

Gordijn, Hugo

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## Air Transport and Local Development in Belgium and The Netherlands

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## **Air Transport and Local Development in Belgium and The Netherlands**

Hugo Gordijn  
Institute for Transport Policy Analysis  
P.O.Box 20901  
2500 EX The Hague, The Netherlands  
[hugo.gordijn@minienm.nl](mailto:hugo.gordijn@minienm.nl)

Theme H : Infrastructure, Transport and Communications

### **Abstract**

The impact of an airport on spatial economic development is cited to justify investments. Local governments are of the opinion that an airport can have a positive effect on a region. However, there are disagreements about just how much extra employment and added value an airport generates. It differs between 200 en 2000 extra jobs per million passengers.

This paper contains recent data about the airport development of Dutch and Belgian airports. It shows significant differences between the airports. Small airports have a relatively large amount of employees compared to their production. Large airports benefit from their greater scale.

Timeseries for employment and added value show an increase in labor productivity. Employment at Schiphol airport were around 2000 jobs per million Workload units 40 years ago. Nowadays around 1000 jobs are counted for the same workload.

The total number of jobs on Belgian airports has decreased owing to the demise of SABENA in 2001. The paper also shows how the stimulating development policy of the Walloon government leads to a sharp increase in employment on the two Walloon airports : Charleroi as an airport for low-cost airlines and Liège-Bierset as an airport for express-freight.

Employment has continuously grown at Amsterdam Schiphol airport since the 1970's. In the early years this was mainly through the growth of passenger numbers and the development of the hub-function. In more recent years the growth has been spurred by the demand for increased safety measures, but the most significant contribution to the recent growth of employment at Schiphol has been the development of the Airport-city.

The presence of a home-base carrier has shown to have the largest effect on employment.

JEL-code : Transportation Systems R40 - General

## 1. Introduction.

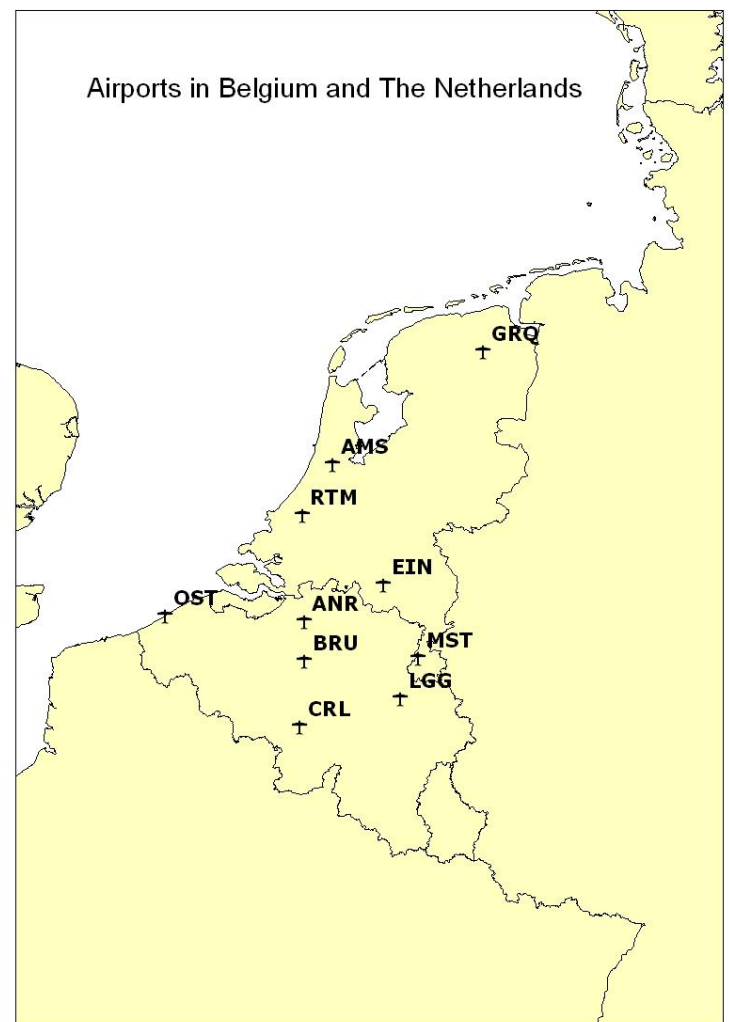
The role of airports in economic development has been studied for a long time. For example, ACI Europe (1998) reports an average direct on-site job density of 1100 jobs per million passengers for 23 larger European airports. To enclose freight in the calculation of airport transport output use is made of workload units (WLU) : 1 passenger or 100 kilogram freight. York Aviation (2004) found on average 950 on-site jobs for every million workload units of 25 European airports. Not only direct employment is important, but also indirect employment (suppliers). Hakfoort, Poot and Rietveld (2001) find that the total multiplier of direct employment on Amsterdam Schiphol Airport is approximately 2: one job on the airport leads to approximately one job in indirect employment.

