Benchmarking Coastal Airports with Regard to Seasonality

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- See **www.gap-projekt.de** for further details.

Outline:

- Background and Research Motivation
- Data and Characteristics of Sample Airports
- Indicators of Inequality and Variation
- Financial Situation of Sample Airports
- Efficiency Measures
- Special Issues
- Summary and Outlook

Rank	Airport	IATA Code	Result	Rank	Airport	IATA Code	Result
1	Dusseldorf	DUS	99.49%	33	Oslo	OSL	45.09%
2	Zurich	ZRH	91.69%	34	Moscow D	DME	44.47%
3	Paris CDG	CDG	91.60%	35	London City	LCY	42.67%
4	Frankfurt/Main	FRA	89.07%	36	Valencia	VLC	41.01%
5	Madrid	MAD	87.94%	37	Toulouse	TLS	40.22%
6	London H	LHR	84.67%	38	Rhodes	RHO	40.08%
7	Nice	NCE	82.12%	39	Mahon	MAH	39.92%
8	Istanbul	IST	79.00%	40	Budapest	BUD	39.71%
9	Brussels	BRU	78.92%	41	Malaga	AGP	39.44%
10	Munich	MUC	74.55%	42	Gothenburg	GOT	38.78%
11	Stuttgart	STR	74.49%	43	Jersey	JER	38.74%
12	Amsterdam	AMS	72.05%	44	Lamaca	LCA	38.57%
13	London G	LGW	69.17%	45	Venice	VCE	37.16%
14	Lisbon	LIS	67.04%	46	Chania	CHQ	37.12%
15	Hamburg	HAM	66.84%	47	Heraklion	HER	34.95%
16	Marseille	MRS	63.44%	48	Faro	FAO	34.06%
17	Warsaw	WAW	62.22%	49	Clermont F	CFE	31.78%
18	Geneva	GVA	61.62%	50	Bremen	BRE	31.58%
19	Copenhagen	CPH	61.50%	51	Almeria	LEI	29.56%
20	Manchester	MAN	59.31%	52	Tenerife	TFS	29.17%
21	Vienna/S	VIE	56.62%	53	Sevilla	SVQ	28.38%
22	Nuremberg	NUE	56.00%	54	St.Petersburg	LED	27.62%
23	Moscow V	VKO	55.97%	55	Ljubljana	LJU	25.76%
24	Rome Fiumicino	FCO	55.73%	56	Strasbourg	SXB	24.52%
25	Athens	ATH	54.21%	57	Kerkyra (Corfu)	CFU	24.30%
26	Paris ORY	ORY	53.34%	58	Genoa	GOA	23.65%
27	Lyon	LYS	53.08%	59	Sofia	SOF	22.18%
28	Arrecife	ACE	51.77%	60	Dresden	DRS	20.43%
29	Stockholm	ARN	51.55%	61	Santiage del Monte	OVD	18.30%
30	Cologne/Bonn	CGN	51.05%	62	Billund	BLL	18.24%
31	Gran Canaria	LPA	48.50%	63	Riga	RIX	16.71%
32	Bologna	BLQ	45.51%	64	Vilnius	VNO	4.66%

1-*RUNWAY UTILIZATION GIVEN BY YEARLY ACTUAL CAPACITY / AVAILABLE CAPACITY, 2002*

Large airports with capacity bottlenecks are at the top of the table

Airports with high seasonality are in the bottom of the table

Measurement & Efficiency Benchmarking:

Motivation for Study and Effects of Seasonality

- Tendency to evaluate Airports with Seasonal Air Traffic as underutilized
- But
  - Tourism creates positive externalities, that justifies investment in such airports
  - The seasonal nature of the airport must be considered and measured to make more meaningful comparisons
  - Here a first attempt, thanks to good data!

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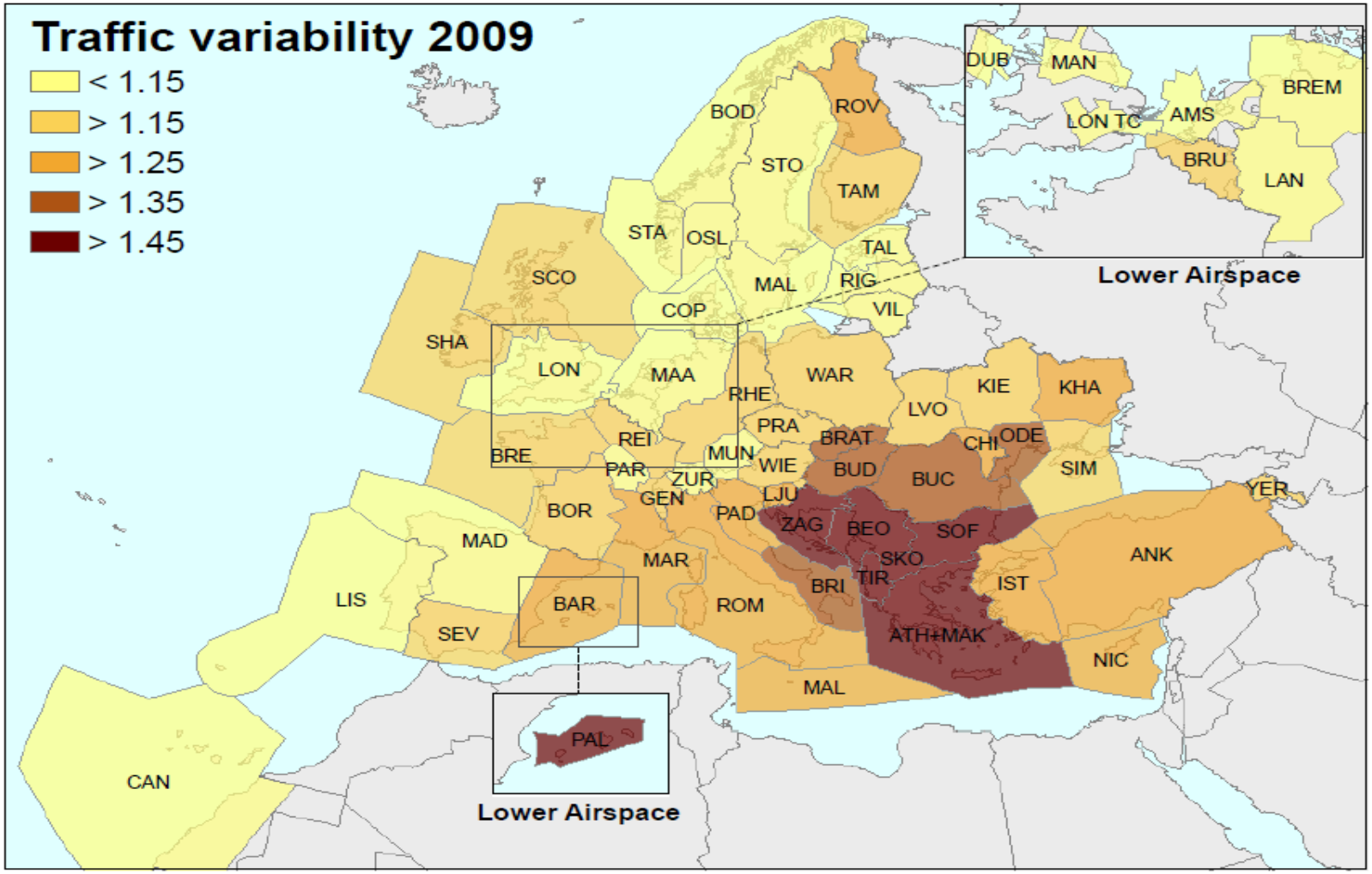
The Situation: Seasonality in Europe*



Source: Eurocontrol

* Includes over flights

Airport Sample

- ✈Dubrovnik (DBV)
- ✈Ljubljana (LJU)
- ✈Podgorica (TGD)
- ✈Pula (PUY)
- ✈Split (SPU)
- ✈Tivat (TIV)
- ✈Zadar (ZAD)
- ✈Zagreb (ZAG)

Osijek and Rijeka have been excluded, as they are too small.

Data Sources:

First Hand:

- Monthly Data from Participating Airports

Secondary Sources:

- Flight Schedule Data from Flightstats.com and Official Airline Guide (OAG)
- Eurostat Statistical Database and Eurocontrol “Performance Review Report”

Airline Profiles at the different airports:

Data extracted from September 2010;

Airline Name	Airline	ZAG	SPU	DBV	TGD	TIV	ZAD	PUY	Total
CROATIA AIRLINES	OU	64%	41%	29%	2%	0%	43%	40%	38%
MONTENEGRO AIRLINES	YM	0%	0%	0%	65%	38%	0%	0%	13%
GERMANWINGS	4U	5%	13%	3%	0%	0%	6%	5%	5%
JAT AIRWAYS	JU	0%	0%	0%	16%	16%	0%	0%	4%
EASYJET	U2	0%	8%	9%	0%	0%	0%	0%	3%
TYROLEAN AIRWAYS	VO	4%	0%	0%	5%	0%	0%	3%	2%
MALEV HUNGARIAN AIRLINES	MA	4%	3%	0%	4%	0%	0%	0%	2%
NORWEGIAN AIR SHUTTLE	DY	0%	6%	6%	0%	0%	0%	0%	2%
RYANAIR	FR	0%	0%	0%	0%	0%	41%	10%	2%
AUSTRIAN AIRLINES AG	OS	1%	3%	4%	0%	0%	0%	0%	2%
AIR FRANCE	AF	4%	0%	0%	0%	0%	0%	0%	1%
LUFTHANSA CITYLINE	CL	2%	3%	1%	0%	0%	0%	0%	1%
CZECH AIRLINES	OK	2%	1%	1%	2%	0%	0%	0%	1%
AEROFLOT RUSSIAN AIRLINES	SU	2%	3%	0%	0%	0%	0%	0%	1%
SAS SCANDINAVIAN AIRLINES	SK	1%	3%	0%	0%	1%	0%	3%	1%
TURKISH AIRLINES	TK	2%	0%	0%	2%	0%	0%	0%	1%
AUGSBURG AIRWAYS	IQ	2%	0%	1%	0%	0%	0%	0%	1%
JET2.COM	LS	0%	1%	4%	0%	0%	0%	0%	1%
WIZZ AIR	W6	1%	1%	1%	0%	0%	0%	0%	1%
BRITISH AIRWAYS	BA	0%	0%	4%	0%	0%	0%	0%	1%

Destination Profile at selected airports :

Data extracted from September 2010;

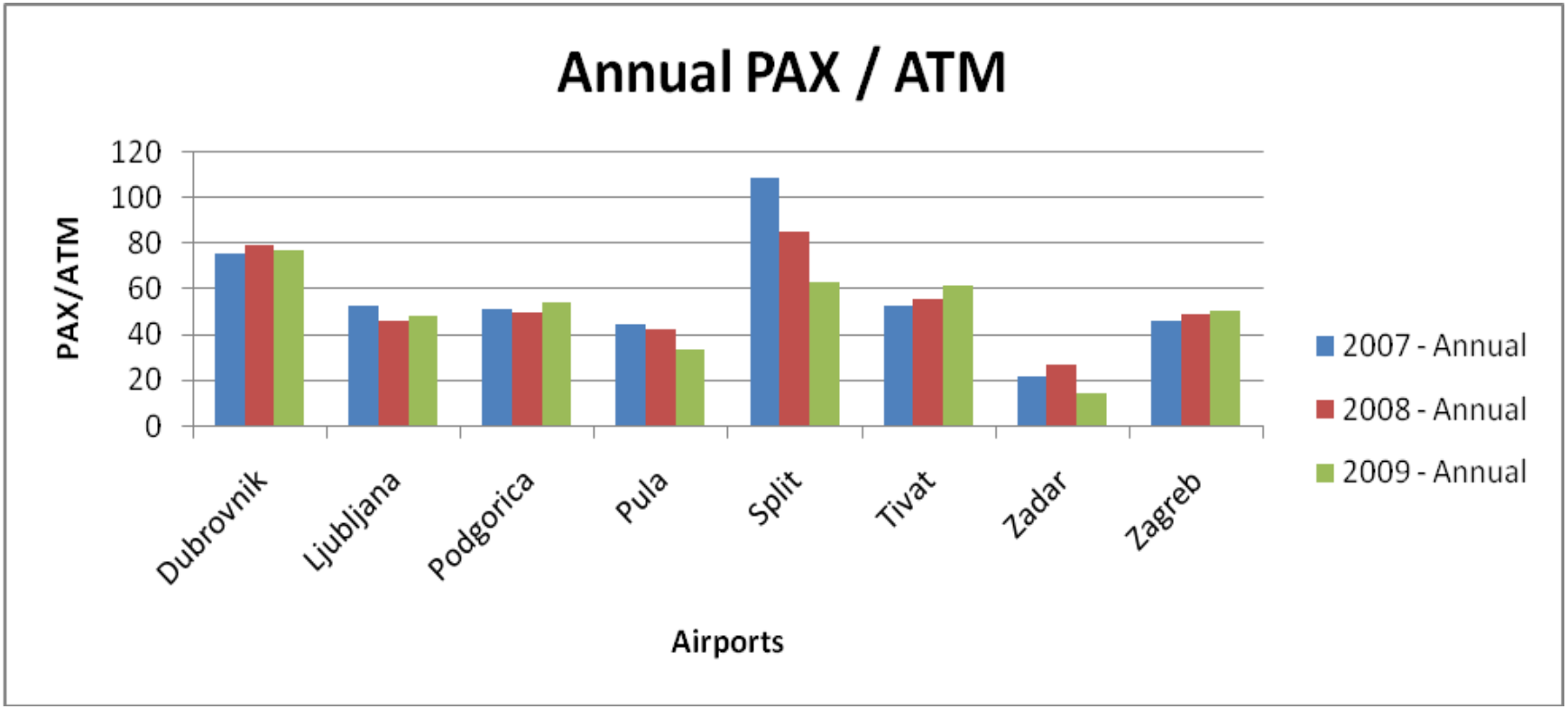
Share of Scheduled Flights Destination	ZAG	Share of Scheduled Flights Destination	SPU	Share of Scheduled Flights Destination	DBV	Share of Scheduled Flights Destination	ZAD
VIE	10%	ZAG	15%	ZAG	17%	PUY	26%
MUC	8%	MUC	7%	LGW	9%	ZAG	15%
FRA	8%	LGW	5%	VIE	6%	STN	9%
SPU	8%	VIE	5%	MUC	4%	RYG	6%
DBV	7%	CGN	4%	FRA	4%	BRQ	6%
CDG	6%	OSL	4%	MAD	3%	CGN	6%
BUD	4%	FCO	4%	DUB	3%	CRL	6%
SJJ	4%	FRA	4%	BRU	3%	HHN	6%
ZRH	4%	DME	3%	DME	3%	FDH	3%
ZAD	4%	SVO	3%	BCN	3%	NYO	3%
BRU	3%	ARN	3%	DUS	2%	NRN	3%
SKP	2%	SXF	3%	STN	2%	DME	3%
LHR	2%	BUD	3%	MAN	2%	BRI	3%
PRG	2%	STR	3%	SXF	2%	DUB	3%
CGN	2%	ZRH	3%	LPL	2%	BRE	3%
SVO	2%	KBP	3%	ARN	1%	ARN	0%
IST	2%	BRS	2%	OSL	1%	ZAD	0%
AMS	2%	GOT	2%	EMA	1%	VIE	0%
PRN	2%	PRG	2%	FCO	1%	LYS	0%
CPH	2%	DUS	2%	OTP	1%	KBP	0%

