

Data Analyst Task  
Edinburgh Airport Flight Information August 2017

14.4.2021

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## Introduction

This report is a summary of the flight information at Edinburgh Airport in the month of August 2019 and the dataset used throughout this report contains a wide range of information about flights which have arrived or departed from Edinburgh Airport in the timeframe, such as the gate it departed from, how many passengers were on board and whether the passengers were driven to and from the aircraft by coach. As well as this, there are a number of key performance indicators (KPIs) which can be used to look at the performance of the various aspects of Edinburgh Airport which could lead to possible changes to enhance the experience of customers flying to and from the Airport.

This report used Microsoft Excel to analyse the dataset and provide visualisations which could provide interesting insights into the performance of flights within Edinburgh Airport. These visualisations have been explored in this Microsoft Word report, which allows for descriptions and explanations to be made on the data analysis which has been carried out.

My first decision when deciding how to carry out this data analysis was to clean up the data, as it contained data ranging from the 31<sup>st</sup> of July 2019 until the 31<sup>st</sup> of December 2020. As this report only looks at the data for the month of August 2019, the data was sorted into date order and all dates not within August 2019 were removed (a copy of the data was made first to allow for the dataset to be restored easily).

The next step was to make use of pivot tables as they provide a more useful (and more readable) summary of the data which can then be turned into different visualisations to allow for better decision making.

## Aircraft and Passenger Traffic

The first insight which will be looked at is the amount of aircraft traffic which has passed through Edinburgh Airport in August 2019 (figure 1).

Appendix A shows a pivot table of data being analysed. The first column shows the Airline which is operating the flights, followed by the number of arrivals and departures made by that airline, a total number of flights of each airline, and the final column shows the percentage of flights (arrivals and departures) which that airline made at Edinburgh Airport during August 2019.

The calculation used to find the percentage of total flights by each airline is shown below, with the field then converted into a percentage format.

`=GETPIVOTDATA("airport_code",$A$3,"airline",A5)/GETPIVOTDATA("airport_code",$A$3)`

The data shows that the two most popular airlines operating flights at Edinburgh Airport were EasyJet and Flybe, as together they operate over one third (35.33%) of all flights from Edinburgh Airport during this time period. Ryanair (15.15%) were not far behind, and the reason for these three flights being the most popular could be that they are known for offering cheap flights to a variety of different destinations which many people are interested in booking. British Airways operated approximately 10% of all flights at Edinburgh Airport, with LoganAir, Jet2 and Aer Lingus all having around 5% of all flights each. These airlines are all very popular choices in the UK and most people will know about these flights first when it comes to their bookings, which is why they operate such a large number of flights at Edinburgh Airport.

The rest of the airlines only operated a small proportion of the total number of flights at Edinburgh Airport, probably due to being lesser known to the UK public and not being the first airline which people think of booking their flights with.

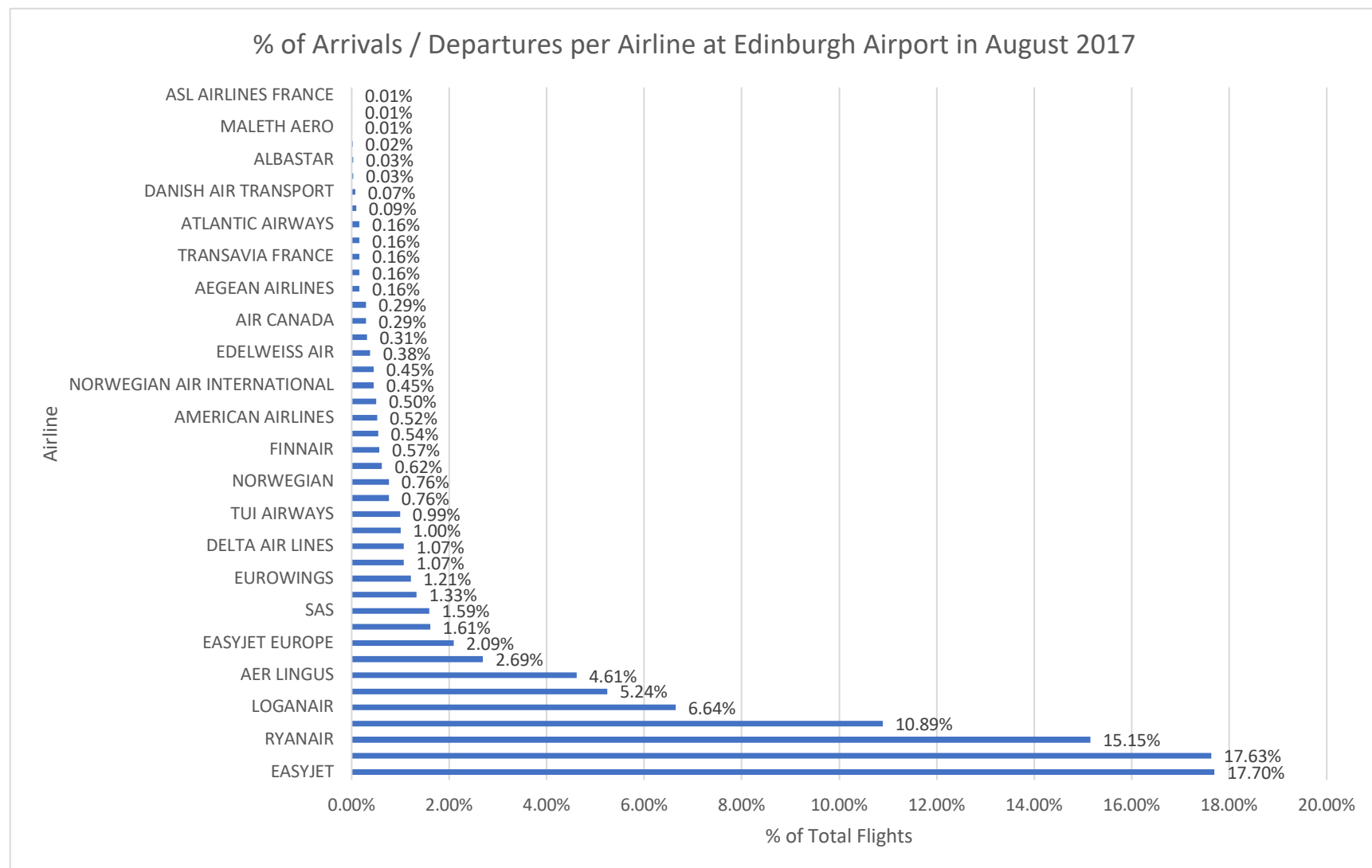


Figure 1: Graph Showing Percentage of Total flights for each Airline

The next visualisation is similar to the previous one, but rather than looking at the total flights, this looks at the total number of passengers (figure 2). The calculation used to find the percentage of the total passengers for each airline is shown below, with the field being converted into a percentage format, with the pivot table data in Appendix A.