Apart from direct and indirect employment some authors use “induced” and “cathalytic” employment. Induced refers to the spending and activity generated by direct and indirect operations. But these calculations can lead to double counting (Zuidberg & Veldhuis (2012) p 15, Oxerra (2010) p 10). Catalytic refers to the wider role of the airport on regional development by a better accessibility. It is especially important for remote areas (Halpern & Bräthen (2010), Espon (2012)).

CE Delft (2005) criticize the use of employment as an indicator for the economic importance of airports. They state that that “it is incorrect to assume that all these people would become unemployed if activity in the aviation sector ceased. Budgets may well be spent elsewhere, leading to employment in other sectors of the economy. If people had not travelled by air, they would have spent the money in a different way” and “it seems strange to substantiate the importance of air travel and transport by emphasizing the number of hamburgers sold at a given airport.”. Instead CE advocates to calculate the social and environmental costs and the use of the Value of time saved for businesses and passengers who profit from the improved accessibility of the region which is served by airports. Another argument can be the improvements of reliability. CE, (2013).

This criticism indicate that there is not only a big difference in the desirability of aviation, but also in the way economic benefits are perceived and calculated. The purpose of the paper is to provide facts concerning the ongoing developments in The Netherlands and Belgium and make a contribution in the debate pertaining the relation between Air transport and regional development.

This paper is structured as follows. First, data is presented pertaining to traffic and transport on the Belgian and Dutch airports. Then, figures about employment and value added are presented. This is framed with a description of the most important activities at the various airports that broadly explain these developments. This paper ends up with some contributions to the ongoing discussion about the relation between air transport and regional economic development.



## 2. Empirical data for Belgium

Belgium has six airports that are important for international connectivity. The most important is Brussels-Zaventem, the national airport. The airport witnessed almost 19 million passenger movements in 2012. In addition to Brussels, only the fast growing Charleroi has a substantial amount of passenger traffic.

**Tabel 1 Passengers at Belgian Airports 2006-2012.**Source : Airports.

Passengers (*1000)	Code	2006	2007	2008	2009	2010	2011	2012
Brussels/Zaventem	BRU	16.708	17.877	18.516	16.998	17.181	18.786	18.971
Antwerpen/Deurne	ANT	148	175	177	169	163	166	85
Ostend/Bruges	OST	146	180	200	193	214	233	233
Kortrijk/Wevelgem	KJK	65	67	66	65	66	70	69
Charleroi/Gosselies	CRL	2.166	2.459	2.957	3.937	5.195	5.901	6.065
Liege/Bierset	LGG	307	333	400	357	299	309	131
Total		19.541	21.090	22.317	21.719	23.118	25.465	25.554

Brussels is also an important airport for Belgium in the area of freight. However, the amount of cargo processed declined significantly when DHL relocated its intercontinental hub from Brussels to Leipzig-Halle. The other airport with large amounts of freight is Liege-Bierset where TNT has established its hub-function.