Aircraft Types: Fleet Mix at the different airports

Data extracted from September 2010;

Aircraft Types	Average Seats per Aircraft	ZAG	SPU	DBV	TGD	TIV	ZAD	PUY	RJK	Total
DH4	73	37%	21%	10%	9%	0%	73%	53%	0%	24%
319	133	27%	33%	28%	3%	2%	10%	8%	0%	22%
100	105	1%	0%	0%	64%	48%	0%	0%	0%	14%
320	156	17%	19%	18%	2%	10%	0%	11%	0%	14%
AT7	68	1%	0%	2%	16%	17%	0%	0%	0%	4%
733	133	2%	4%	7%	1%	8%	0%	0%	0%	3%
EM2	30	4%	0%	0%	2%	0%	0%	0%	0%	2%
73G	127	0%	2%	2%	0%	8%	0%	0%	88%	2%
73H	118	0%	4%	5%	0%	0%	0%	0%	0%	2%
CRJ	50	4%	0%	0%	0%	0%	0%	0%	0%	2%
321	184	0%	0%	8%	0%	0%	0%	0%	0%	1%
E95	107	0%	3%	3%	1%	2%	0%	0%	0%	1%
738	161	0%	4%	2%	0%	0%	0%	0%	13%	1%
734	148	0%	0%	6%	0%	2%	3%	0%	0%	1%
757	159	0%	1%	2%	0%	0%	0%	16%	0%	1%
F70	76	3%	0%	0%	0%	0%	0%	0%	0%	1%
CR9	88	0%	1%	3%	1%	0%	0%	0%	0%	1%
AR8	83	2%	0%	0%	0%	0%	0%	0%	0%	1%
M90	157	0%	1%	2%	0%	0%	0%	0%	0%	1%
735	111	0%	1%	0%	2%	0%	0%	0%	0%	1%
	113	99%	96%	98%	99%	96%	85%	87%	100%	97%

Passengers per ATM



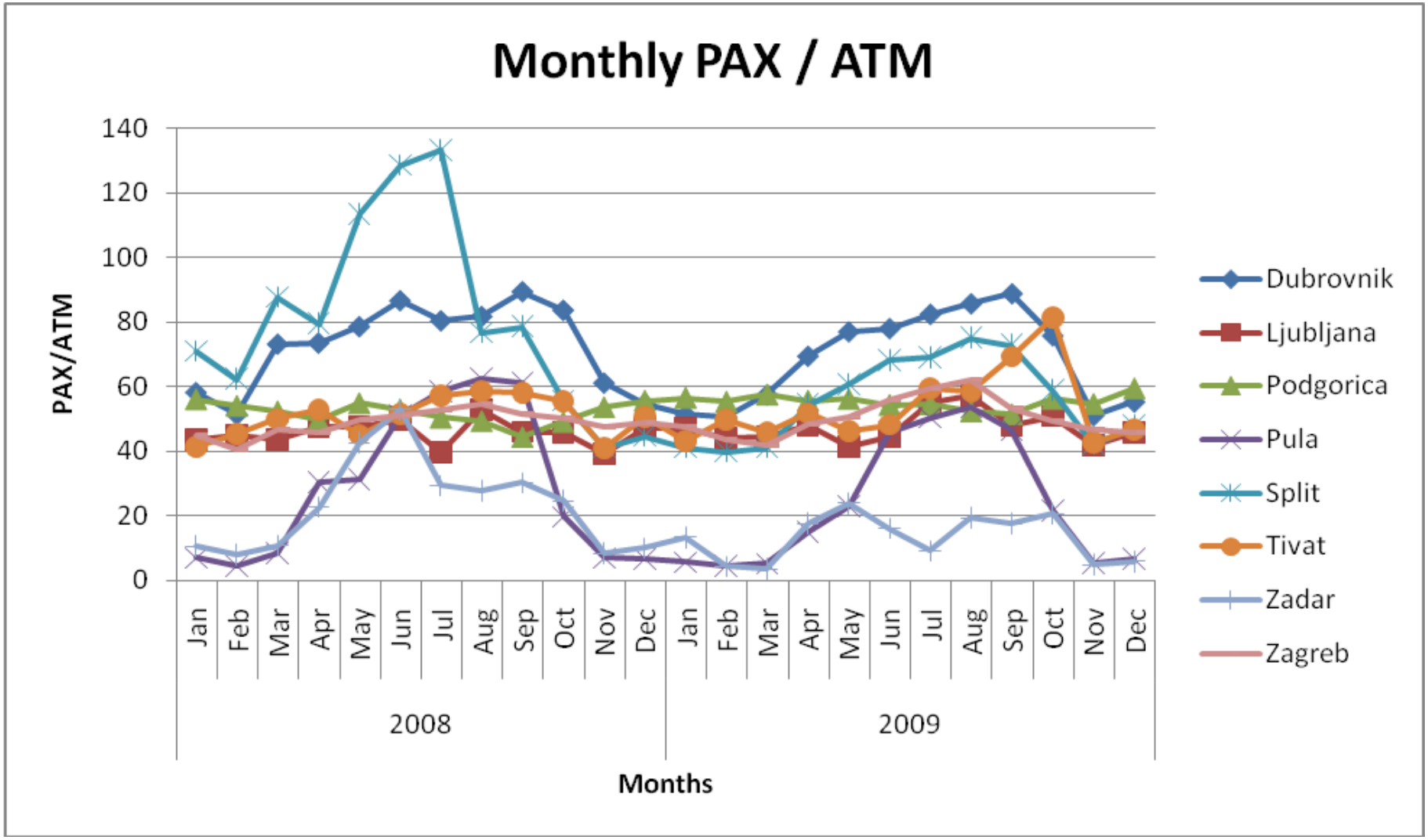
For SPU, ATM increases but PAX decreases from 2008 to 2009. It can be because of;

i) the structure of traffic (smaller planes), or

ii) the seat-load-factor is lower (same planes, but less passenger for a plane) – probably this because the profits have declined in half from 08-09

Can we get the fleet mix for 2008 and 2009?

Passengers per ATM



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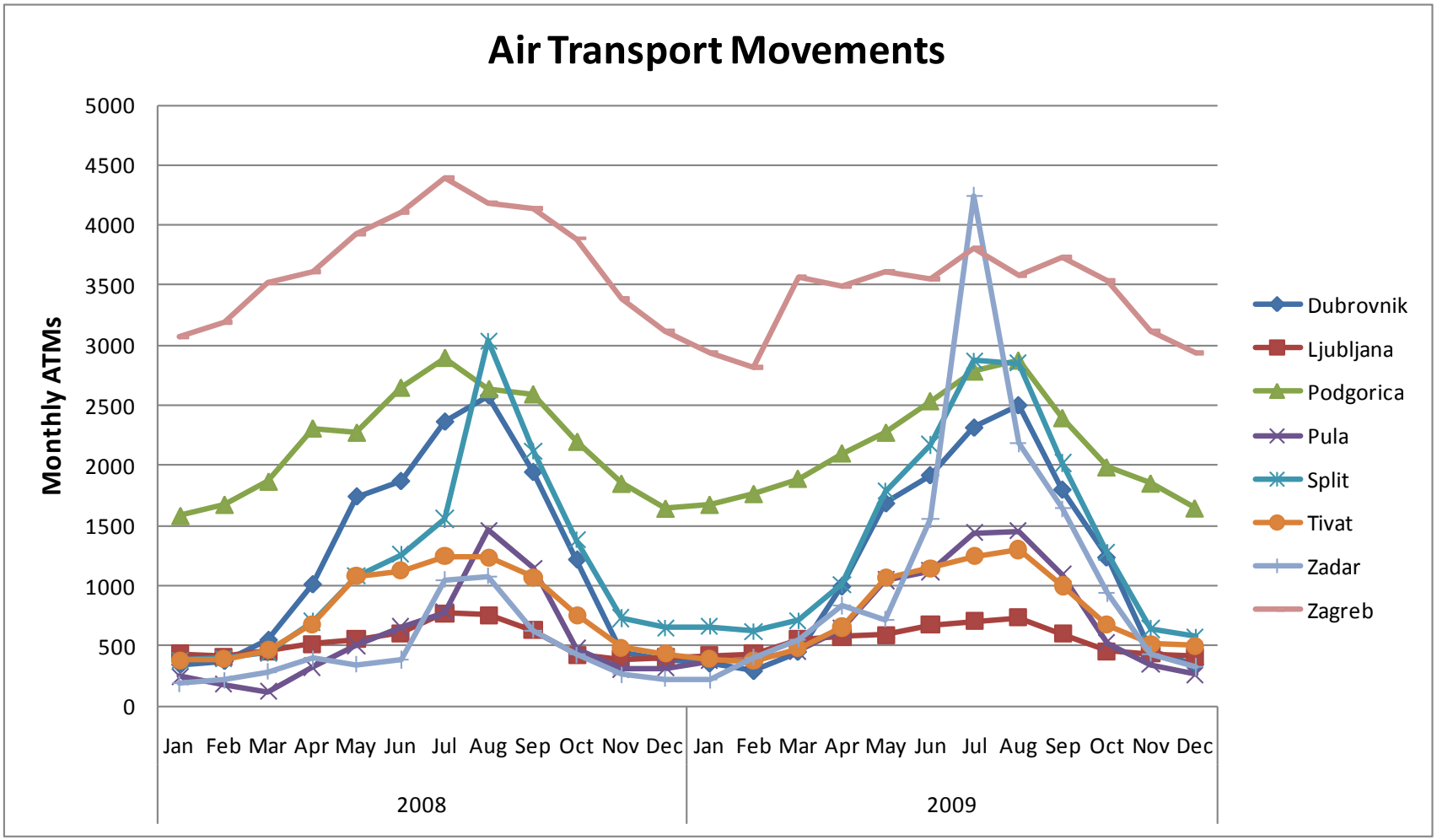
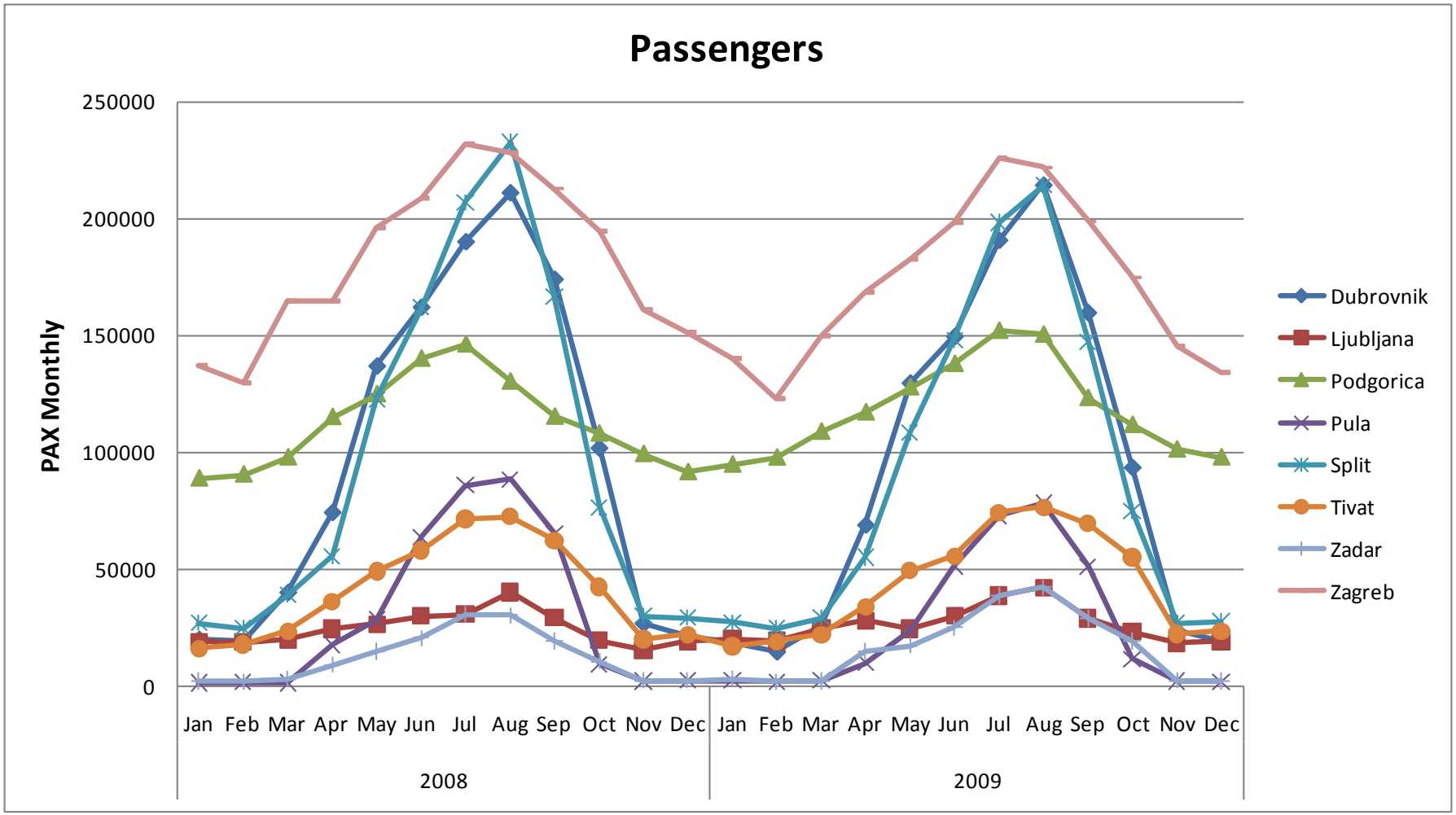
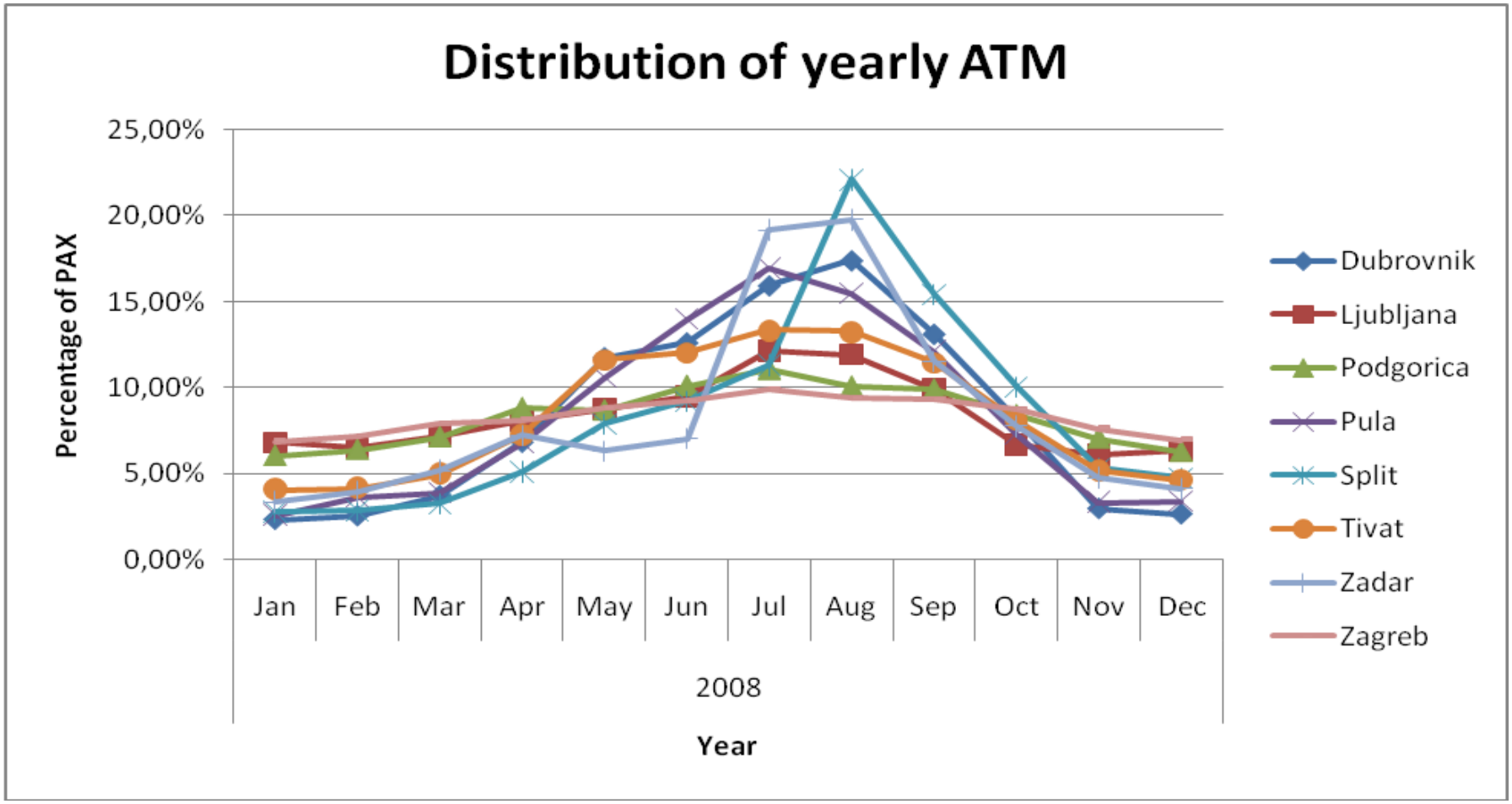
Indications of Seasonality: Monthly ATM 2008-2009