`=GETPIVOTDATA("passengers",$A$3,"airline",A5)/GETPIVOTDATA("passengers",$A$3)`

EasyJet have the highest proportion of passengers (21.67%) out of all of the airlines who operated flights at Edinburgh Airport during August 2019, which makes sense as they also operated the highest proportion of flights during this time. However, it is interesting to see that Ryanair, who only operated 15.15% of flights actually carried over a fifth (20.93%) of all passengers who flew to / from Edinburgh Airport that month.

In contrast, Flybe operated a large proportion of flights (17.63%), but only carried 9.3% of all passengers. This could be because they have a fleet of much smaller aircraft (such as the Bombardier Dash 8 Q400) which has a much smaller capacity than the Airbus A320s which EasyJet often use for their flights. This means that Flybe must operate a much larger number of flights in order to have the same number of passengers that EasyJet carry.

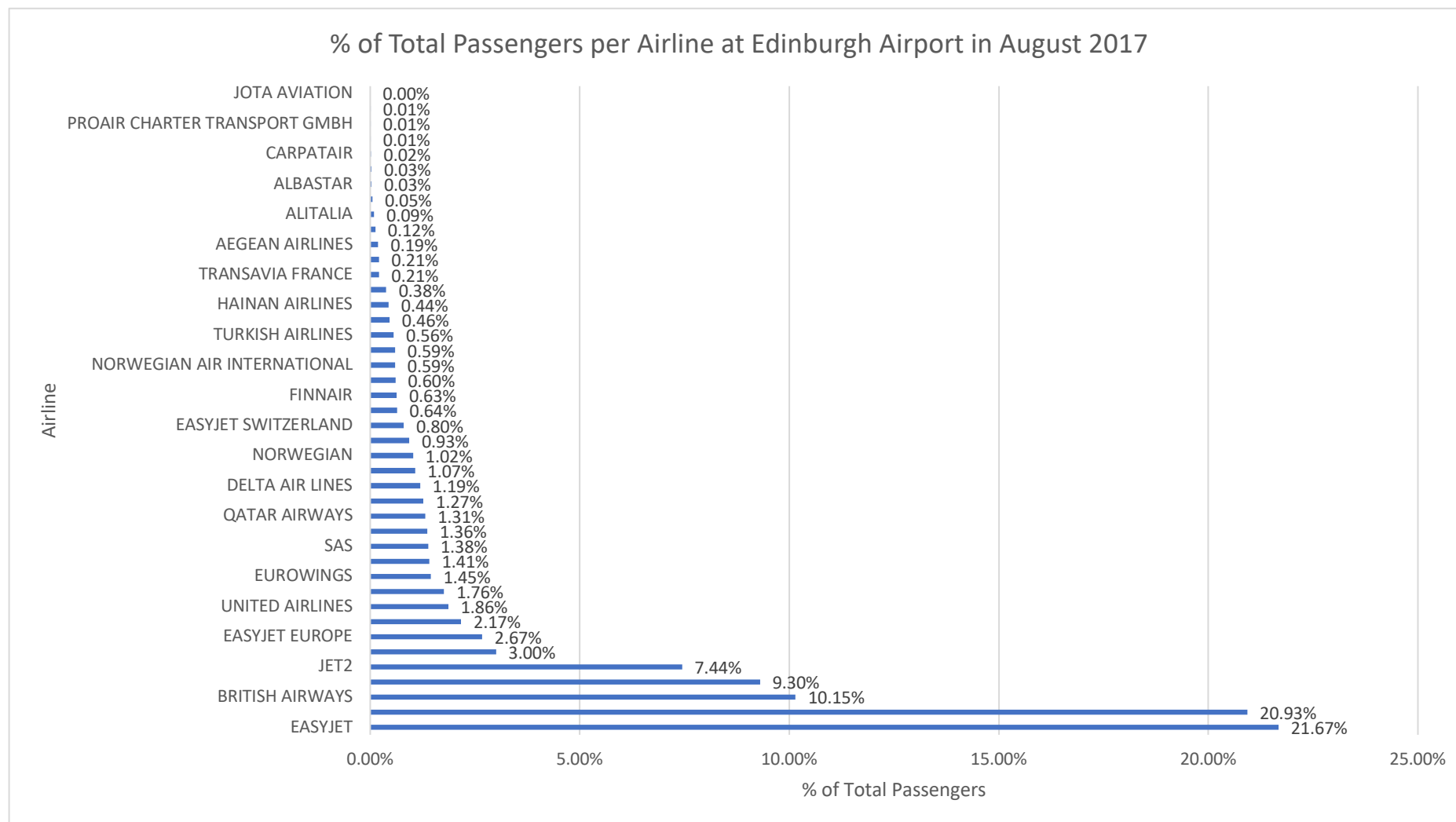


Figure 2: Graph Showing Percentage of Total Passengers for each Airline

## Aircraft Delays

The next data visualisation shows the percentage of total flights that were considered late at Edinburgh Airport (figure 3). This shows the airline operating the flights, the number of flights which were on-time (or less than 15 mins late), the number of late flights, the total number of flights, and the percentage of the airline's flights which were considered late.

The raw pivot table data can be found in appendix B. This key performance indicator can be calculated by subtracting the scheduled time away from the actual time of the flight, which shows the amount of delay which a flight encountered (if a flight was early, the delay was 00:00). After this, flights which were less than 15 minutes late were considered to have been on-time, therefore a new column was produced to find all flights where the delay was over 15 minutes.

<code>=MAX(0,B2-A2)</code>	<i>// subtract actual time – scheduled time</i>
<code>=IF(M2 &lt; \$M\$3, "Y", "N")</code>	<i>// if delay is over 15 mins, flight was late</i>

The first 3 airlines show 100% of their flights were considered late, but this is mainly because they only operated a small number of flights at Edinburgh Airport in August 2019 (less than 3 each). Moving onto airlines who operated at least 50 flights, Turkish Airlines (59%) and TUI Airways (56%) had some of the worst punctuality rates with over half of all their flights being over 15 minutes later than scheduled.