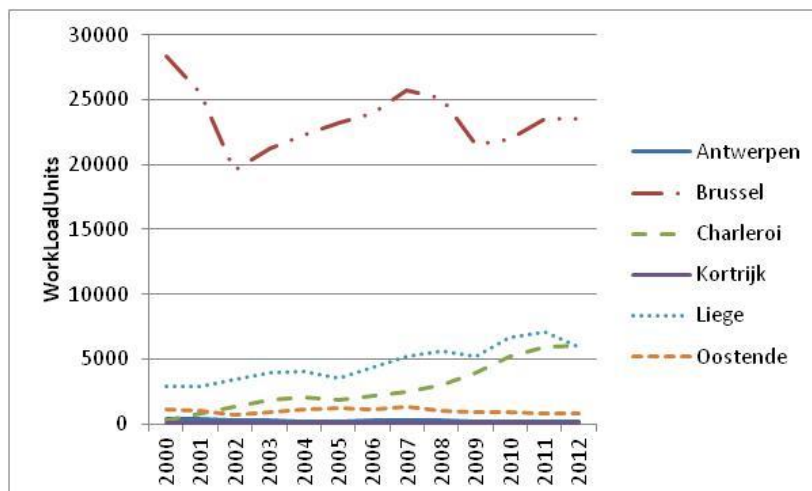
**Table 2 Freight at Belgian Airports 2006 - 2012.** Source : Airports.

Freight (*1000 ton)	Code	2006	2007	2008	2009	2010	2011	2012
Brussels/Zaventem	BRU	720	784	661	449	476	475	459
Antwerpen/Deurne	ANT	7	5	5	4	4	4	4
Ostend/Bruges	OST	99	109	83	74	64	57	53
Kortrijk/Wevelgem	KJK	0	1	0	0	0	0	0
Charleroi/Gosselies	CRL	0	0	0	0	0	0	0
Liege/Bierset	LGG	407	490	519	482	639	674	577
Total		1232	1389	1267	1009	1184	1211	1093

To make a good comparison between how busy different airports are, Work Load Units (1 WLU=1

passenger, or 100 kg freight) are utilized. This figure shows the number of WLU(\*1000) at different airports. At Brussels, passenger traffic dominates, but freight still comprises 30% of the 23,6 million Work Load Units in 2012.

Liège has constantly expanded in cargo and express courier services (TNT) to 6.100 kWLU in 2012. Charleroi has specialized in (low cost) passenger transport to 5.900 kWLU. Ostend handles specialist cargo; 800 kWLU in 2012. Antwerp focuses on short haul passengers travelling to and from the Antwerp conurbation (100 kWLU). Kortrijk



**Figuur 1 Workload units (\*1000) at Belgian airports 2006-2012.**

occupies the business travel segment (100 kWLU),  
Both Walloons airports (Liège and Charleroi) are part of the Walloon governments regional economic stimulus program.

For the Belgian airports data on employment and Value added are published in reports of the Belgian National Bank (Kupfer & Lagneaux (2009) and Deville & Vennix (2011)).

If we restrict ourselves to the air transport cluster<sup>1</sup> we get the following results for the Belgian airports:  
The drop in WorkLoadUnits in Table 3 reflects the large upheavals that have taken place in the Belgian Air transport sector, such as the demise of SABENA in 2001/2002 and the relocation of the DHL-hub to Leipzig in 2007-2009. The demise of SABENA in particular led to a significant loss of employment.

**Table 3 Value added and Employment at the airport cluster of Belgian airports 2000-2009. Source : National Bank of Belgium.**

	Value Added (M€)	Employment (FTE)	Value added / Employee (€/FTE)	WLU (*1000)	Empl/WLU
2000	1925	29644	64937	32949	0,900
2001	1867	28831	64746	30662	0,940
2002	1646	22829	72097	25250	0,904
2003	1787	22648	78903	28178	0,804
2004	1866	22044	84653	29695	0,742
2005	1924	21887	87901	30073	0,728
2006	1963	21713	90407	31856	0,682
2007	2013	21763	92496	34969	0,622
2008	1984	22483	88244	34991	0,643
2009	1929	21927	87974	31811	0,689

Table 3 also shows the declining employment per Workload unit to indicate the improved labor productivity. In the ‘crisis years’ 2001 and 2008/2009, we see a decline in labor productivity. The changes in employment happen at a slower pace than the loss of work and value added.