Indications of Seasonality: Monthly PAX 2008-2009

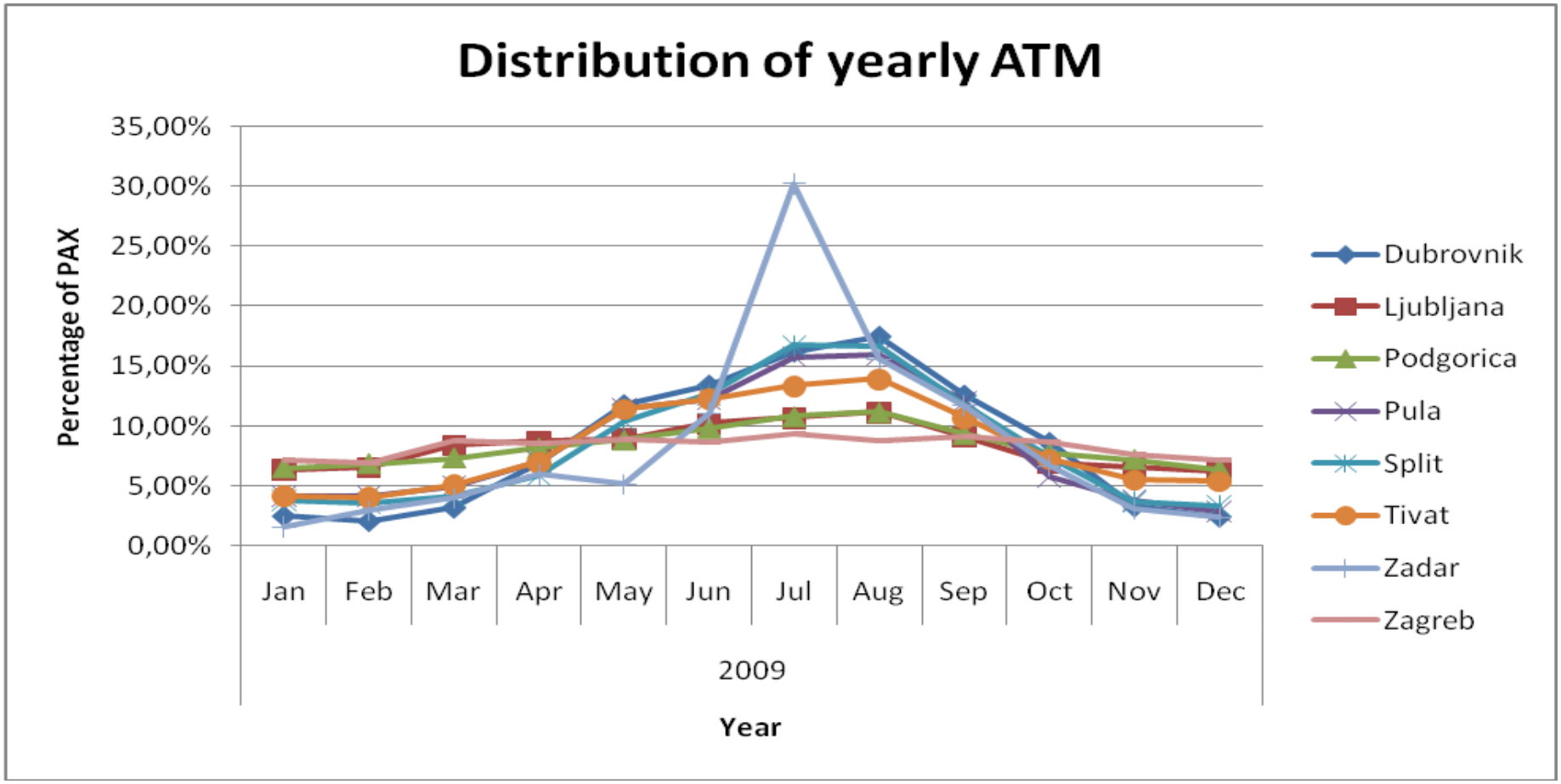


Indicators of Seasonality



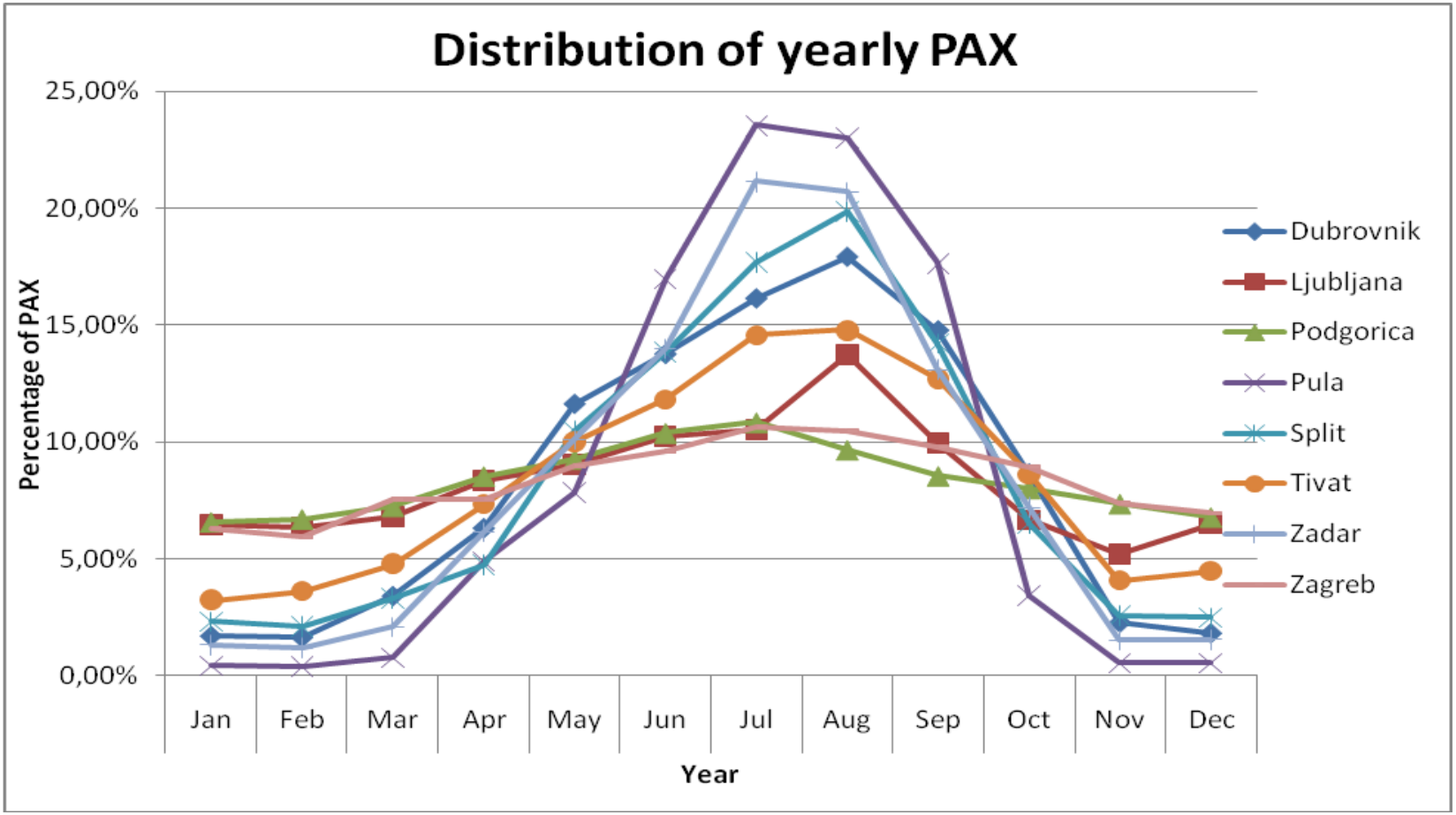
- In Split, appr. 22% of the total ATMs in 2008 was served in August, 15% in September. But only around 3% was in January and February.
- Similar situation for Zadar, Pula and Dubrovnik…

Indicators of Seasonality



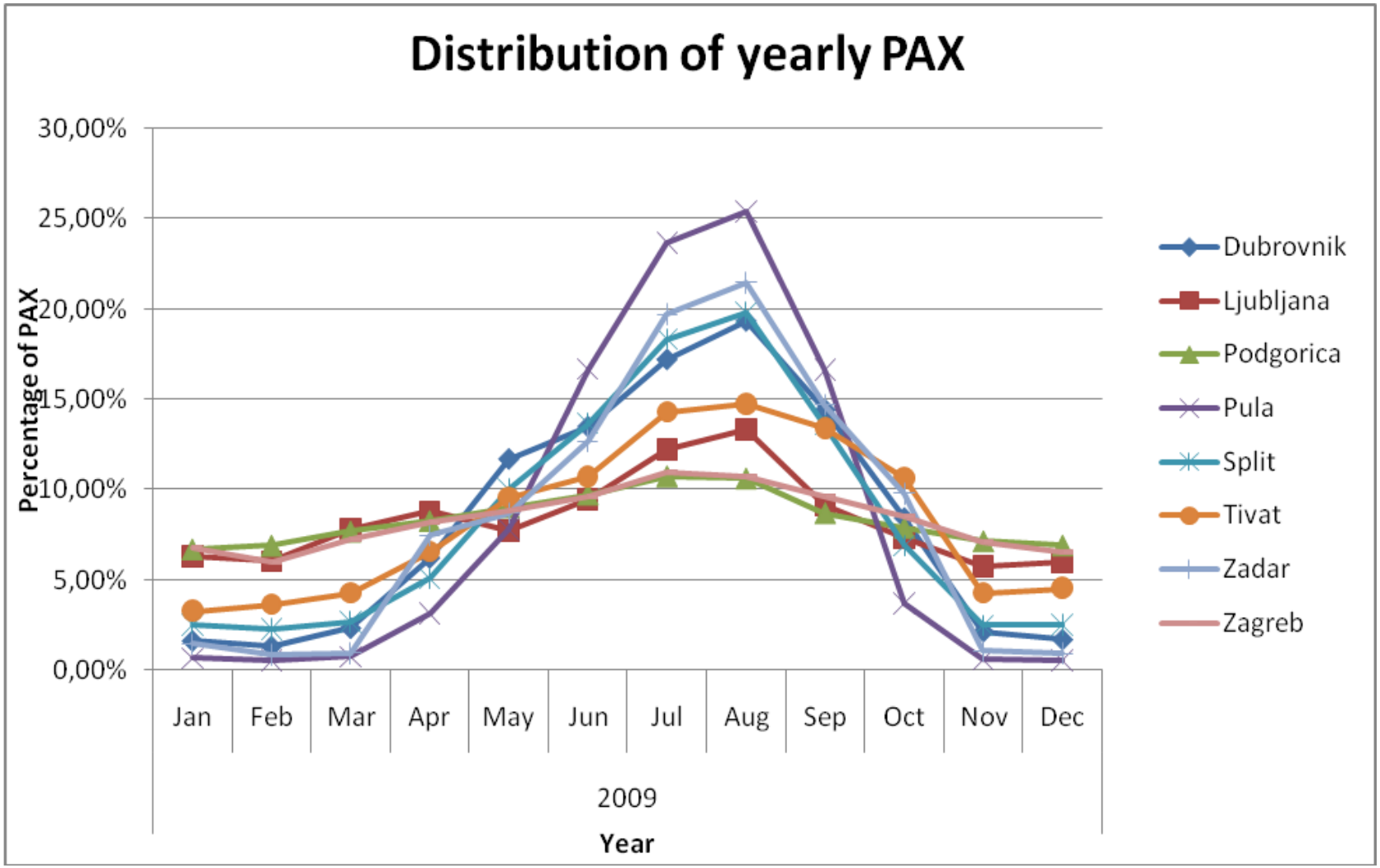
- In Zadar, 30% of the total ATMs in 2009 was served in July, but only around 2-3% in winter months.

