found during maintenance where the part or system in question was scheduled to be checked. Over-running maintenance can be a reflection of poor maintenance planning.
	Crew Out-of-Hours	When this occurs as a result of poor operational planning by the air carrier and inadequate flight and turnaround times being allocated for the aircraft.
	Absence of correct Flight Documentation	Where the failure to prepare and submit the documentation necessary to operate the flight was due to factors within the air carrier's control.
5	Safety Assessment of Foreign Aircraft (SAFA) Inspection	s SAFA aircraft inspections which reveal technical issues which require immediate assessment and/or aircraft repair. (These are issues that should have been addressed during the normal maintenance or operation of the aircraft)

Method of Analysis

A method for estimating EC-261 compensation for a designated set of flights is summarized in Figure 1.

Candidate EC-261 Flights

Candidate EC-261 flights are identified from a flight performance data-base. The flights must be delayed by more than 180 minutes by the arrival delay (i.e. Actual GMT arrival time minus Scheduled GMT arrival time exceeded 180 minutes) or cancelled.

These flights are checked for eligibility for EC-261 compensation by evaluating their scheduled departure and arrival times with Extra-ordinary Circumstances (EoC) that may exist at the origin or destination airports, or in the airspace.

For eligible flights the number of passengers is estimated based on the seat count for the flight and the estimated load factor for the origin/destination

pair. Compensation is calculated for each passenger.

Extra-ordinary Circumstances (EoC)

Flights with arrival delay greater than 180 minutes were excluded for the following reasons considered Extra Ordinary Circumstances (EoC):

1. Flight identified as a diverted flight
2. Cause of delay: National Airspace System, Weather, Security, Late Arriving Flight not attributed to NAS/Weather/Security delays.

Flights designated as cancelled were excluded for the following reasons considered Extra Ordinary Circumstances (EoC):

1. Flight was cancelled due to safety issues (e.g. mechanical issue). Based on an estimate of flights are cancelled for safety (e.g. mechanical) issues, 60% flights were randomly selected for exclusion
2. Flight identified as cancelled for reason National Airspace System, Weather, or Security(not Carrier Delay)

For this analysis it is assumed that 10% of the flights cancelled for Carrier Delay reason notified passengers before 24 hours of scheduled departure time

Flights were not excluded due to propagated delays of the tail number from the previous leg.

Passenger Count

The number of passengers eligible for compensation was based on the number of seats on each flight and the estimated Load Factor for the flight. The number of seats was derived from the data. When this data was missing, the seats were estimated based on the typical number of seats for the equipment type. When this information was missing, an estimate of the average seats per flights for that month was used as default.

The Load Factor for each flight was based on the T100 Load Factor for the month for the origin/destination pair. When this information was not available the domestic system-wide Load Factor for the month was used as a default.