The larger airlines which operated the largest proportions of all flights at Edinburgh Airport had much better punctuality rates of less than half of all flights being delayed by more than 15 minutes, with 48% of EasyJet's flights being late and 44% of Flybe's flights being considered late. These rates, although could be better, are to be expected when they are operating such a large number of flights each day with short turnaround times.



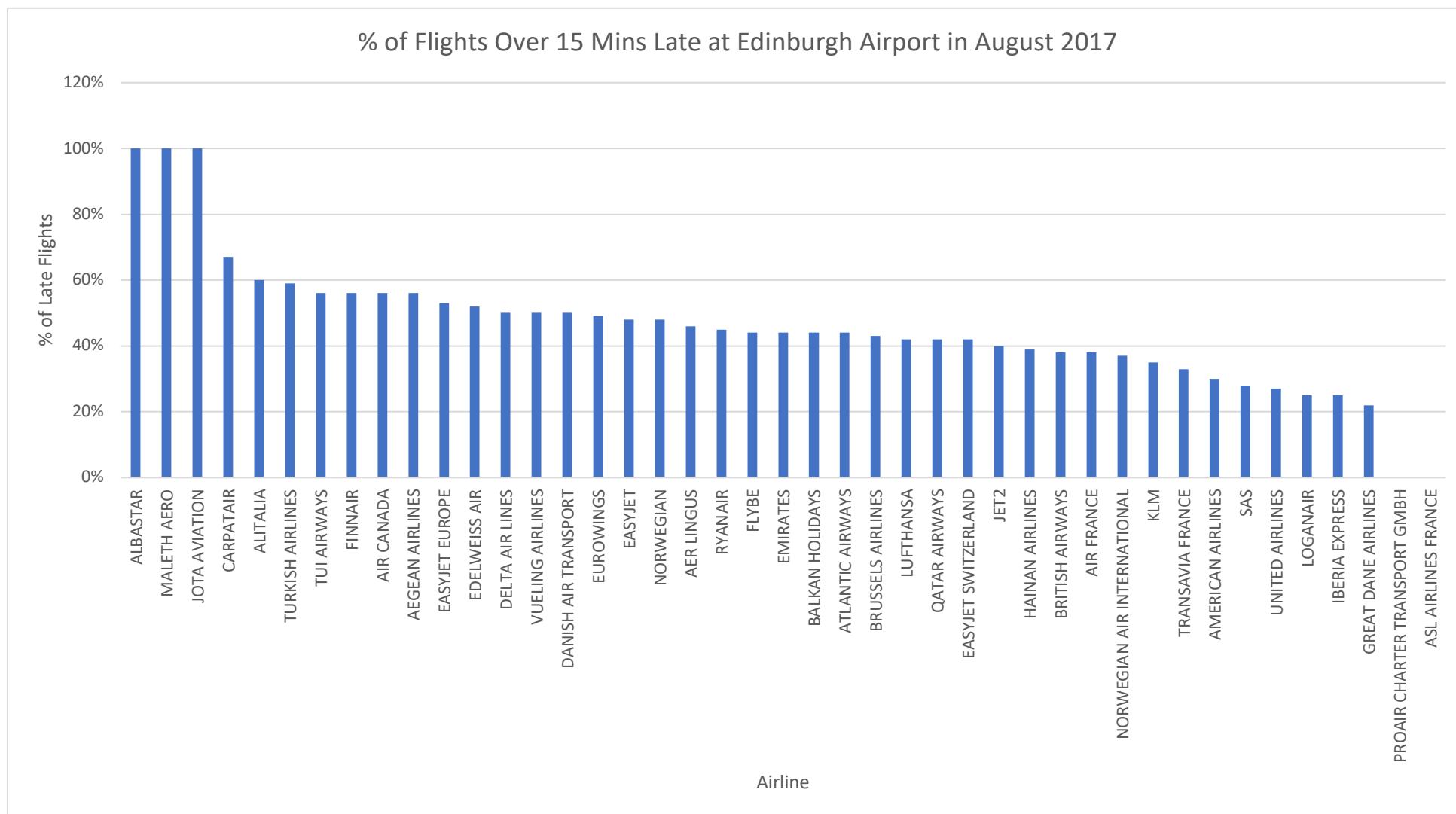
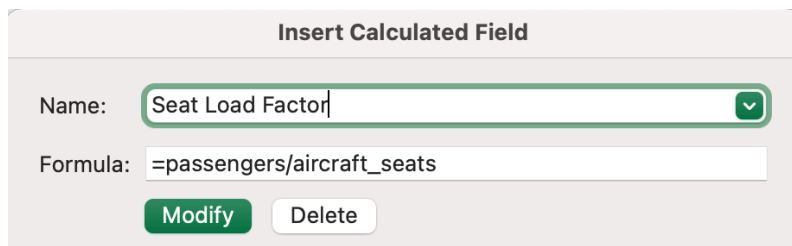


Figure 3: Graph Showing Percentage of Flights Over 15 Minutes Late at Edinburgh Airport

## Seat Load Factors

The next visualisation shows another of the key performance indicators (KPIs), by looking at how full the flights were compared to the plane's capacity (the Seat Load Factor – SLF - of the flight). It shows the SLF of the arrivals of each airline, the SLF of the departure flights of each airline, and the combined SLF for every airline. This data has then been converted into a graph to provide a better visual insight into how full each airline is when operating to / from Edinburgh Airport (figure 4).

This is calculated by creating a new calculated field for the Pivot Table (appendix C), where the number of passengers is divided by the number of seats on the aircraft, and the expression is shown below.



The image shows a screenshot of the 'Insert Calculated Field' dialog box in Microsoft Excel. The dialog box has a title bar that says 'Insert Calculated Field'. Inside, there are two main input fields: 'Name:' and 'Formula:'. The 'Name:' field contains the text 'Seat Load Factor' and has a green checkmark icon to its right. The 'Formula:' field contains the text '=passengers/aircraft\_seats'. Below these fields are two buttons: a green 'Modify' button and a white 'Delete' button with a grey border.

ProAir Charter Transport have the highest seat load factor, but this is to be expected as they offer private flights which only a small number of people use.