Table 4 shows the direct and indirect employment and value added (Kupfer & Lagneaux, 2009). The derived multiplier is around 2,2. The indirect employment is calculated by looking at input-output relations between different sectors. This confirms the figure mentioned in the introduction.

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<sup>1</sup> clusters: Networks of production of strongly interdependent firms (including specialized suppliers) linked to each other in a value-adding production chain.

Table 4 Direct and indirect Employment and Value Added at Belgian airports 2006. Source : Kupfer & Lagneaux (2009).

AIRPORT	EMPLOYMENT IN 2006			Value Added (million Euro)		
	direct	Indirect employment (in FTEs)	Multiplier	direct	indirect	Multiplier
Antwerpen	519	848	2,63	42	72	2,71
Brussels	17618	19732	2,12	1436	1660	2,15
Charleroi	922	1065	2,16	67	87	2,30
Kortrijk	146	223	2,52	10	19	2,91
Liege	1843	3094	2,68	144	266	2,84
Ostend	441	465	2,06	31	39	2,26
<b>TOTAL</b>	<b>21488</b>	<b>25427</b>	<b>2,18</b>	<b>1730</b>	<b>2134</b>	<b>2,23</b>

In table 5 these numbers are linked to the workload units that have been processed at the airports in question. It reveals large differences.

Table 5 Employment and Value added related to workload units at Belgian airports in 2006.

	Employment	Value added (M€)	passengers 2006 (*1000)	freight 2006 (*1000 ton)	WLU (*1000)	EMP/WLU *1000	VA/WLU (€/pWLU)
Antwerpen	1367	113	148	6,8	216	6,3	524
Brussels	37350	3096	16708	719,7	23904	1,6	129
Charleroi	1987	155	2166	0,0	2166	0,9	71
Kortrijk	369	29	65	0,0	65	5,7	437
Liege	4937	411	307	406,5	4373	1,1	94
Ostend	906	71	146	98,5	1132	0,8	62
<b>TOTAL</b>	<b>46915</b>	<b>3864</b>	<b>19541</b>	<b>1232</b>	<b>31856</b>	<b>1,5</b>	<b>121</b>

The average Employment-WLU ratio is 1,5 in 2006 and 121.000 Euro Value added per WLU. The high values of Employment – Workload unit ratio's in Antwerp and Kortrijk indicate the low number of workload units while having relatively high costs and employment for the airport operator, security, air navigation and the like. On the other side of the scale Ostend (low-cost freight) and Charleroi (low-cost passengers) have a lower value per WLU than average. In the case of Charleroi this is partly caused by Ryanair workers being registered in Ireland and they are therefore not included in the Belgian figures. Value added per employee ranges from 77.000 Euro to 83.000 which indicates low differences in wage structure between airports.

### 3. Empirical data for The Netherlands.

Table 6 Passengers (million) at airports in The Netherlands 2000-2012. Source : Airport websites and CBS.

Passengers	(Million)	Schiphol	Rotterdam	Maastricht	Eindhoven	Groningen	Twente
Year	Total	AMS	RTM	MST	EIN	GRQ	ENS
2000	40,8	39,6	0,7	0,3	0,4	0,1	0,0
2001	40,8	39,5	0,7	0,3	0,4	0,1	0,0
2002	42,0	40,7	0,6	0,4	0,3	0,1	0,0
2003	41,3	40,0	0,6	0,4	0,3	0,1	0,0
2004	45,0	42,5	1,2	0,3	0,7	0,2	0,1
2005	46,6	44,2	1,0	0,3	1,0	0,1	0,0
2006	48,7	46,1	1,0	0,3	1,2	0,1	0,0
2007	50,5	47,8	1,1	0,1	1,4	0,1	closed
2008	50,6	47,4	1,1	0,3	1,6	0,2	
2009	46,6	43,6	1,0	0,2	1,7	0,2	
2010	48,8	45,2	1,0	0,3	2,1	0,2	
2011	54,1	49,8	1,2	0,4	2,6	0,1	
2012	55,8	51,0	1,3	0,3	3,0	0,2	