Indicators of Seasonality



- The three capital cities in the sample LJU, TGD and ZAG show more stable traffic throughout the year.

Indicators of Seasonality



Seasonality Indicator 1: "Peak Month to Average Month", 2009

- In terms of PAX and ATM
- Quick way of ranking
- Factor does not include annual fluctuation, therefore not ideal candidate for measuring seasonality

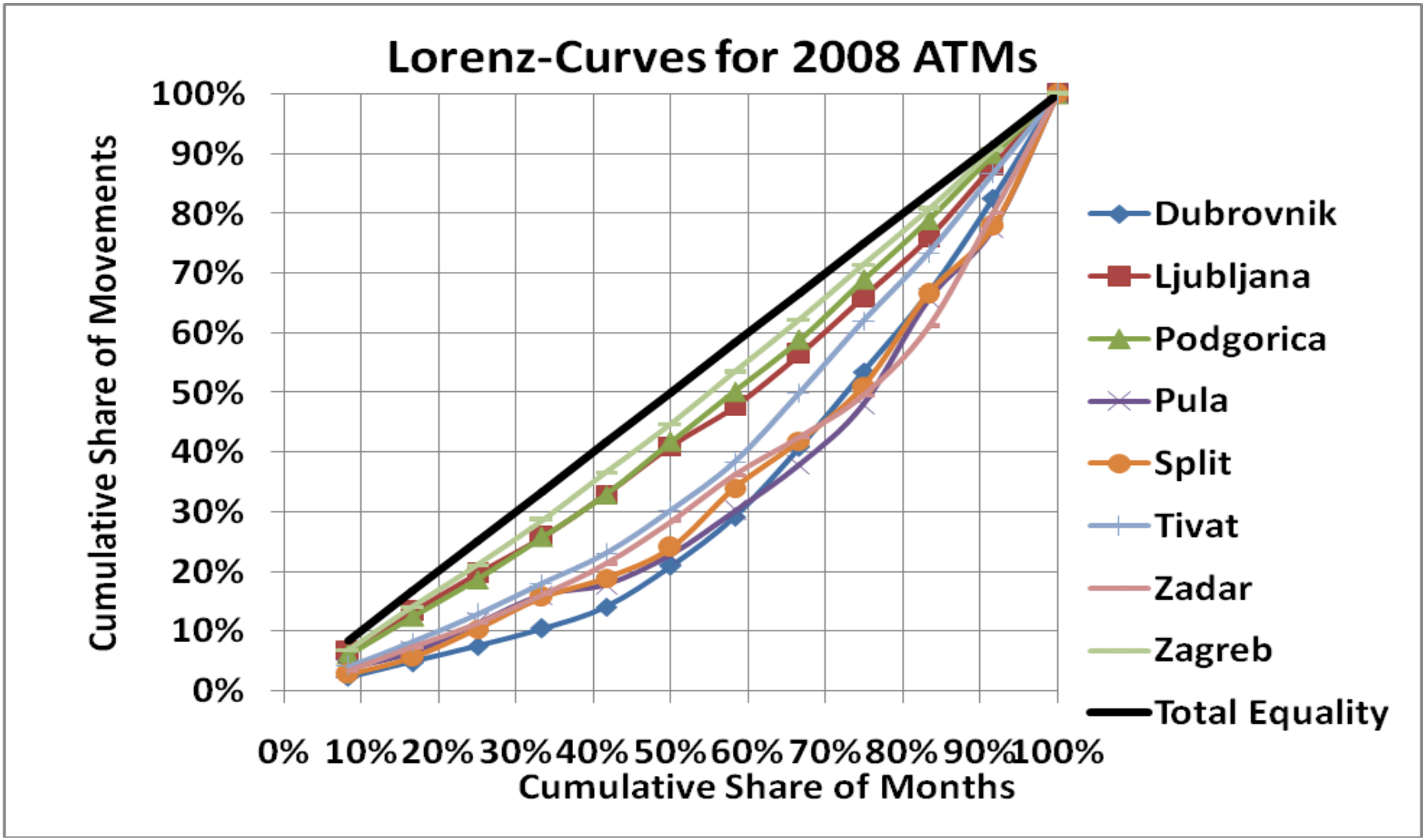
Rank ATM	Peak-to-Average Factor	Airport	Rank PAX	Peak-to-Average Facator	Airport
1	1.28	Zagreb	1	1.28	Podgorica
2	1.3	Podgorica	2	1.32	Zagreb
3	1.65	Ljubljana	3	1.64	Ljubljana
4	1.78	Tivat	4	1.77	Tivat
5	2.15	Dubrovnik	5	2.32	Dubrovnik
6	2.38	Split	6	2.38	Split
8	2.54	Zadar	7	2.58	Zadar
9	2.9	Pula	8	3.05	Pula
	2	**Average**	**9**	**2.20**	**Average**

Seasonality Indicator 2: “Lorenz Curve”

- “Visualizes” Inequality
- Preparation through Cumulative Diagram and Ranking
- The further away from “Total Equality”

45-Degree line, the more seasonal is the Airport

Seasonality Indicator 2: "Lorenz Curve"



Seasonality Indicator 3: "GINI-Coefficient"

- **In addition to Ratios and Lorenz-Curve, we can also use the Gini-Coefficient, which is to some extent the graphical representation of the Lorenz Curve**
- The most commonly used measure of inequality.
- The coefficient varies between

  0, which reflects complete equality and

  1, which indicates complete inequality.*
- Applicable for Seasonality?
- We are still experimenting about what are good indicators of seasonality

* Source: World Bank

Seasonality Indicator 3: "GINI-Coefficient"

- Ranking possible by one Index, therefore Gini is a good indicator for Benchmarking seasonal Differences
- Results will differ if we use different measure of inequality, PAX or profits instead of ATMs
  Note - further Research to make Seasonal and Non-Seasonal Airports comparable

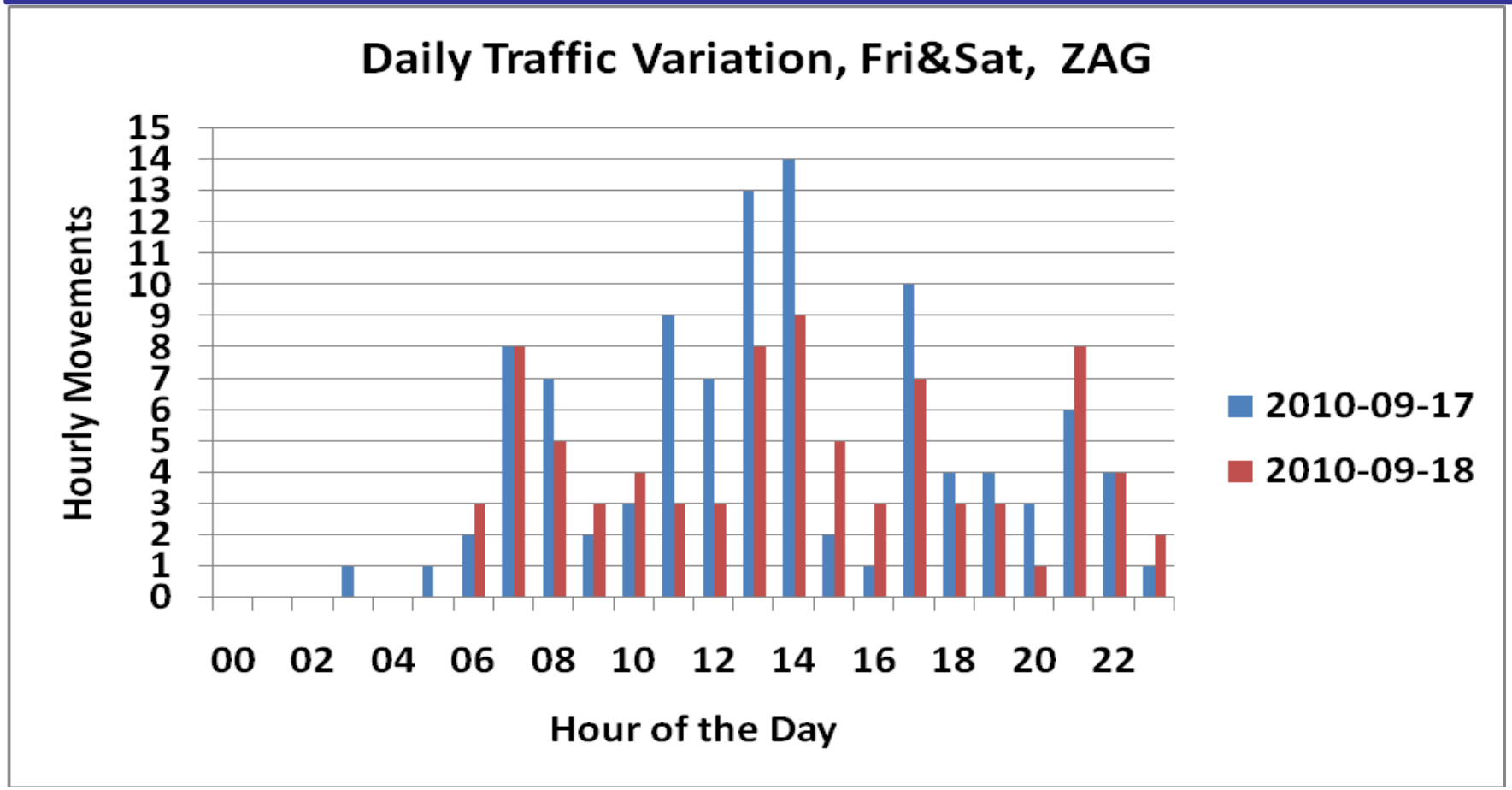
Note: Zagreb had the least seasonal difficulties in 2008, other Croatian Airports suffer more

GINI-Index	Airport
0.05	Zagreb
0.12	Ljubljana
0.12	Podgorica
0.25	Tivat
0.30	Zadar
0.30	Split
0.32	Pula
0.36	Dubrovnik
0.42	Rijeka
0.18	Average
0.00	Total Equality

Daily Traffic Variation:

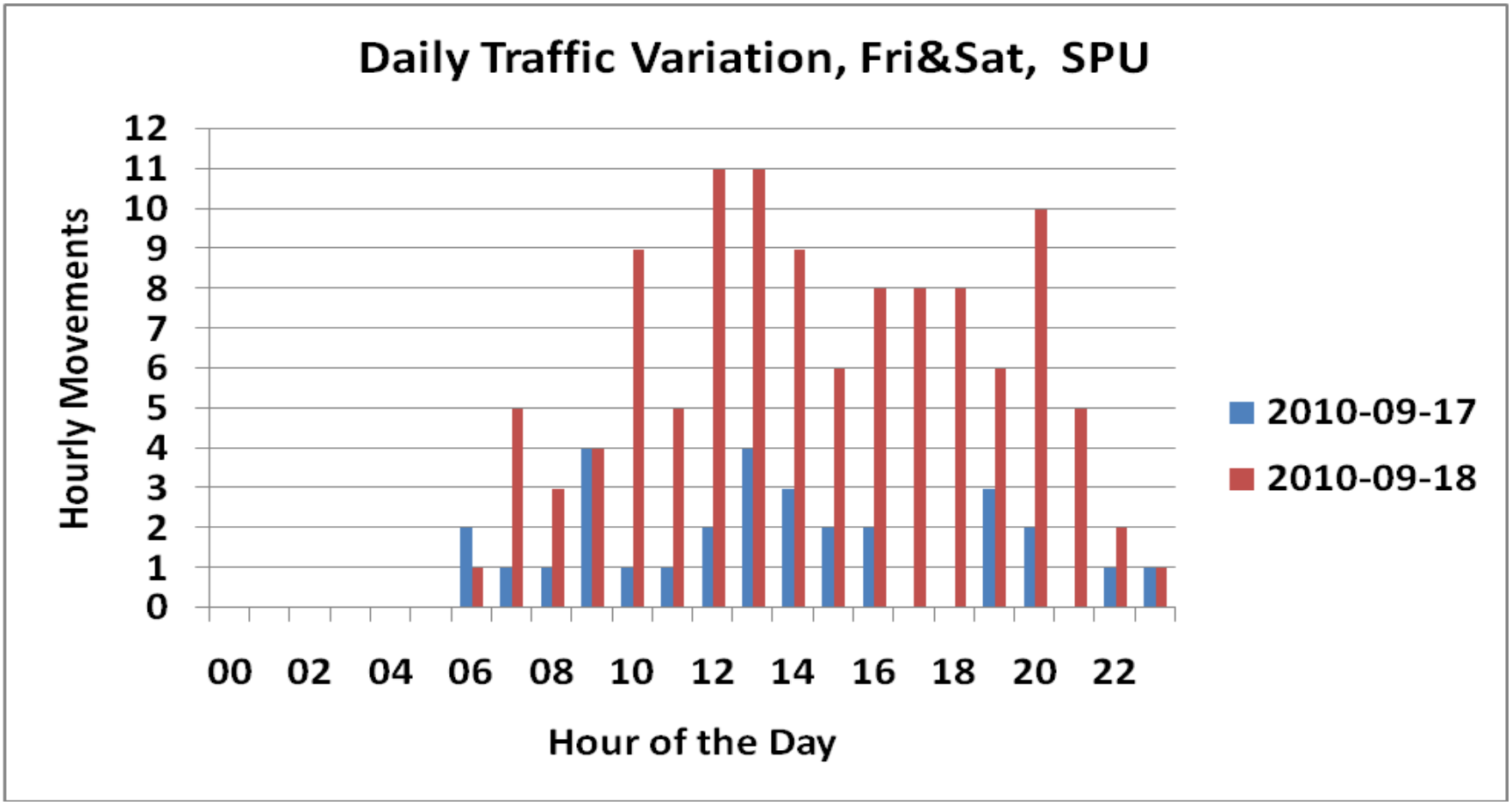
Besides the monthly variation, daily variation of traffic is also interesting to take a closer look:

→ In Zagreb, we observe a peak on Friday..