The airlines TUI Airways (0.966) and Jet2 (0.963) have very high seat load factors, which shows that the majority of their seats were occupied during their flights. This means that they did not have many empty seats which simply results in lost money for the airline as they are doing exactly the same journey but with less people on board resulting in less income for the airline.

EasyJet have a SLF of 0.906 which is to be expected as they are such a large airline, which means that they can put in a huge amount of research to look at which routes are the most popular. They can also constantly evaluate their existing routes to see which ones are not as popular and change them (or remove them entirely) if they are not as busy and profitable as they need to be.

On the other hand, Loganair only have a SLF of 0.653 which shows that their flights were approximately two fifths empty. This is not good news for the airline as they still have similar costs as if they were full, but with less people on board to make this worthwhile which results in less profits for the airline.

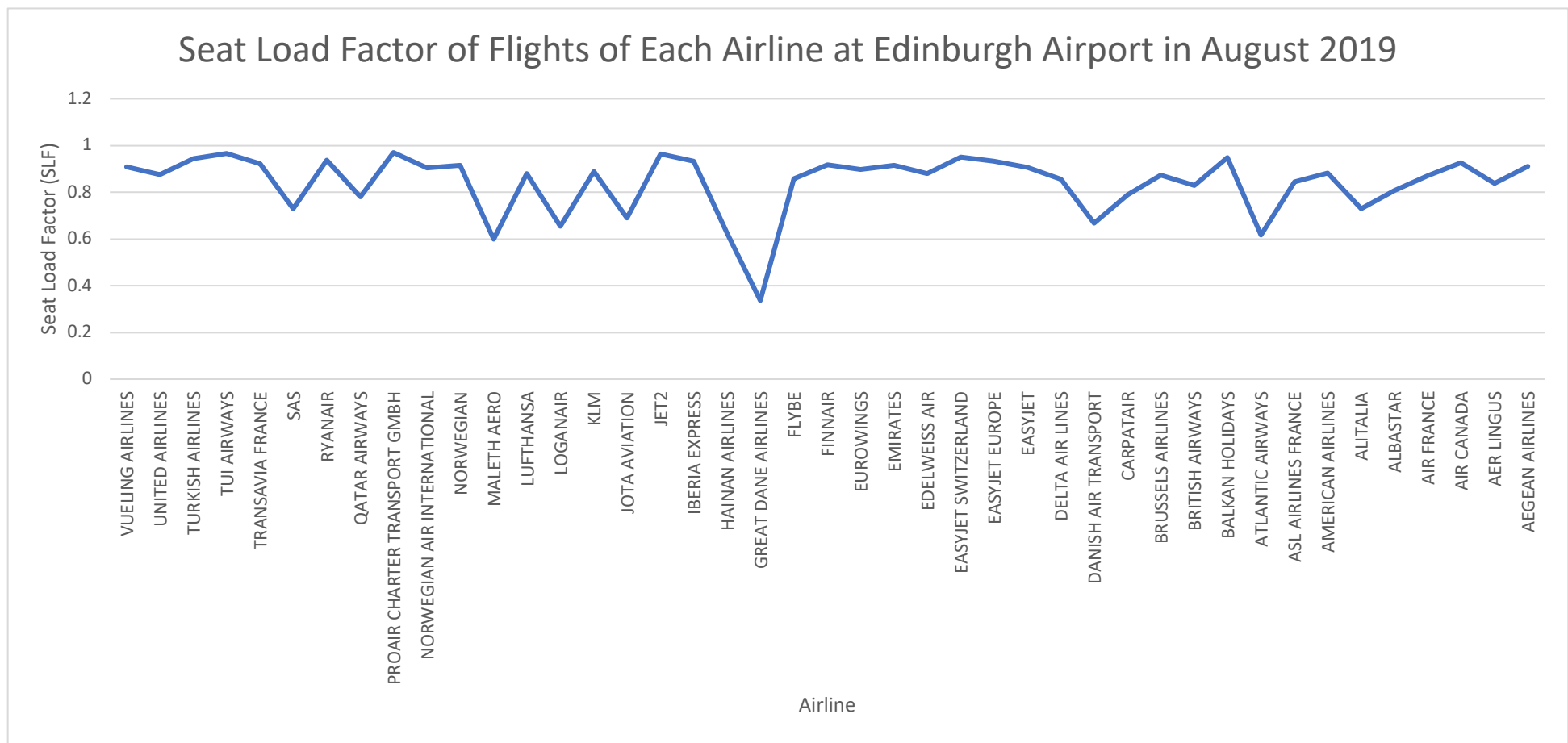


Figure 4: Graph Showing the Seat Load Factor for each Airline

## Pier Service Level

The final key performance indicator is about the pier service level, which looks at the number passengers who were driven between the aircraft and the terminal (figure 5). This shows the airline, the total number of flights they operated in August 2019, the number of these flights where the passengers were driven to / from the terminal, and the percentage of the airline's flights where the passengers were driven to / from the aircraft.

In order to calculate the percentage of passengers who were driven, the calculation is shown below, and the field was converted into a percentage format, with the pivot table data in appendix D.

```
=GETPIVOTDATA("Sum of  
was_coached",$A$3,"airline",A4)/GETPIVOTDATA("Count of  
airline_code",$A$3,"airline",A4)
```

From this data analysis, ProAir Charter Transport had 100% of flights where the passengers were driven to and from the aircraft. This will probably be because they operate private and luxury flights where the passengers have paid often expensive prices to experience something luxurious to allow them to relax before, during and after the flight.

For the bigger airlines who operate a much larger proportion of flights at Edinburgh Airport, TUI Airways have had just over half (51.75%) of their flights where the passenger was driven to and from the aircraft. One possible reason for this is that their aircraft might be directed to a gate which is far away from the terminal, which means that it is not possible for passengers to walk to / from the aircraft due to the dangers of an airport.

For the rest of the airlines, less than a third of their flights involved driving the passengers to or from the terminal, such as Loganair (29.24%), EasyJet (12.14%) and British Airways (2.55%). This could be because these airlines are often assigned gates which are relatively close to the terminal, which means that it is as easy (and safe) as possible for the passengers to walk to and from the terminal without needing to use a coach to drive them to where they need to go.