$$Pax(i) = Seats(i) * LF(i)$$

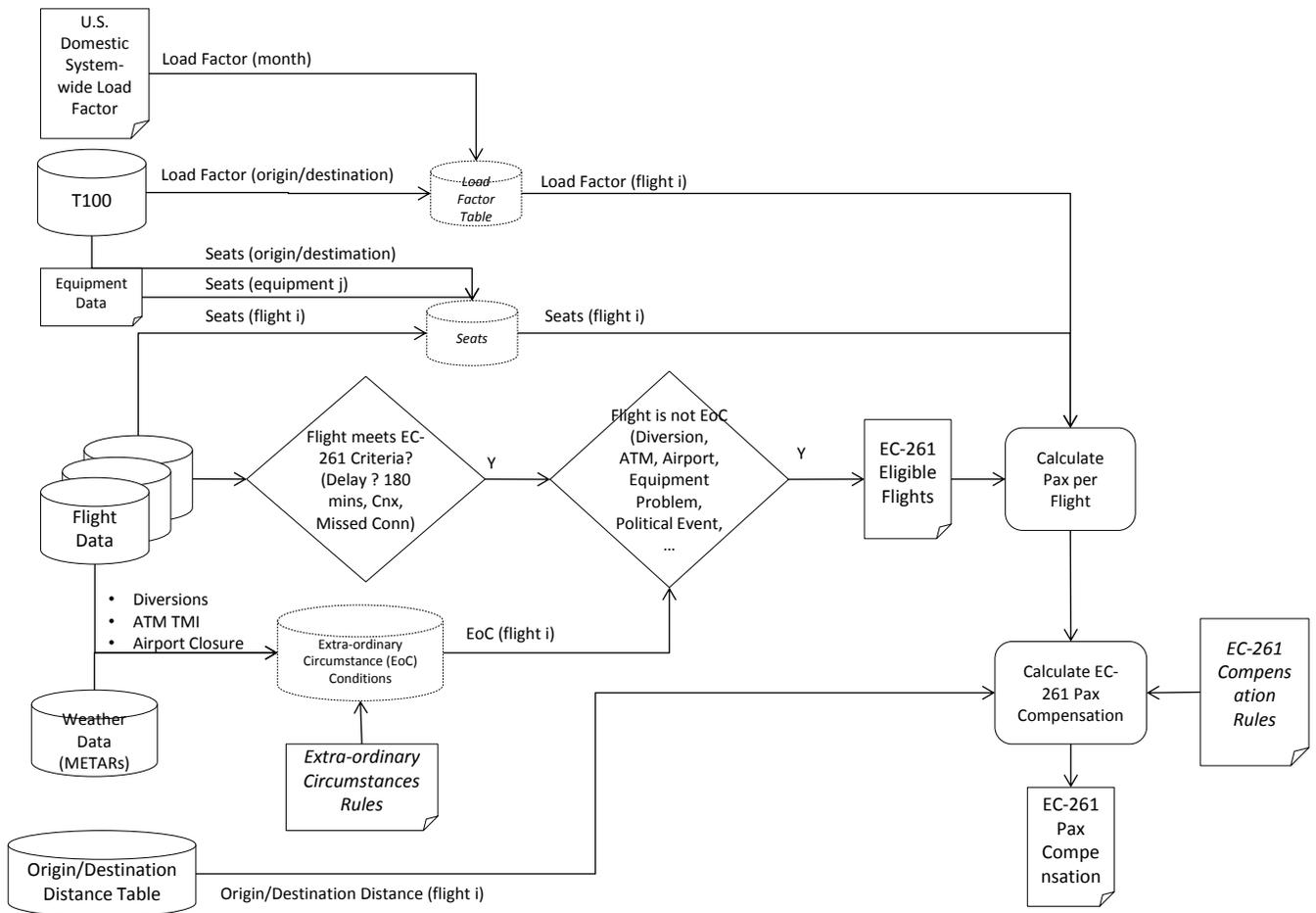


FIGURE 1: Method for Calculating estimates for Passenger Compensation for EC-261

where:

$Pax(i)$ = number of passengers on flight i

$Seats(i)$ = number of Seats on flight i

$LF(i)$ = Load Factor on flight i

Compensation Calculations

Total Compensation is the sum of compensation for the flights delayed over 180 minutes and the flights cancelled that did not meet EoC conditions.

$$STC = \sum Pax(i) * Comp(i)$$

Where:

i = flight that is delayed more than 180 minutes and is NOT EoC, or flight that is cancelled in advance and NOT EoC.

$Pax(i)$ = passengers on flight i

$Comp(i)$ = €250 if stage-length (i) < 1500km, €400 if stage-length is > 1500km and < 3500km, and €600 if stage-length is > 3500km

Euros were converted to \$ with an exchange rate of €1 = \$1.07.

Results

Analysis was conducted for all airline scheduled flights departing 32 major U.S. airports in calendar year 2016. Flights included domestic

and international flights with an origins and/or destination at one of 32 major airports.

Flight Statistics

During 2016, for the 32 airports, there were 8,315,851 flights (Table 4). Of those flights 195,025 (2.3%) flights were disrupted by the EC-261 criteria (i.e. delayed more than 180 minutes, or cancelled without rebooking options within a -2/+4 hour delay before 7 days of departure or within a -1/+2 hour delay within 7 days of departure). However due to Extra-ordinary Circumstances as defined by EC-261, 36,108 flights (0.4%) were eligible for Ec-261 compensation.

Within the set of flights that were disrupted and were not considered Extra-ordinary Circumstances (EoC), 69.7% were flights delayed by more than 180 minutes, and 30.3% were flights that were cancelled without appropriate rebooking options.