Daily Traffic Variation:

→The graph shows the air traffic movements for each hour of the day for Split Airport.
→In Split we observe a peak on Saturday
(recall the abandoned peak-pricing on Saturdays in Split)



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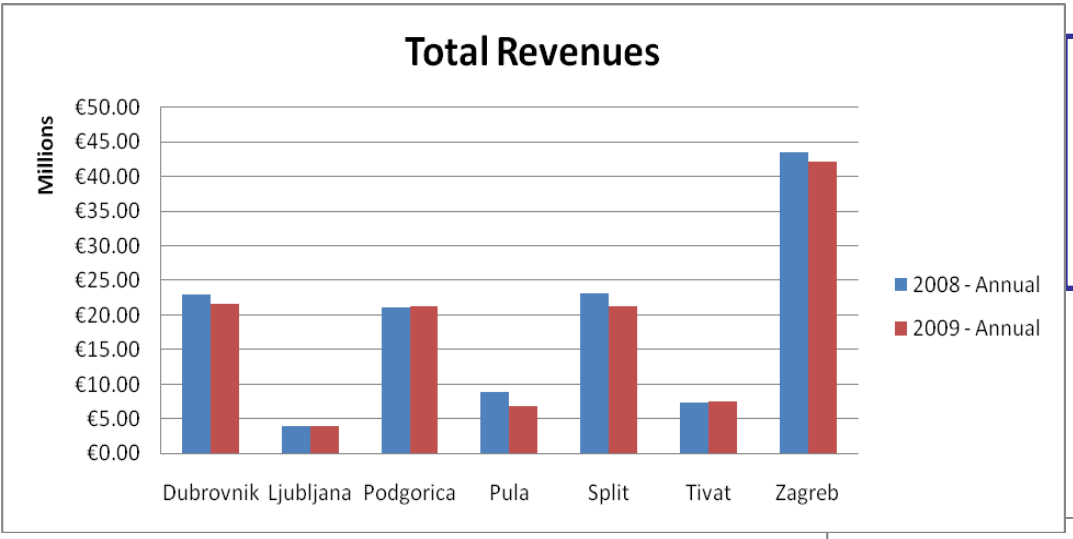
Financial Indicators:

The traffic shows us reasonable seasonal variations:

→But how do these variations are reflected in the financial figures?
→How do the revenues, costs, profits look like?

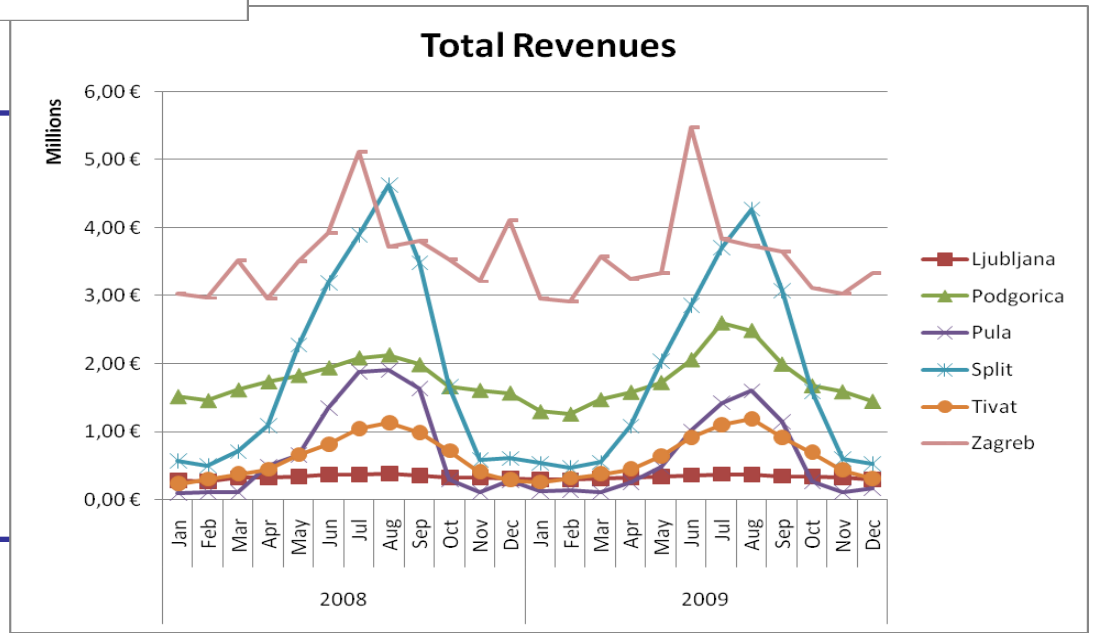
However, the financial data is not complete yet,
Data for Dubrovnik is on an annual level and Zadar 08-09 is completely missing

Financial Indicators: Total Revenues

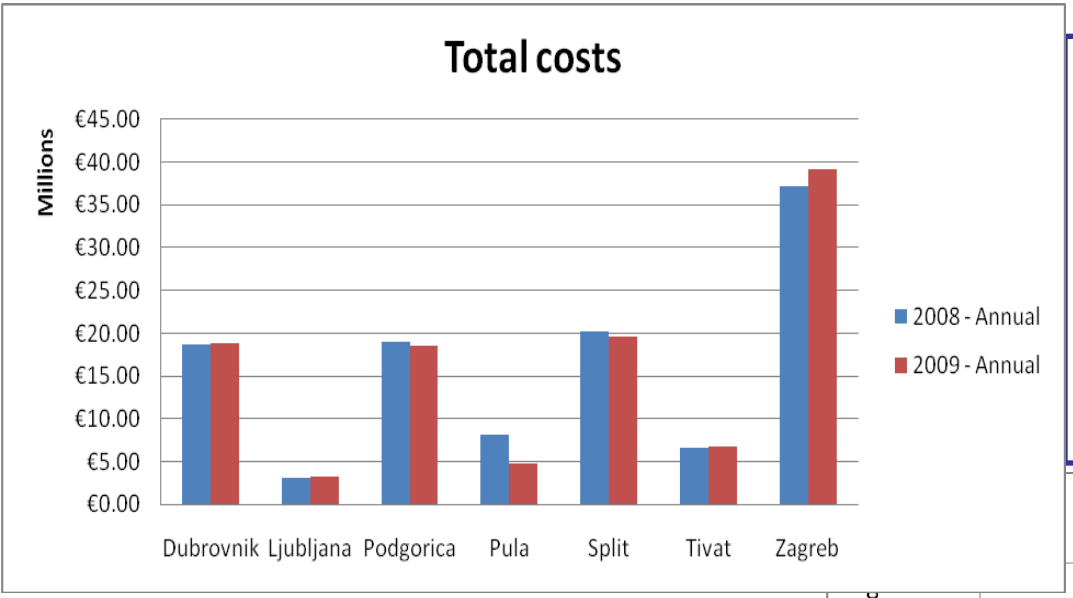


→Annual total revenues can only give us an idea about the scale of the airports.
→From 2008 to 2009, there is no dramatic changes.

→Even **ZAG** with less seasonality has a peak on revenues in June.
→Do they have any pricing strategy regarding the summer months?
→Why does **LJU** have such low revenues? Even compared to Tivat (which has comparable traffic)

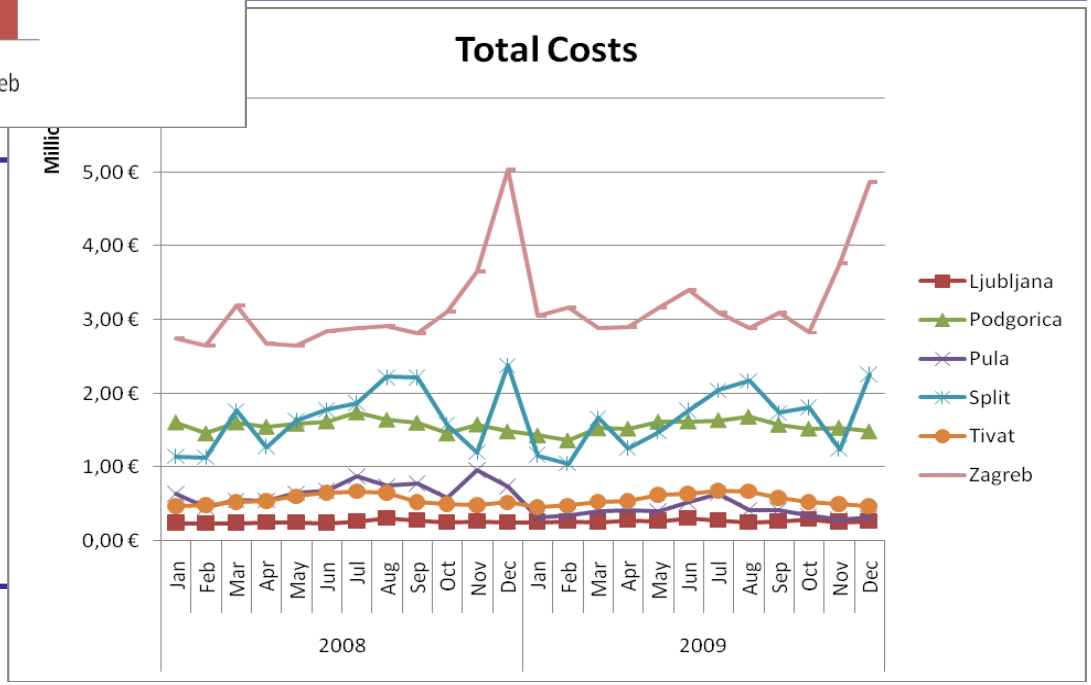


Financial Indicators: Total Costs

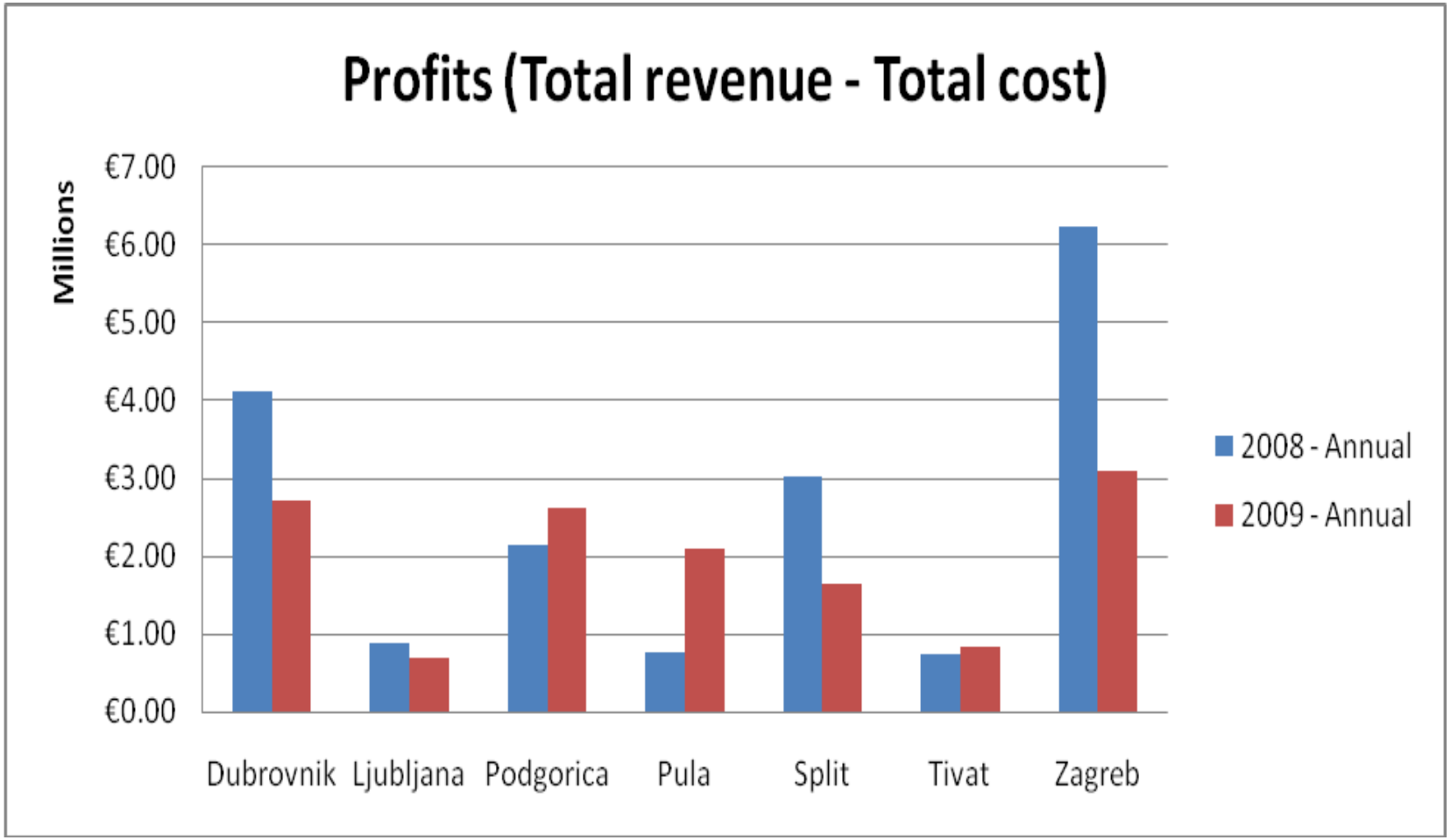


→Annual total costs can only give us an idea about the scale of the airports.
→Later per PAX or ATM is more meaningful
→From 2008 to 2009, there is no dramatic changes except **PUY** was able to reduce its costs.