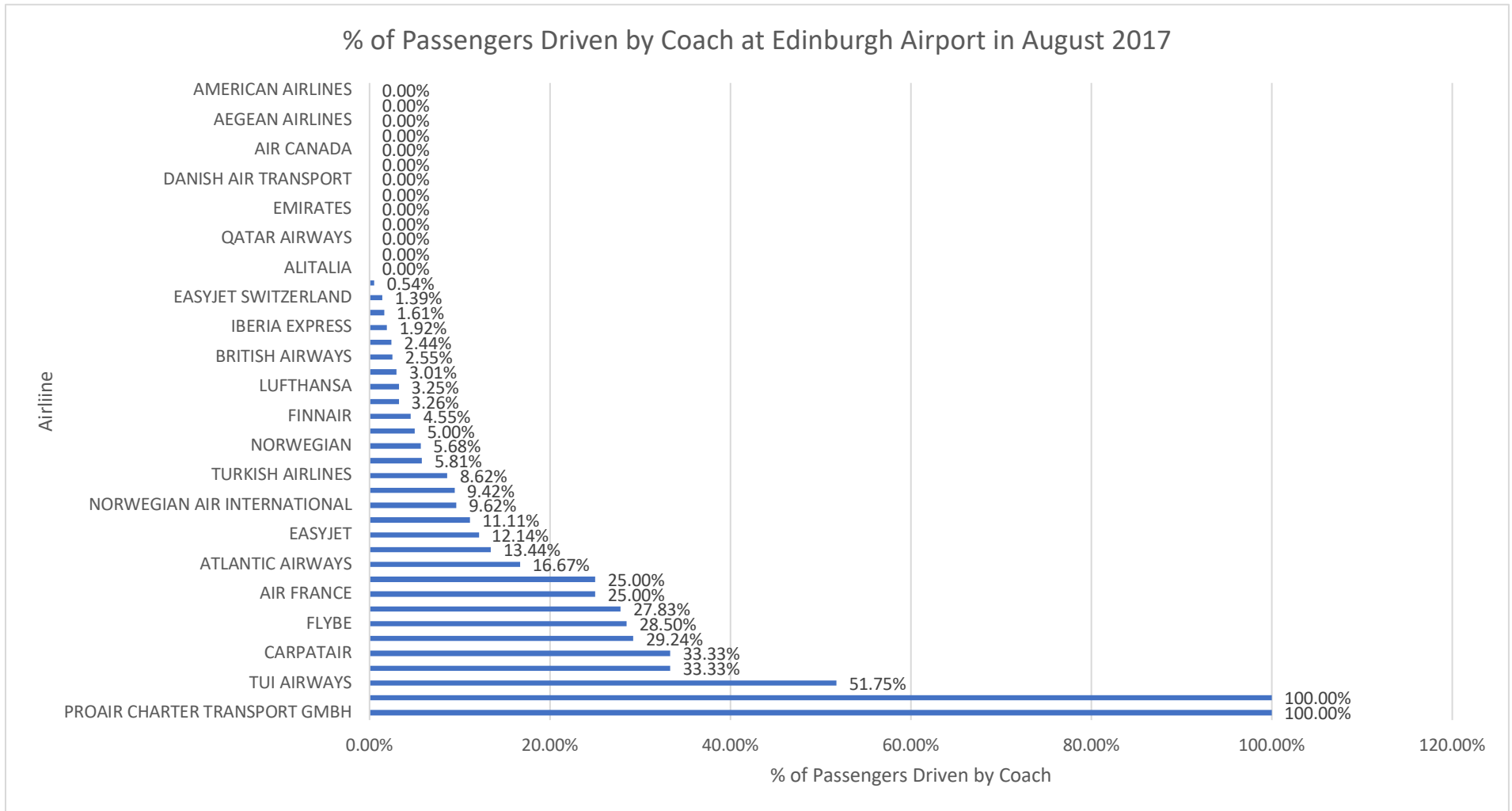


Figure 5: Graph Showing Percentage of Passengers Driven To / From Airline by Coach

## Passenger Distributions Across Departure Gates and Reclaim Belts

The final visualisation shows the distributions of the passengers across the departure gates and the baggage reclaim belts.

For the departure gates, some arrivals had departure gates assigned which needed to be ignored, which was done by filtering out all arrival flights in the pivot table.

Similarly, for the baggage reclaim belts some departing flights may have reclaim belts assigned to them which needed to be ignored, which was done by filtering out all departure flights in the pivot table.

The first of these visualisations shows the number of passengers of departing flights from Edinburgh Airport at each departure gate in August 2019 (figure 6). It shows that gates 11 (49,273), 12 (63,017) and 14 (46,627) were the busiest of all the departure gates in this time period, with gates 22 (5119) and 23 (4775) having the least number of passengers.

The second visualisation shows the number of passengers of arriving flights at Edinburgh Airport at each baggage reclaim belt (figure 7). Belt 7 is easily the busiest belt (231,631), having almost double the number of passengers pass through compared to the next busiest belt 8. Belts 1 (40,503), 2 (51,809) and 3 (44,702) were the least used baggage reclaim belts at Edinburgh Airport in August 2019.