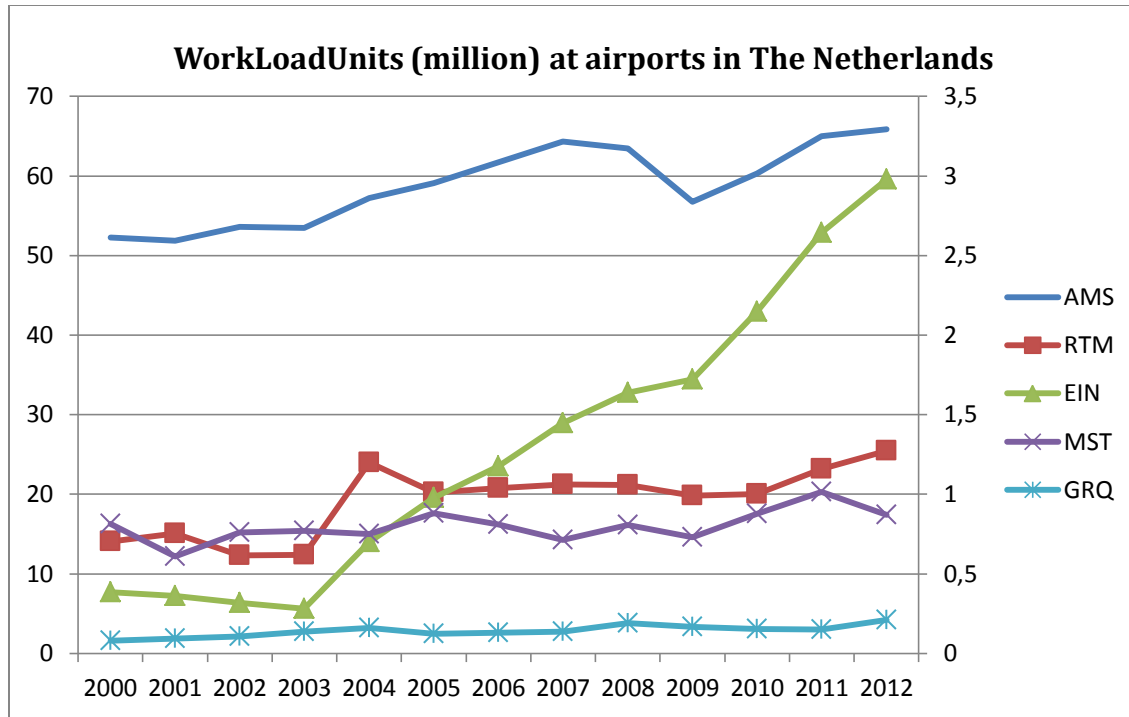
Table 7 Freight (tons \* 1000) at airports in The Netherlands 2000-2012. Source : CBS.

	Amsterdam	Rotterdam	Eindhoven	Maastricht	Groningen
	AMS	RTM	EIN	MST	GRQ
2000	1267	1	0	47	0
2001	1234	1	0	33	0
2002	1289	0	1	40	0
2003	1354	0	1	34	0
2004	1467	0	1	45	0
2005	1496	0	1	58	0
2006	1567	0	1	54	0
2007	1651	0	0	58	0
2008	1603	0	1	55	0
2009	1317	0	1	53	0
2010	1512	0	0	62	0
2011	1524	0	0	65	0
2012	1483	0	0	54	0