TABLE 4: Summary of flight statistics

Flight Statistics		
Flights Operated From/To Major Airports	32 U.S.	8,315,851
Estimated Enplaned Passengers		798,321,696
Disrupted Flights	195,025	2.3% of all flights
Delayed GT 180 Mins	116,771	59.9% of disrupted flights
Cancelled	78,254	40.1% of disrupted flights
Disrupted Flights (not EoC)	36,108	0.4% of all flights
Delayed Flights GT 180 Mins (not EoC)	25,152	69.7% of disrupted flights (not EoC)
Cancelled Flights (not EoC)	10,956	30.3% of disrupted flights (not EoC)
Disrupted Passengers (not	3,466,371	0.4% of all passengers

EoC)		
Delayed GT 180 Mins (not EoC)	2,342,198	67.6% of disrupted passengers (not EoC)
Cancelled (not EoC)	1,124,173	32.4% of disrupted passengers (not EoC)

EC-261 Compensation

During this period estimated compensation to disrupted passengers is estimated to be \$955.7.M (Table 5). This value is 4% of the net pre-tax income reported by U.S. airlines that are members of Airlines for America (airlines.org).

Sixty five percent (65%) of the compensation (\$619.5M) was for passengers on flights delayed by more than 180 minutes. Thirty five percent (35%) of the compensation was for passengers on cancelled flights.

This compensation is equivalent to \$1.20 for each enplaned passenger, and \$299.50 for each disrupted passenger.

This compensation is equivalent to \$108.80 per flight, and \$29K per disrupted flight.

The compensation calculated is a maximum compensation under the assumption that all eligible passengers take the necessary actions to file a claim for compensation. Industry averages for “breakage” (i.e. claims not filed) can be as high as 80%.

TABLE 5: Summary of EC-261 Compensation

EC-261 Compensation		
Total Compensation	\$955,713,368	
Delayed Flights GT 180 Mins	\$619,570,288	64.8% of total compensation
Cancelled Flights	\$336,143,080	35.2% of total compensation
Avg. Compensation per Disrupted Pax	\$299.5	
Avg. Compensation per Pax	\$1.20	
Avg. Compensation per Disrupted Flight	\$29,194.4	
Avg. Compensation per all Flights	\$108.8	

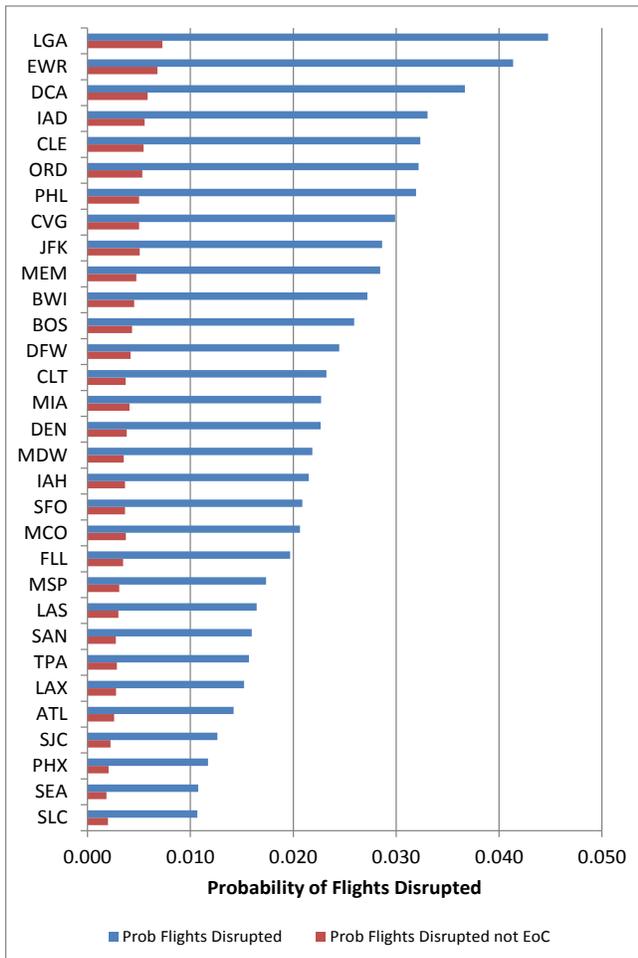


FIGURE 2: Airports ranked by disruption (EoC and not EoC) and by not EoC disruption.