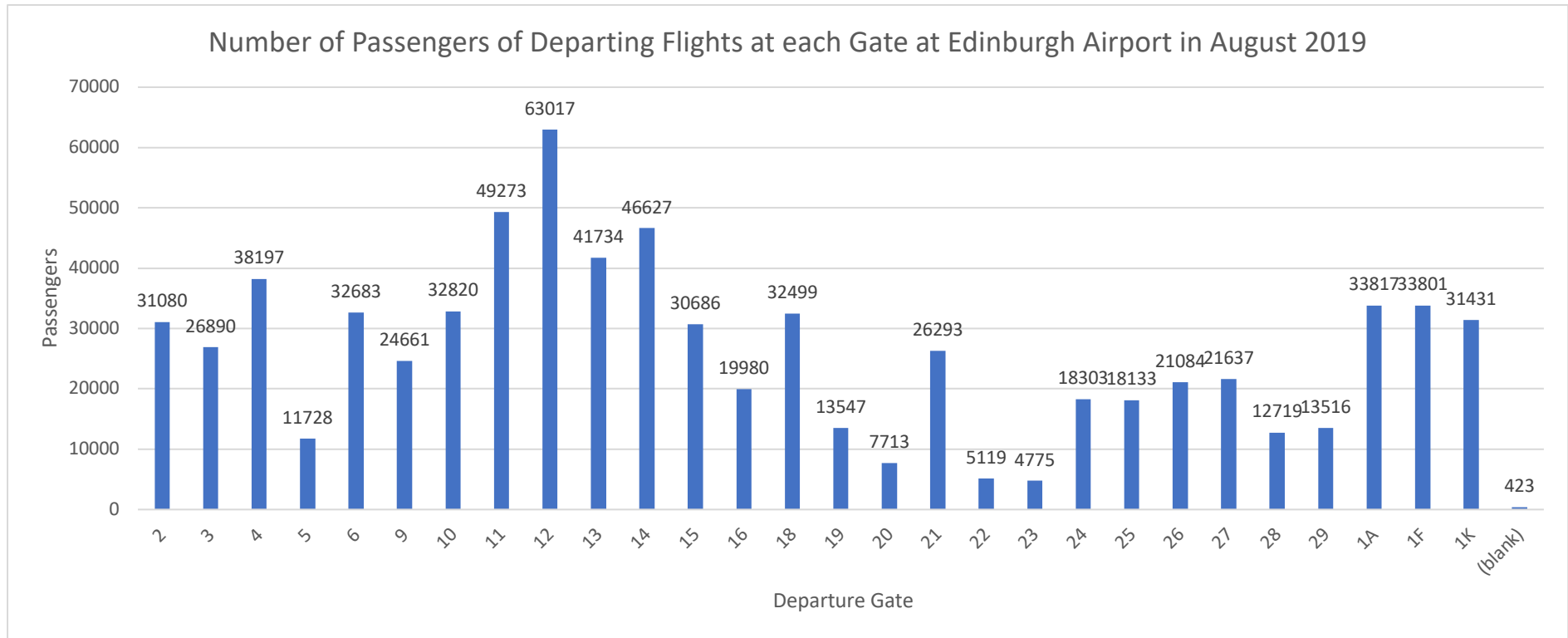


Figure 6: Chart Showing Total Number of Passengers at Each Departure Gate

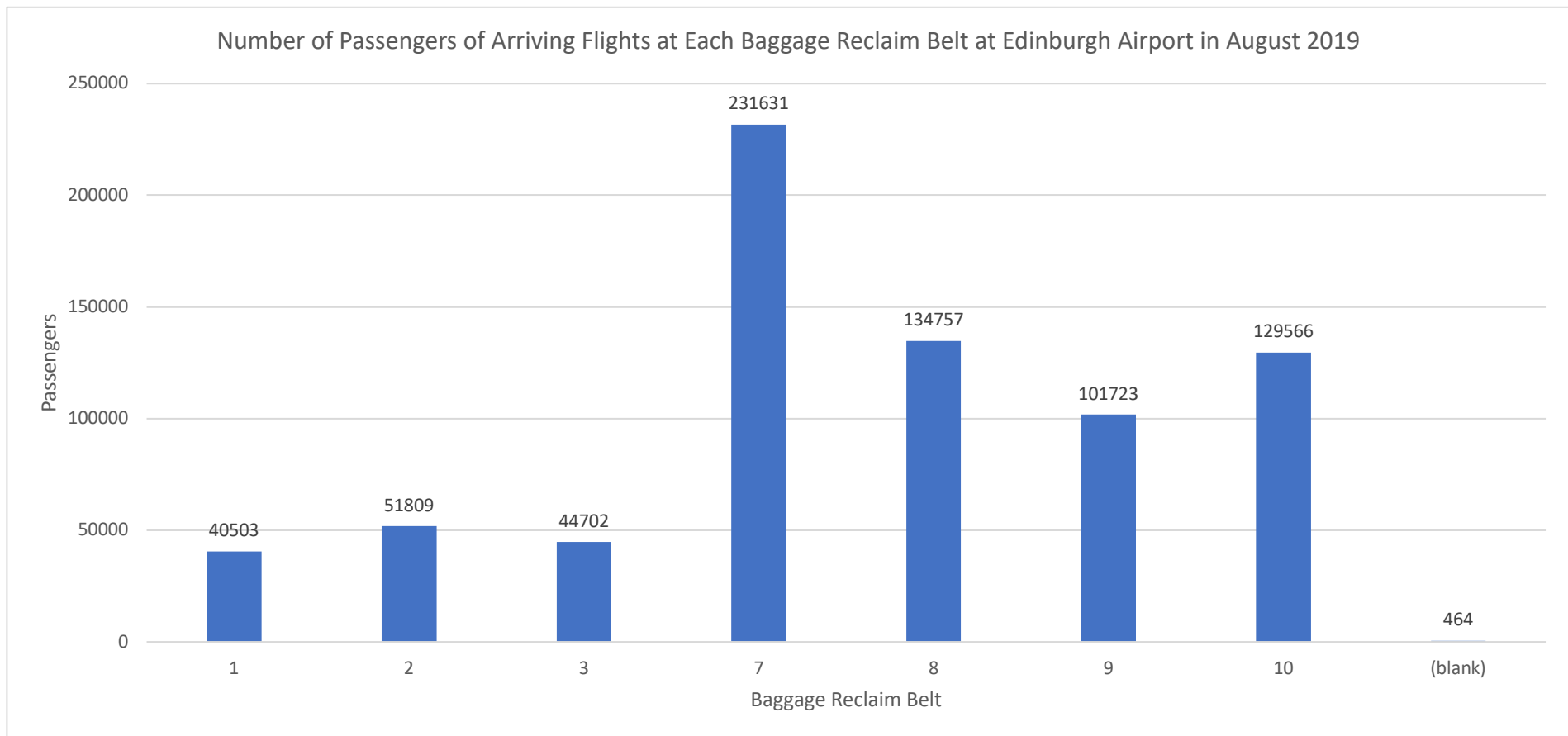


Figure 7: Chart Showing Total Number of Passengers at Each Baggage Reclaim Belt



## Appendix A: Pivot Table of Passenger Distributions

Airline	Flight Arrivals	Flight Departures	Total Flights	% of Arrivals / Departures per Airline
EASYJET	1020	1023	2043	17.70%
FLYBE	1016	1019	2035	17.63%
RYANAIR	873	876	1749	15.15%
BRITISH AIRWAYS	628	629	1257	10.89%
LOGANAIR	383	383	766	6.64%
JET2	303	302	605	5.24%
AER LINGUS	266	266	532	4.61%
KLM	155	155	310	2.69%
EASYJET EUROPE	120	121	241	2.09%
UNITED AIRLINES	93	93	186	1.61%
SAS	92	92	184	1.59%
LUFTHANSA	77	77	154	1.33%
EUROWINGS	70	70	140	1.21%
AIR FRANCE	62	62	124	1.07%
DELTA AIR LINES	62	61	123	1.07%
BRUSSELS AIRLINES	57	58	115	1.00%
TUI AIRWAYS	57	57	114	0.99%
QATAR AIRWAYS	44	44	88	0.76%
NORWEGIAN	44	44	88	0.76%
EASYJET SWITZERLAND	36	36	72	0.62%
FINNAIR	33	33	66	0.57%
EMIRATES	31	31	62	0.54%
AMERICAN AIRLINES	30	30	60	0.52%
TURKISH AIRLINES	29	29	58	0.50%
NORWEGIAN AIR INTERNATIONAL	26	26	52	0.45%
IBERIA EXPRESS	26	26	52	0.45%
EDELWEISS AIR	22	22	44	0.38%
HAINAN AIRLINES	18	18	36	0.31%
AIR CANADA	17	17	34	0.29%
VUELING AIRLINES	17	17	34	0.29%
AEGEAN AIRLINES	9	9	18	0.16%
GREAT DANE AIRLINES	9	9	18	0.16%
TRANSAVIA FRANCE	9	9	18	0.16%
BALKAN HOLIDAYS	9	9	18	0.16%
ATLANTIC AIRWAYS	9	9	18	0.16%
ALITALIA	5	5	10	0.09%
DANISH AIR TRANSPORT	4	4	8	0.07%
CARPATAIR	2	1	3	0.03%
ALBASTAR	1	2	3	0.03%
PROAIR CHARTER TRANSPORT GMBH	1	1	2	0.02%
MALETH AERO		1	1	0.01%
JOTA AVIATION		1	1	0.01%

ASL AIRLINES FRANCE	1		1	0.01%
<b>Grand Total</b>	<b>5766</b>	<b>5777</b>	<b>11543</b>	<b>100%</b>

<b>Airline</b>	<b>Passenger Arrivals</b>	<b>Passenger Departures</b>	<b>Total Passengers</b>	<b>% of Total Passengers per Airline</b>
EASYJET	159852	160794	320646	21.67%
RYANAIR	154875	154770	309645	20.93%
BRITISH AIRWAYS	74220	75925	150145	10.15%
FLYBE	68317	69284	137601	9.30%
JET2	55118	55016	110134	7.44%
KLM	20964	23478	44442	3.00%
EASYJET EUROPE	19541	19982	39523	2.67%
AER LINGUS	15534	16516	32050	2.17%
UNITED AIRLINES	13057	14447	27504	1.86%
LUFTHANSA	12654	13360	26014	1.76%
EUROWINGS	10683	10725	21408	1.45%
TUI AIRWAYS	10575	10243	20818	1.41%
SAS	10033	10450	20483	1.38%
EMIRATES	10361	9739	20100	1.36%