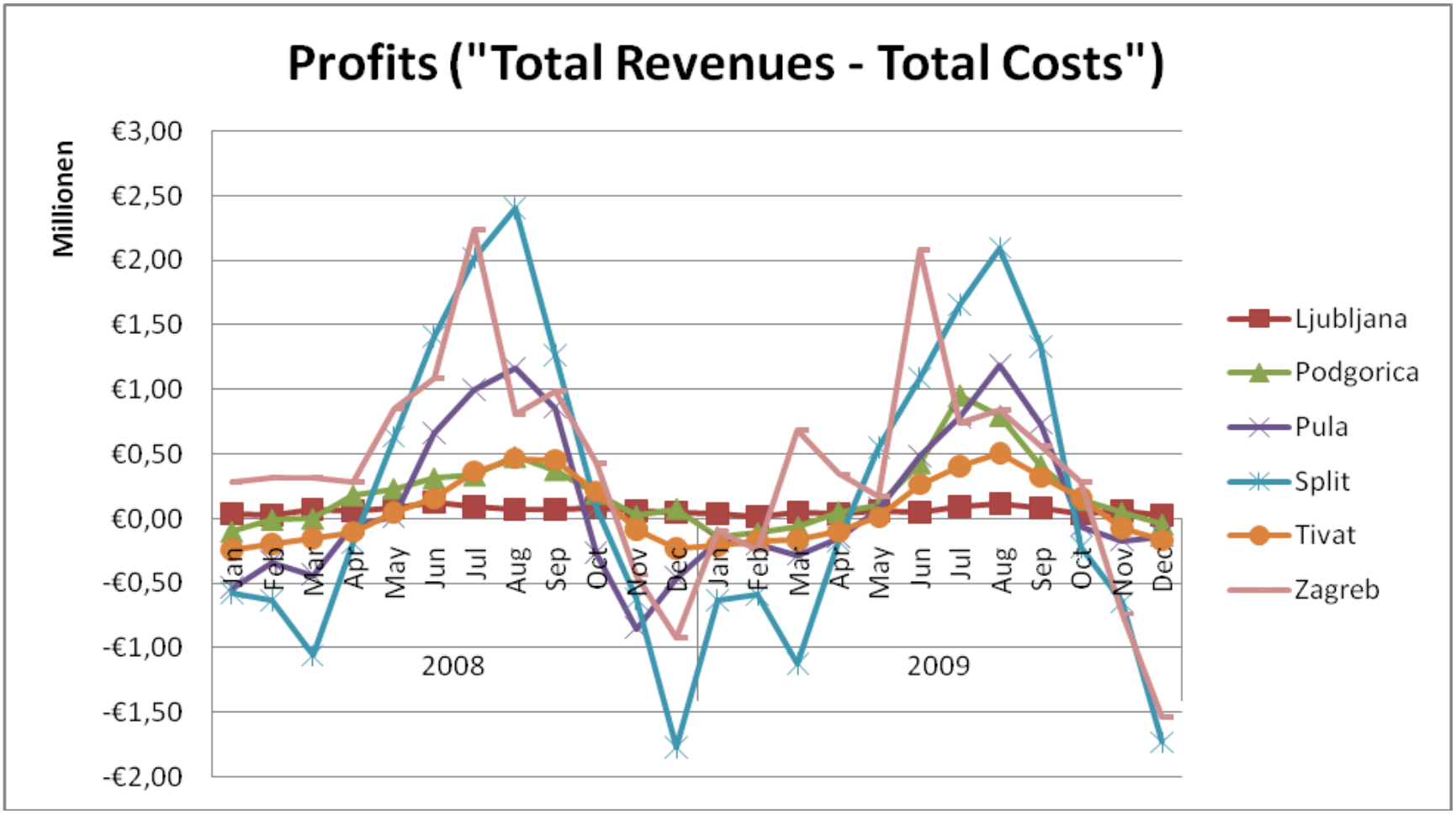
→Total costs in **ZAG** and **SPU** increase in the last months of the year! Reason?
→For the other airports, it is stable over the months.
→Whereas the revenues much lower in the winter months, which is the main challenge for such airports.



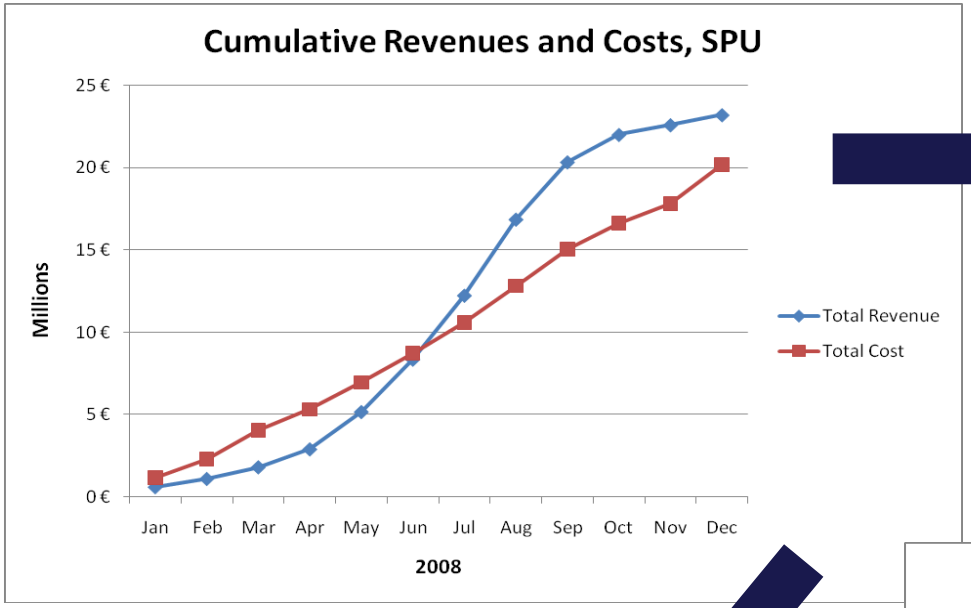
Financial Indicators: Profits, Annual



Financial Indicators: Profits, Monthly



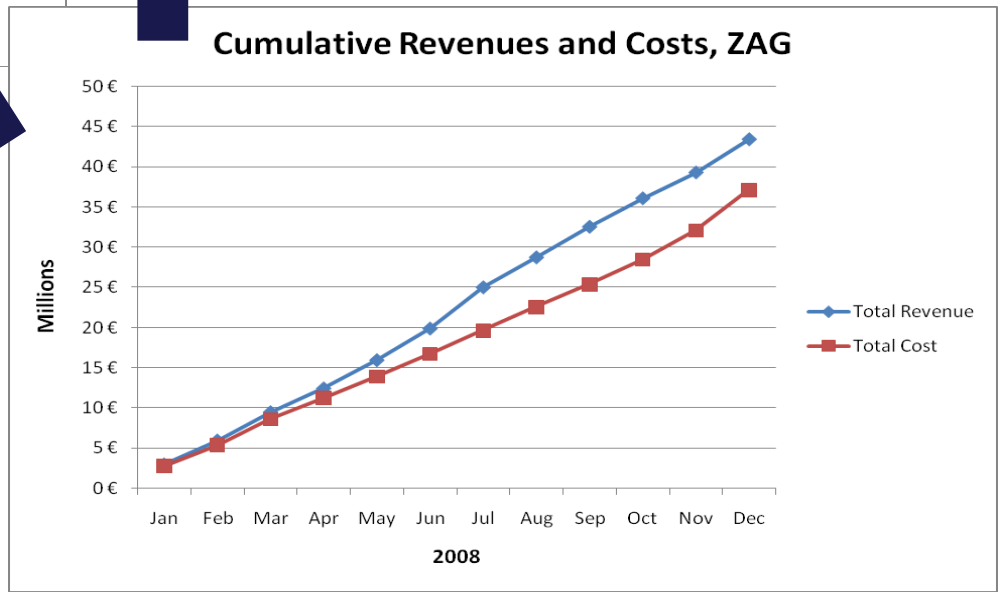
Financial Indicators: Total Costs and Revenues



→In **SPU,** the airport starts to recover its costs in June of 2008…

whereas,

→In **ZAG,** airport's revenues are higher than its costs for each month in 2008.



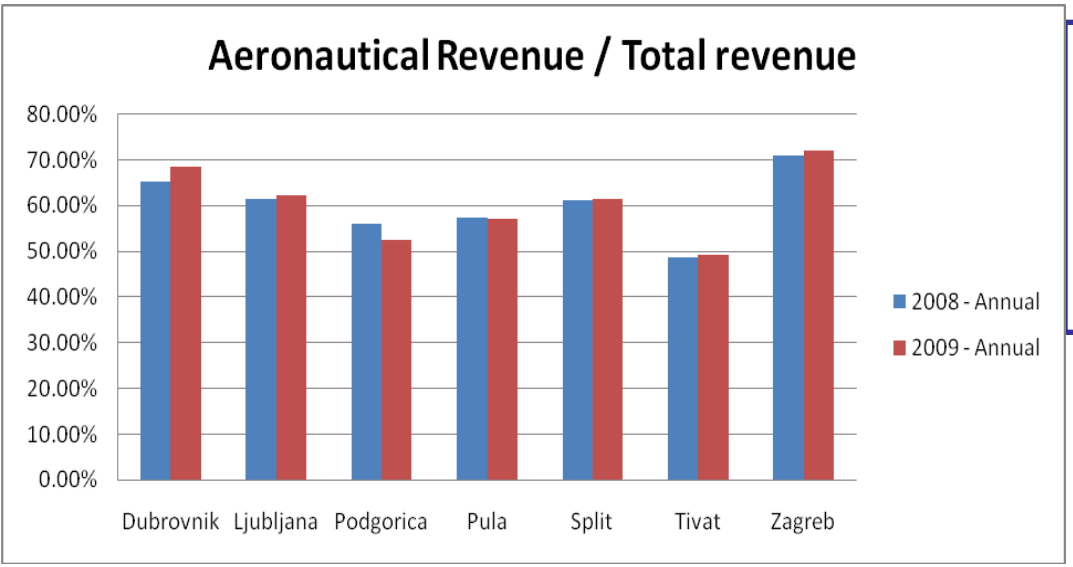
→What possibilities are there:

i) To increase the revenues in winter?

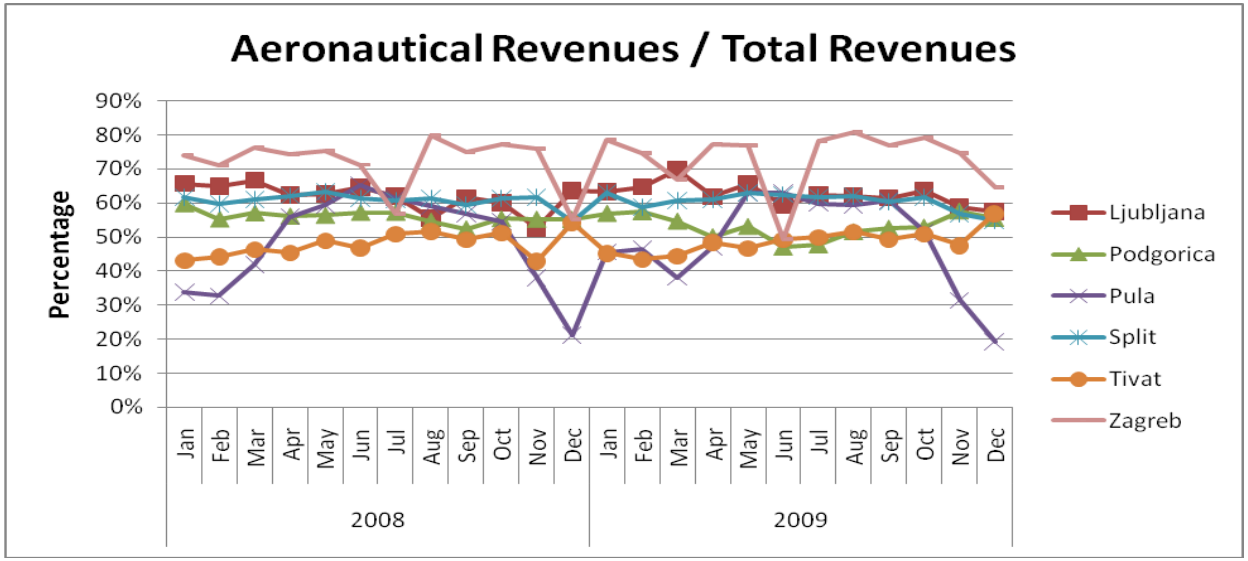
ii) To decrease the costs in winter?

iii) To increase the revenues in summer to better subsidize the costs in winter?

Financial Indicators: Share of Aviation Revenues

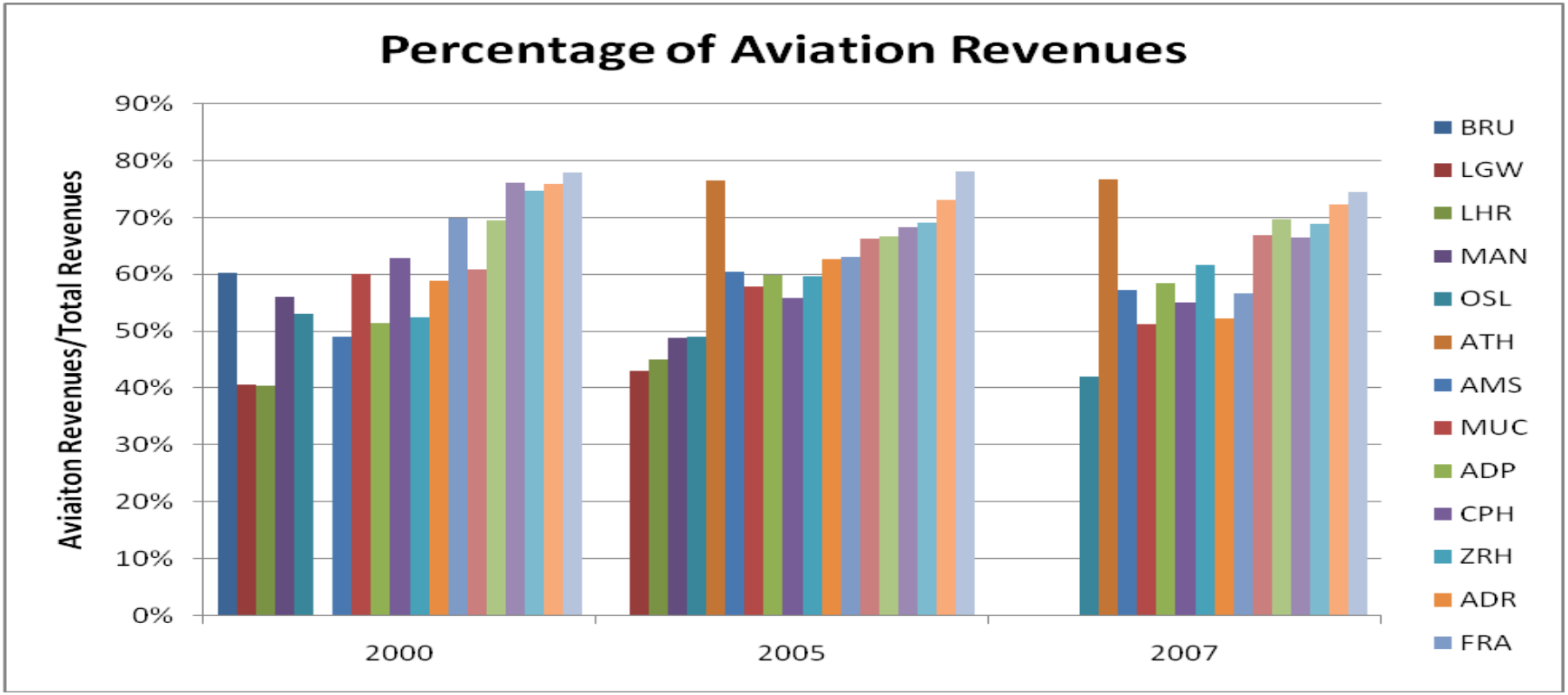


→Share of non-aviation revenues is in average around 40%, which is as in European Average
(see next slide for selected European airports)