Flight Disruption by Airport

Flight disruptions (i.e. greater than 180 minutes or cancelled without advance warning), by airport for all flights, ranges from 1.1% (SLC) to 4.5% (LGA) with a median and mean of 2.4%. Flight disruptions by airport for non-EoC flights, ranges from 0.2% (LGA) to 0.7% (SLC) with a median and mean of 0.4%. The airports ranked by disruption are illustrated in Figure 2.

On average, 1 out of 6 disrupted flights is not EoC.

There was no correlation between total operations and disruptions. Further there was no correlation between stage-length and disruptions. Each airports operation's was unique.

Maximum Passenger Compensation by Airport

The Maximum Passenger Compensation by airport is illustrated in Figure 3. The top 8 airports are considered “gateway hubs” with significant international service with Stage Lengths greater than 3500km: ORD (\$91.6M), JFK (\$87.6M), LAX (\$69.7M), EWR (\$68.4M), DFW (\$57.9M), SFO (\$53.5M), MIA (\$49.1M), ATL (43.7M).

The overall ranking follows an exponential form with Total Compensation (\$) = $5E+06e^{0.0925 * Rank}$ ($R^2 = 0.9755$). ORD and JFK airport contribute \$20M more than the 3rd ranked airport (LAX). The top 8 airports contribute 54% of the total compensation.

There was *no* correlation between Total Passenger compensation by airport and stage-length. ORD, with the highest compensation by airport has 74% of the flights less than 1500km, 20% between 1500 km and 3500km, and 5% greater than 3500 km. JFK, in contrast, with the second highest compensation has the percentage of flights flipped. JFK has 30% of the flights less than 1500 km, 27% between 1500 km and 3500km, and 42% greater than 3500 km.

Disrupted Passenger Compensation by Airport

The average compensation for each disrupted passenger ranged from a maximum of \$389.40 (JFK) to a minimum of \$250 (MEM). The top 4 airports with the highest compensation for disrupted passengers was JFK, LAX, SFO, and MIA with compensation in excess of \$300. The lowest average compensation was MEM, MDW, CVG, CLE, LGA and DCA. Memphis, Chicago- Midway, Cincinnati and Cleveland are located in the mid-west and are dominated by regional service. La Guardia and Washington National are slot controlled airports restricted to domestic service.

Conclusions

This paper describes an analysis of the compensation paid by U.S. airlines to passengers if these flights were subject to a EC-261 passenger bill of rights. The analysis was conducted for the calendar year 2016 for domestic and international flights to and from the 31 largest U.S. airports.

Flights that met the criteria for Extra-ordinary Circumstances (EoC) were excluded.

For this time period it is estimated 0.4% of the flights meet the EC-216 compensation criteria. Airlines operating these flights would be obliged to compensate passengers a total of \$955.7M (4% of pre-tax net income) or \$109 per flight. Compensation to passengers averaged \$299 per disrupted passenger or \$1.08 per passenger. “Gateway airports” with long distance international flights had both the higher likelihood of flights meeting the compensation criteria as well as the highest compensation.

How Airlines Manage EC-261 Claims

Processing EC-261 claims is a burden to airlines adding administrative and legal costs. Many airlines have well-defined policies and procedures for processing (and defending unmeritorious) claims. Other airlines seeking to reduce administrative and legal cost simply compensate passengers even for invalid claims for which they may have a valid defense. This may minimize costs and may boost customer loyalty. It can also encourage unmeritorious claims.

Airline Actions to Reduce Compensation Costs

Total compensation at an airport or for an airline is function of the number of seats operated in each stage-length category, the likelihood of these seats experiencing a non-EoC EC-261 flight disruption. The relative values of the compensation yields a weighting of the stage-length categories. Under the assumption that the number of seats flown and the likelihood of a non-EoC flight disruption are the same for each stage-length category, it takes 2.4 stage-length < 1500km flights to cost the airline one > 3500 km stage-length flight. Likewise, it takes 1.6 flights with stage-length < 1500km to cost the airline a single flight stage-lengths between 1500km and 3500km.