QATAR AIRWAYS	11331	8101	19432	1.31%
LOGANAIR	9367	9359	18726	1.27%
DELTA AIR LINES	8439	9224	17663	1.19%
AIR FRANCE	7550	8297	15847	1.07%
NORWEGIAN	7584	7440	15024	1.02%
BRUSSELS AIRLINES	6496	7225	13721	0.93%
EASYJET SWITZERLAND	5784	5985	11769	0.80%
AMERICAN AIRLINES	4413	5057	9470	0.64%
FINNAIR	4602	4755	9357	0.63%
AIR CANADA	4343	4532	8875	0.60%
NORWEGIAN AIR INTERNATIONAL	4534	4207	8741	0.59%
IBERIA EXPRESS	4430	4301	8731	0.59%
TURKISH AIRLINES	4205	4109	8314	0.56%
EDELWEISS AIR	3376	3406	6782	0.46%
HAINAN AIRLINES	2922	3620	6542	0.44%
VUELING AIRLINES	3002	2650	5652	0.38%
TRANSAVIA FRANCE	1516	1623	3139	0.21%
BALKAN HOLIDAYS	1570	1501	3071	0.21%
AEGEAN AIRLINES	1480	1374	2854	0.19%
ATLANTIC AIRWAYS	857	859	1716	0.12%
ALITALIA	624	667	1291	0.09%
GREAT DANE AIRLINES	308	407	715	0.05%
ALBASTAR	124	283	407	0.03%
DANISH AIR TRANSPORT	191	194	385	0.03%
CARPATAIR	149	88	237	0.02%

ASL AIRLINES FRANCE	124		124	0.01%
PROAIR CHARTER TRANSPORT GMBH	50	47	97	0.01%
MALETH AERO		79	79	0.01%
JOTA AVIATION		67	67	0.00%
<b>Grand Total</b>	<b>735155</b>	<b>744186</b>	<b>1479341</b>	<b>100%</b>

## Appendix B: Pivot Table of Late Flights

Airline	On-Time Flights	Late Flights	Total Flights	% of Flights Over 15 Mins Late
ALBASTAR		3	3	100%
MALETH AERO		1	1	100%
JOTA AVIATION		1	1	100%
CARPATAIR	1	2	3	67%
ALITALIA	4	6	10	60%
TURKISH AIRLINES	24	34	58	59%
TUI AIRWAYS	50	64	114	56%
FINNAIR	29	37	66	56%
AIR CANADA	15	19	34	56%
AEGEAN AIRLINES	8	10	18	56%
EASYJET EUROPE	114	127	241	53%
EDELWEISS AIR	21	23	44	52%
DELTA AIR LINES	61	62	123	50%
VUELING AIRLINES	17	17	34	50%
DANISH AIR TRANSPORT	4	4	8	50%
EUROWINGS	72	68	140	49%
EASYJET	1056	987	2043	48%
NORWEGIAN	46	42	88	48%
AER LINGUS	288	244	532	46%
RYANAIR	968	781	1749	45%
FLYBE	1148	887	2035	44%
EMIRATES	35	27	62	44%
BALKAN HOLIDAYS	10	8	18	44%
ATLANTIC AIRWAYS	10	8	18	44%
BRUSSELS AIRLINES	65	50	115	43%
LUFTHANSA	89	65	154	42%
QATAR AIRWAYS	51	37	88	42%
EASYJET SWITZERLAND	42	30	72	42%
JET2	364	241	605	40%
HAINAN AIRLINES	22	14	36	39%
BRITISH AIRWAYS	776	481	1257	38%
AIR FRANCE	77	47	124	38%
NORWEGIAN AIR INTERNATIONAL	33	19	52	37%
KLM	202	108	310	35%
TRANSAVIA FRANCE	12	6	18	33%
AMERICAN AIRLINES	42	18	60	30%
SAS	133	51	184	28%
UNITED AIRLINES	135	51	186	27%
LOGANAIR	575	191	766	25%
IBERIA EXPRESS	39	13	52	25%
GREAT DANE AIRLINES	14	4	18	22%