Financial Indicators: Share of Aviation Revenues

In other European Airports:



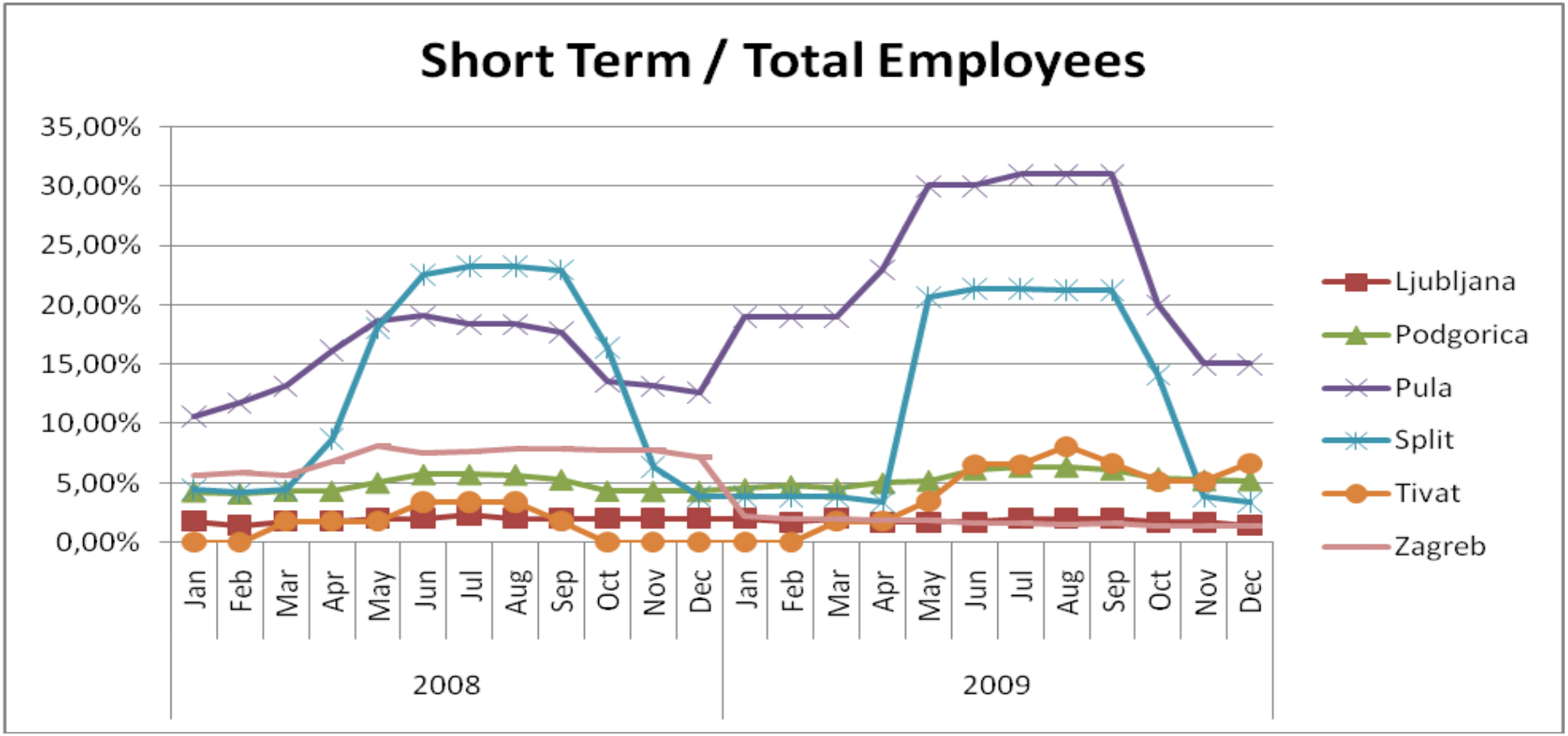
→If we consider the European airports as a benchmark;

- Is there a chance of improvement on non-aviation performance.? More research!!

Outline:

- Background and Research Motivation
- Data and Characteristics of Sample Airports
- Indicators of Inequality and Variation
- Financial Situation of Sample Airports
- Efficiency Measures
- Special Issues
- Summary and Outlook

Employees: Short Term vs. Full Time



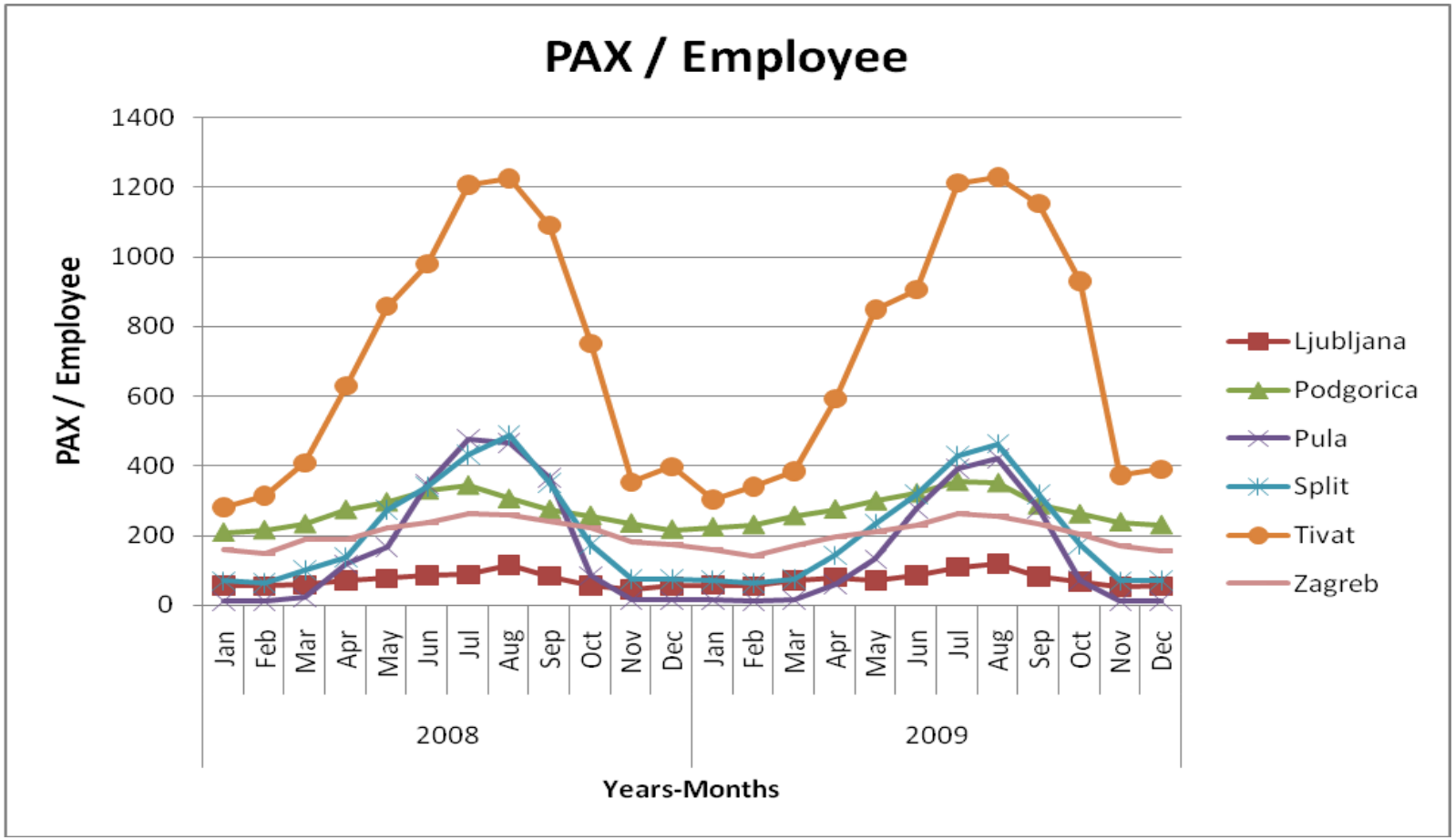
Short term employees in **SPU**(2008)

→Jan: 17 →July: 111

→ Split strategy to hire extra workers in busy summer months.

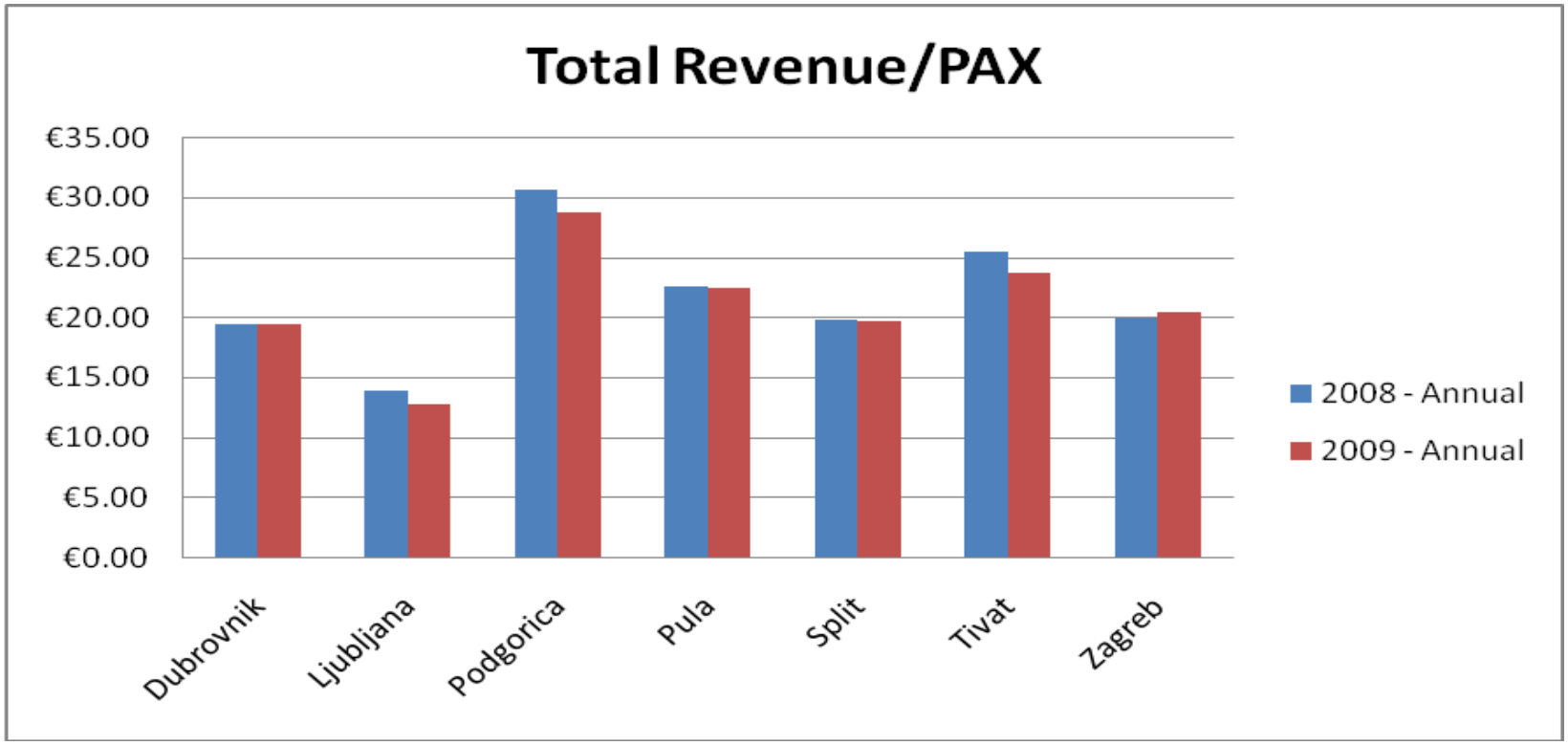
Similar Situation for **PUY**

Efficiency Measures:



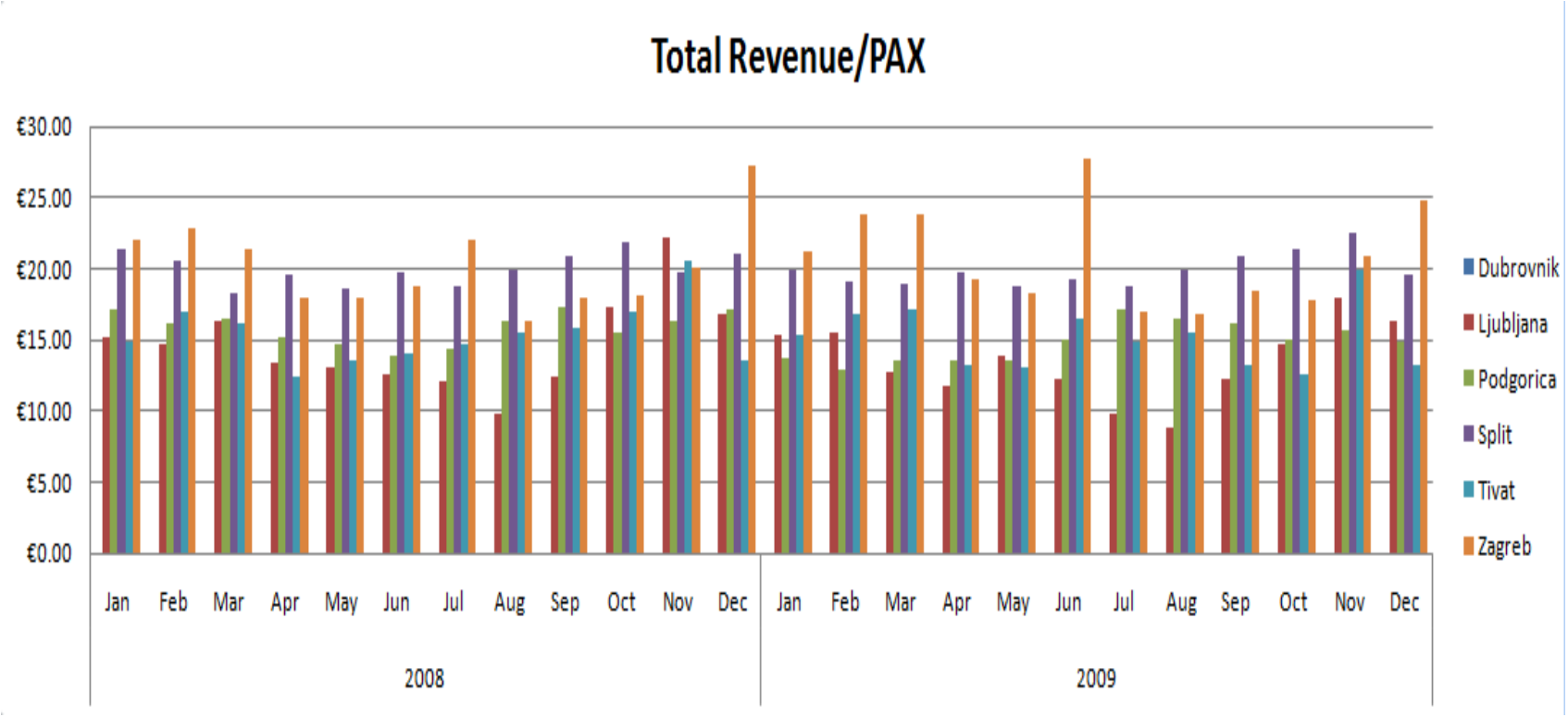
→**TIV** is by far the best one within the sample.
→60 Employees in **TIV,** compared to 350 in **LJU** with similar traffic figures?
→further data analysis needed