Accounting for the differences in average seats flown for each stage-length category, - average 90 seats for stage-length < 1500km, average 120 seats for stage-length 1500km to 3500 km, and average 250 seats for stage=length > 3500 km – the weights for the costs of each flight are 2.13 flights for stage-

length < 1500 km and 6.66 for each flight with stage-lengths for each flight > 3500 km.

Under these assumptions, initiatives by the airlines to reduce disruptions on the longest stage-lengths, whether tactical (e.g. gate assignments, slot swapping) or strategic (e.g. schedule), have the biggest impact on reducing airline compensation costs.

Airlines might also take steps to hedge against losses due to compensation payments. Airlines could insure against the losses through a 3rd party risk management or insurance firm. The insurance company would charge a premium that would cover the costs of payouts. An alternative approach is for the airline to budget an internal account that can be used to payout the compensation. In both cases, the premium and budget would need to be based on risk and ruin models.

Limitations of Analysis and Future Work

The analysis assumes that all eligible passengers applied for the compensation. The EC-261 rules require the passengers to submit claims. As is the case in all insurance domains, not every passenger is likely to submit claims. The effect of “breakage” could reduce the total compensation paid to as low as 20%.

The analysis could also be extended to include compensation for passengers on missed connections not affected by EoC, and to include compensation for passengers on flights delayed by a late arriving previous flights not impacted by EoC.

Acknowledgements

Thank you for technical contributions to George Donohue, John Shortle, Houda Kourdali, Oleksandra “Sasha” Snisarevska

References

- [1] Bureau of Transportation Statistics (2016) Airline On-Time Statistics and Delay Causes. Available on 3/9/2017 at https://www.transtats.bts.gov/OT_Delay/OT_DelayCause1.asp?pn=1
- [2] European Commission (2004) REGULATION (EC) No 261/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL o-

Article 3 - 4. February 2010 (<http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32004R0261>)

- [3] ICAO (2008) Policy and Guidance Material on the Economic Regulation of International Air Transport. International Civil Aviation Organization. Third Edition Doc 9587. Available 3/18/17 at http://www.icao.int/Meetings/atconf6/Documents/Doc%209587_en.pdf

- [4] ICAO (2004) Manual on the Regulation of International Air Transport. International Civil Aviation Organization. Second Edition Doc 9626 Available on 3/18/17 http://www.icao.int/Meetings/atconf6/Documents/Doc%209626_en.pdf

Email Addresses lsherry@gmu.edu.