PROAIR CHARTER TRANSPORT GMBH	2		2	0%
ASL AIRLINES FRANCE	1		1	0%
<b>Grand Total</b>	<b>6655</b>	<b>4888</b>	<b>11543</b>	

## Appendix C: Pivot Table of Seat Load Factor

Airline	SLF of Arrivals	SLF of Departures	Total SLF
PROAIR CHARTER TRANSPORT			
GMBH	1	0.94	0.97
TUI AIRWAYS	0.981620718	0.950802933	0.966211826
JET2	0.962474025	0.963873997	0.963172854
EASYJET SWITZERLAND	0.935014549	0.967507274	0.951260912
BALKAN HOLIDAYS	0.969135802	0.92654321	0.947839506
TURKISH AIRLINES	0.953947368	0.932168784	0.943058076
RYANAIR	0.93865343	0.934804668	0.936725748
EASYJET EUROPE	0.926552869	0.940506448	0.933555367
IBERIA EXPRESS	0.946581197	0.919017094	0.932799145
AIR CANADA	0.905924072	0.945348352	0.925636212
TRANSAVIA FRANCE	0.891240447	0.954144621	0.922692534
FINNAIR	0.901645768	0.931622257	0.916634013
NORWEGIAN	0.924314442	0.906764168	0.915539305
EMIRATES	0.943109412	0.886491899	0.914800655
AEGEAN AIRLINES	0.945083014	0.877394636	0.911238825
VUELING AIRLINES	0.964033398	0.850995504	0.907514451
EASYJET	0.904713393	0.907364144	0.906040724
NORWEGIAN AIR INTERNATIONAL	0.937551696	0.86993383	0.903742763
EUROWINGS	0.895173454	0.89869281	0.896933132
KLM	0.837822716	0.939947153	0.88884
AMERICAN AIRLINES	0.821634705	0.941537889	0.881586297
LUFTHANSA	0.85650467	0.904291323	0.880397996
EDELWEISS AIR	0.8750648	0.88284085	0.878952825
UNITED AIRLINES	0.830756506	0.919195775	0.87497614
BRUSSELS AIRLINES	0.834746852	0.911902057	0.873670805
AIR FRANCE	0.830948712	0.909659029	0.870379524
FLYBE	0.853877112	0.8634381	0.858664587
DELTA AIR LINES	0.810195853	0.900078064	0.854771583
ASL AIRLINES FRANCE	0.843537415	#DIV/0!	0.843537415
AER LINGUS	0.812532692	0.863897897	0.838215294
BRITISH AIRWAYS	0.819449505	0.836740542	0.828102939
ALBASTAR	0.738095238	0.842261905	0.807539683
CARPATAIR	0.745	0.88	0.79
QATAR AIRWAYS	0.909974301	0.65057822	0.780276261
SAS	0.715722642	0.74547011	0.730596376
ALITALIA	0.705084746	0.753672316	0.729378531
JOTA AVIATION	#DIV/0!	0.690721649	0.690721649
DANISH AIR TRANSPORT	0.663194444	0.673611111	0.668402778
LOGANAIR	0.653800517	0.654109589	0.65395495
HAINAN AIRLINES	0.555936073	0.688736682	0.622336377
ATLANTIC AIRWAYS	0.61566092	0.617097701	0.61637931
MALETH AERO	#DIV/0!	0.598484848	0.598484848
GREAT DANE AIRLINES	0.290018832	0.383239171	0.336629002
<b>Grand Total</b>	<b>0.883685792</b>	<b>0.892876768</b>	<b>0.88828556</b>

## Appendix D: Pivot Table of Passengers Driven by Coach

Row Labels	Total Flights	Number of Flights Where Coach was Used	% of Passengers Driven by Coach
PROAIR CHARTER TRANSPORT GMBH	2	2	100.00%
MALETH AERO	1	1	100.00%
TUI AIRWAYS	114	59	51.75%
ALBASTAR	3	1	33.33%
CARPATAIR	3	1	33.33%
LOGANAIR	766	224	29.24%
FLYBE	2035	580	28.50%
BRUSSELS AIRLINES	115	32	27.83%
AIR FRANCE	124	31	25.00%
HAINAN AIRLINES	36	9	25.00%
ATLANTIC AIRWAYS	18	3	16.67%
RYANAIR	1749	235	13.44%
EASYJET	2043	248	12.14%
BALKAN HOLIDAYS	18	2	11.11%
NORWEGIAN AIR INTERNATIONAL	52	5	9.62%
JET2	605	57	9.42%
TURKISH AIRLINES	58	5	8.62%
EASYJET EUROPE	241	14	5.81%
NORWEGIAN	88	5	5.68%
EUROWINGS	140	7	5.00%
FINNAIR	66	3	4.55%
SAS	184	6	3.26%
LUFTHANSA	154	5	3.25%
AER LINGUS	532	16	3.01%
BRITISH AIRWAYS	1257	32	2.55%
DELTA AIR LINES	123	3	2.44%
IBERIA EXPRESS	52	1	1.92%
KLM	310	5	1.61%
EASYJET SWITZERLAND	72	1	1.39%
UNITED AIRLINES	186	1	0.54%
ALITALIA	10	0	0.00%
VUELING AIRLINES	34	0	0.00%
QATAR AIRWAYS	88	0	0.00%
EDELWEISS AIR	44	0	0.00%
EMIRATES	62	0	0.00%
JOTA AVIATION	1	0	0.00%
DANISH AIR TRANSPORT	8	0	0.00%
TRANSAVIA FRANCE	18	0	0.00%
AIR CANADA	34	0	0.00%
GREAT DANE AIRLINES	18	0	0.00%
AEGEAN AIRLINES	18	0	0.00%
ASL AIRLINES FRANCE	1	0	0.00%
AMERICAN AIRLINES	60	0	0.00%
<b>Grand Total</b>	<b>11543</b>	<b>1594</b>	