Efficiency Measures:



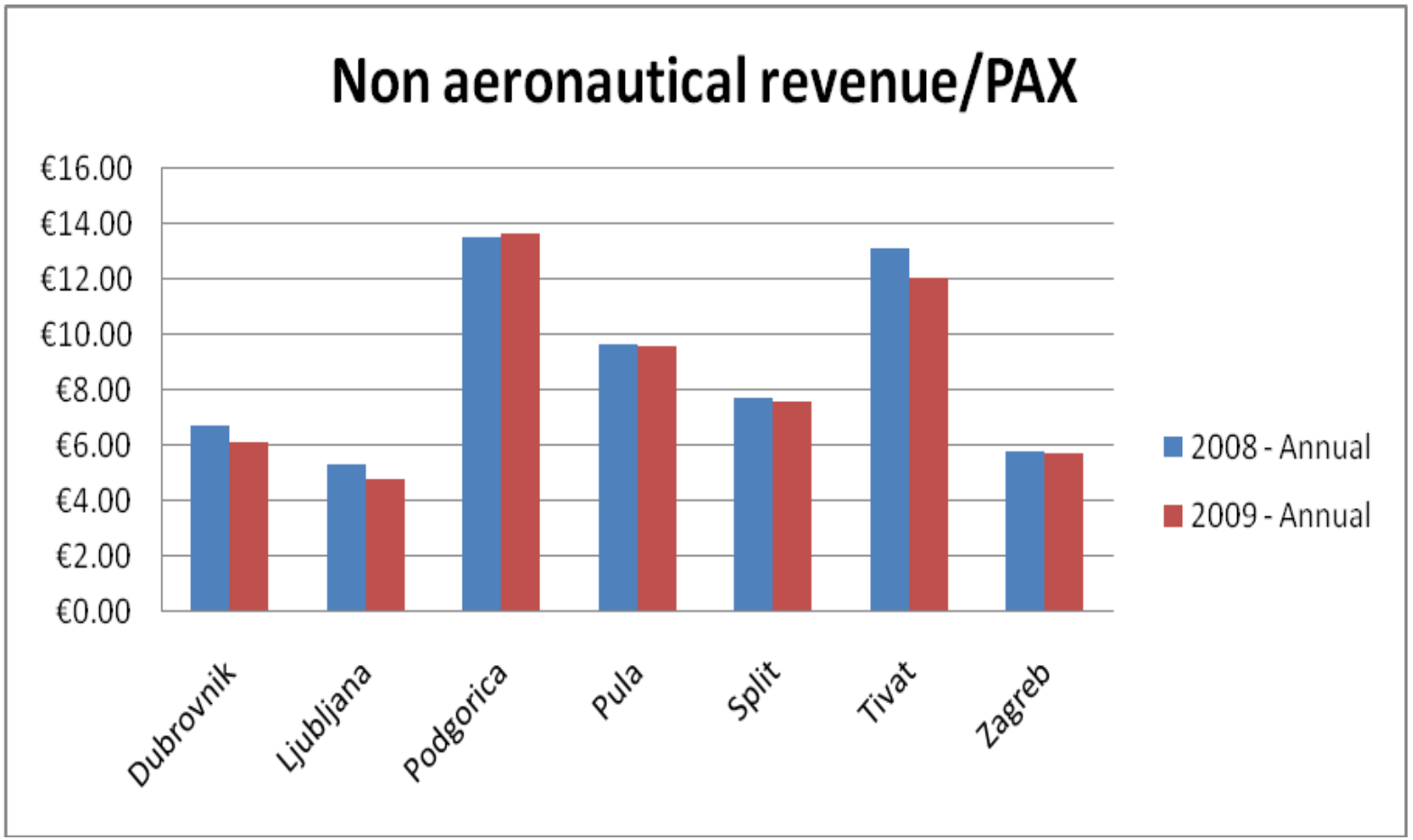
The financial indicators for the Croatian airports are actually quite similar, we still need to analyze in more detail the data from Ljubliana and Podgorica

Efficiency Measures:

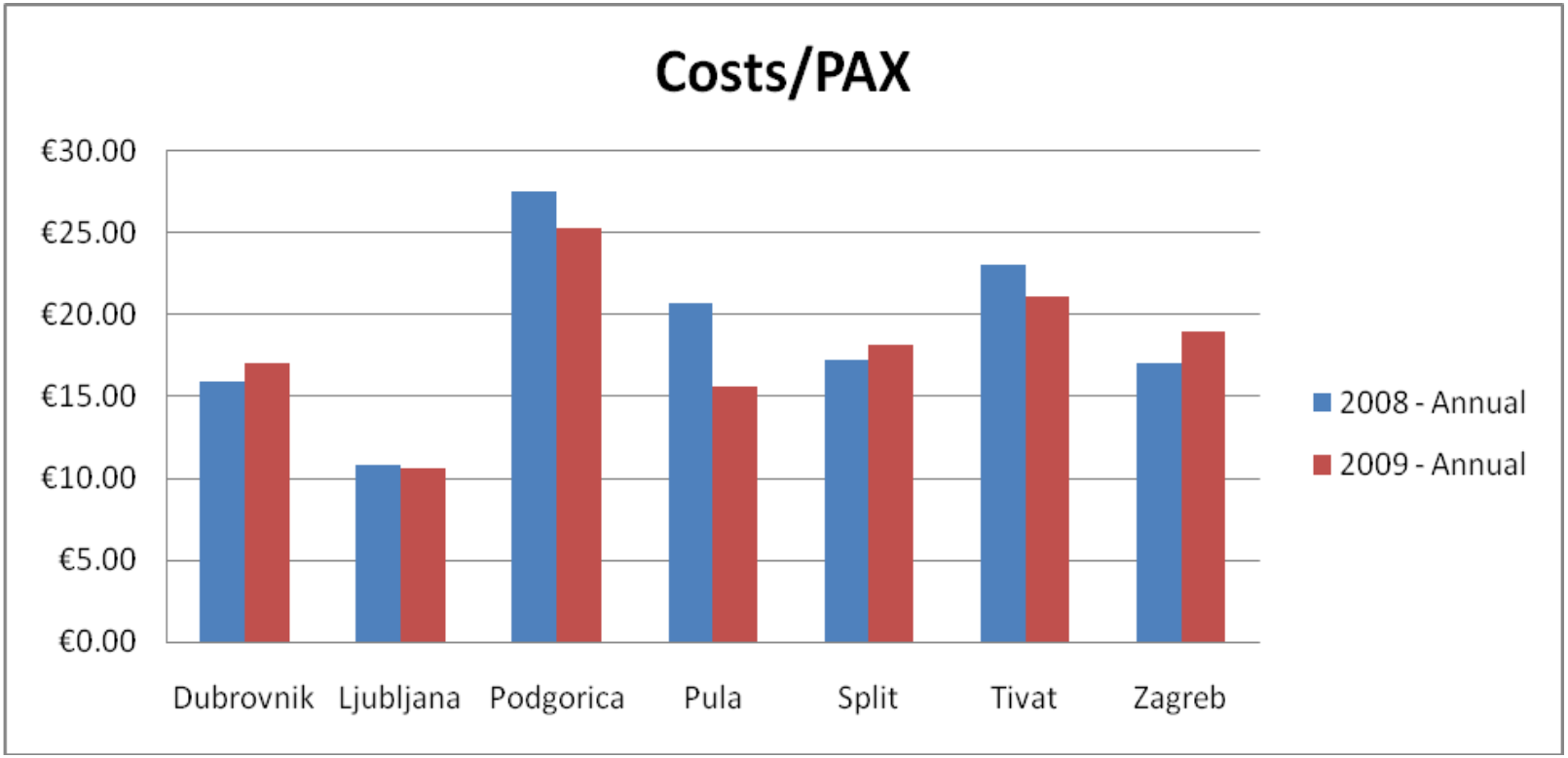


→PUY is an outlier so it is taken out of the graph.
→Calculation of break even point in the future

Efficiency Measures:

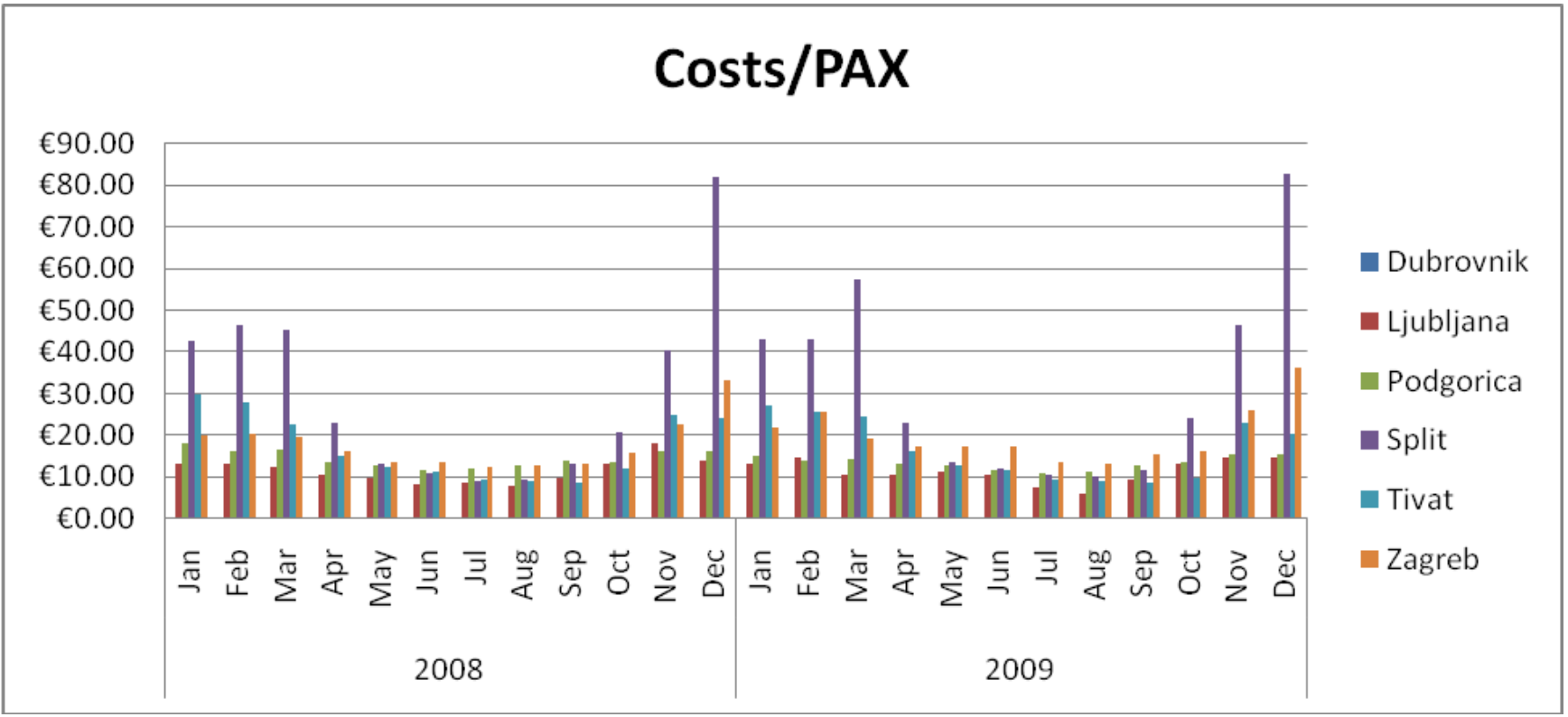


Efficiency Measures:



→Comment here!

Efficiency Measures:



→PUY is an outlier so it is taken out of the graph.
→Personnel costs are fairly consistent during the year, even though there are many fewer PAX in the off season months they still pay out the same salaries
→Also a big number of services contracted is done in the first and last month of the year

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Conclusion

- All airports have peak revenues in summer months, even capital cities who show smaller indications of seasonality.
  - What is the pricing strategy in the summer months?
- In winter months costs are greater than revenues, main challange for airports?
  - Why do the total costs for ZAG and SPU increase in closing months.
- Some airports such as SPU break even in June, whereas ZAG makes profit in each month of the year
- Need to obtain the fleet mix for airports
- Share of non-aviation revenue is in the range of European average.

Conclusion

- Monthly total revenues/PAX are smaller than monthly total costs/PAX in low demand months and vice versa.
  - -Economies of scale: The more PAX the lower cost/PAX become
  - - Break even point: How many PAX to break even?
  - -Monthly revenues,costs/PAX for PUY are inconsistent with other airports
- Only SPU and PUY are adapting a strategy to higher extra workers in busy summer months

Further Studies:

On Financial Efficiency

1. Calculating the cost of seasonal operation

→ Mainly investigating the fixed costs and level of outsourcing to reduce costs

→ Analyze role of state aid to maintain a financially viable operation in the light of the positive externalities the airport creates

2. Focusing on Peak Hour Pricing and financial effects

Thank you for your attention.

GERMAN AIRPORT PERFORMANCE

A Joint Project of:
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