2017 Integrated Communications Navigation and Surveillance (ICNS) Conference

April 18-20, 2017

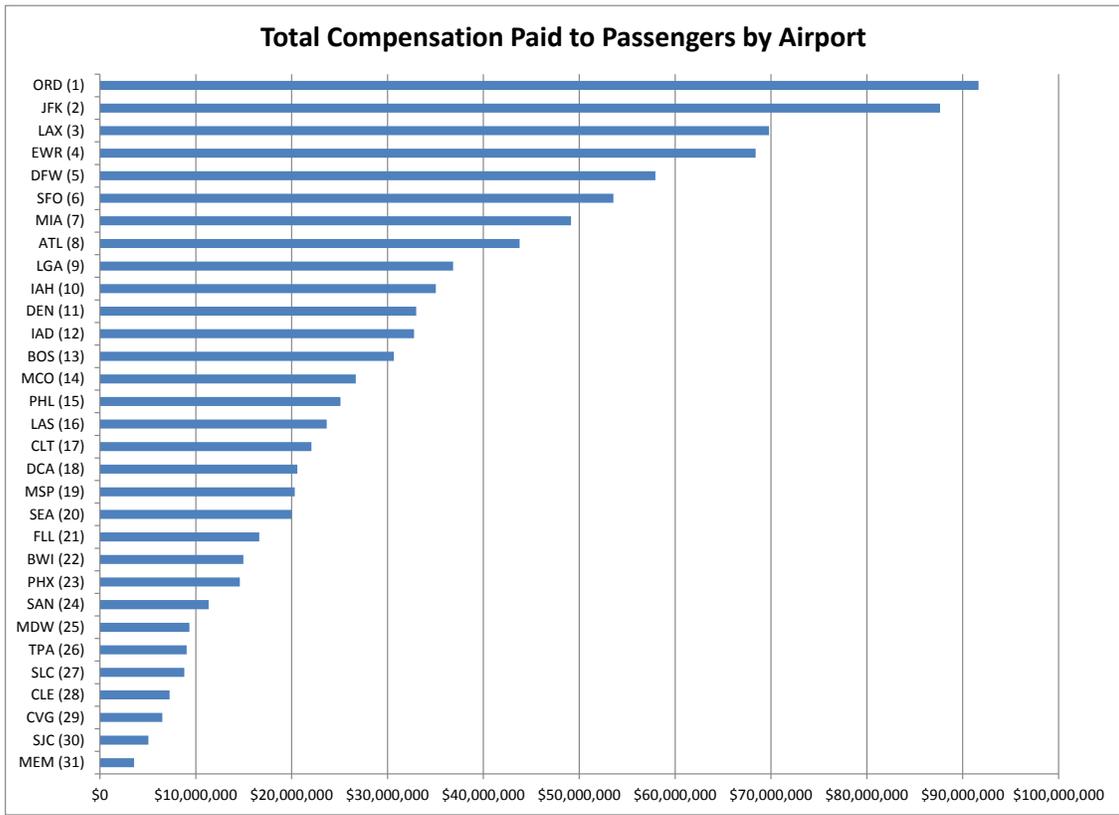


FIGURE 3: Total Compensation paid to passengers by airport

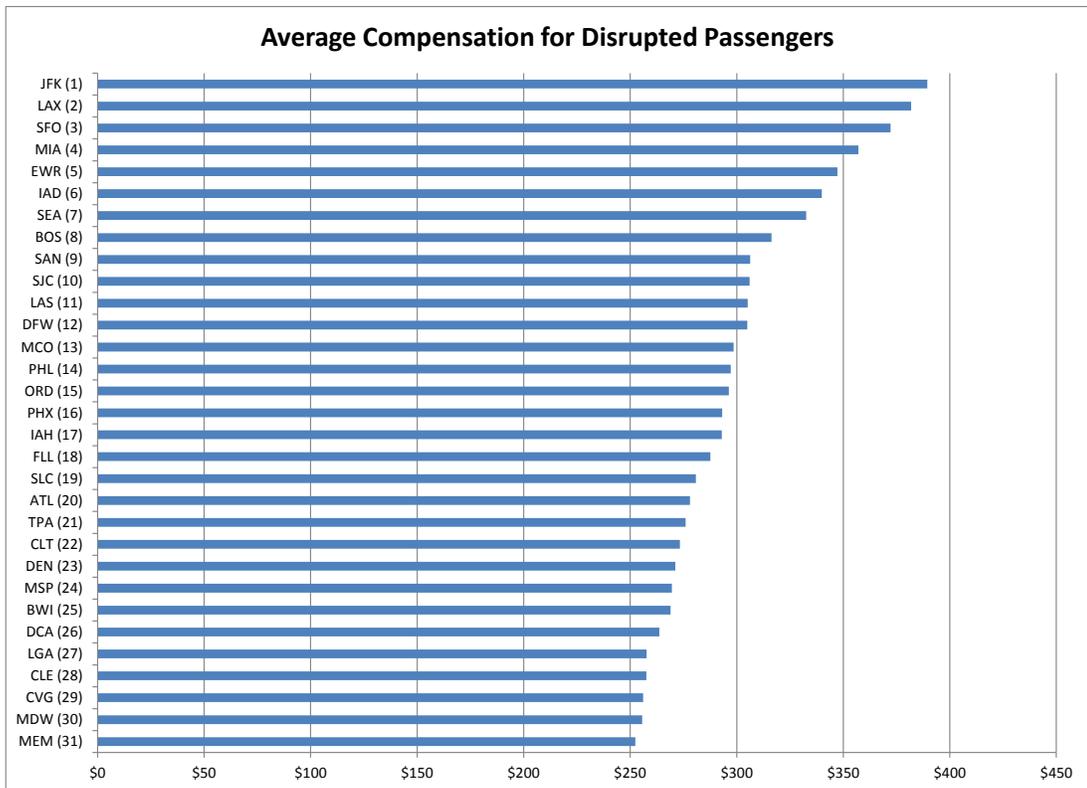


FIGURE 4: Average compensation paid to disrupted passengers by airport.