Amsterdam airport Schiphol dominates the airports in The Netherlands. This intercontinental hub had over 50 million passengers and 1,5 million tons of freight in 2012. Totaling to 66 million WLU. Freight comprises around 25% of the total workload. The regional airports add another 5 million WLU. Eindhoven airport, a military base with civilian co-use, has strong growth in the low cost segment and some business destinations with almost 3 million passengers in 2012. Rotterdam-The Hague airport has a profile as a business airport and 1,27 million passengers. Maastricht-Aachen airport handles specialized

cargo and some low cost flights (870 kWLU). Groningen Airport Eelde (200 kWLU) has some holiday traffic but expects to grow after the extension of the runway in April 2013. Twente Airport Enschede closed in 2007 when the military left the airbase. A civilian restart is currently in progress. Lelystad airport, now in use for general aviation, will be opened to commercial traffic in the coming years as a reliever airport for Schiphol due to environmental (noise) concerns around Amsterdam.

**Figuur 2 Workload units (\*1000) at airports in The Netherlands 2000-2012.**



**Table 8 Employment at Schiphol Airport 1970-2010**

Year	Employment on-site (*1000)	Workload Units (million)	Employment/ million WLU
1970	16,4	6,9	2380
1975	19,5	10,1	1928
1980	23,2	12,9	1797
1985	26,3	16,1	1638
1990	35,9	22,5	1595
1995	40,9	35,1	1163
2000	54,6	51,8	1053
2005	58,0	58,7	988
2010	59,8	60,3	991

Employment data are collected on a yearly bases by Schiphol. The data collection is limited to the land owned by the airport. Adjacent sites like the former Fokker-aircraft factory or the Schiphol-Rijk office location are not taken into account. The long time horizon of the data-collection (Regioplan, 2012) gives valuable information about the relation of employment and workload units. In 1970 a million workload units (a passenger or 100 kilo freight) corresponds with 2380 employees. This number continues to lower until a level of

around 1000 is reached. It is a continual rise in productivity of the primary airport processes. The last decennium gives rise to the airport city developments where real estate development can be observed. The



excellent connectivity of Schiphol, both by air and landside is attractive for non-aviation purposes as is shown for instance in the famous building The Outlook<sup>2</sup>. The Airport City development (Schaafsma, Amkreutz, Guller, 2008) is shown by the appearance of Microsoft in Table 9.

**Table 9 Top-10 Companies at Schiphol Airport 2004 and 2011.**

Company	Employees 2004	Company	Employees 2011
1. Koninklijke Luchtvaart Maatschappij	23137	1. Koninklijke Luchtvaart Maatschappij	24.462
2. Martinair Holland	2477	2. Schiphol Group	2.183
3. Schiphol Group	2296	3. G4S Aviation Security	1.851
4. Koninklijke Marechaussee	1724	4. Transavia.com	1.845
5. Transavia Airlines	1687	5. Koninklijke Marechaussee district	1.788
6. Falck Airport Security	1642	6. HMSHost	1.367
7. KLM Catering Services Schiphol	1523	7. KLM Catering Services Schiphol	1.321
8. Air traffic control The Netherlands	996	8. Microsoft	1.120
9. HMSHost	962	9. Martinair Holland	1.051
10. TPG Post / International Mail Centre A	861	10. Air traffic control The Netherlands	912

The top-10 of largest companies in both years is dominated by the airlines KLM, Transavia and Martinair. The airport operator, air traffic control and airport security organizations are accompanied by airport hospitality and catering. These all serve the primary process of an airport. The international mail centre has left Schiphol. New is Microsoft, which moved its Dutch headquarter to The Outlook on the premises of Schiphol. An airport with exceptional international connectivity is a requisite for Microsoft and other new international companies like it.

#### **4. Relations between air transport and local development; discussion.**

In both Belgium and The Netherlands, the clearest connection between air transport and local development is between the presence of a home carrier and the employment and value added at an airport. The demise of SABENA as a home carrier at Brussels was a huge blow for both the intercontinental connectivity of Belgium and for employment and value added. This is evident from the traffic figures and statistics from the National Bank of Belgium.

A second finding is that all airport processes gradually become more efficient. The raise in labor productivity can be witnessed by an increase in value added per WorkLoad Unit and in less jobs per WLU.

We also see that the indirect effects play an increasingly important role. Figures show that the strongest grow in employment at Schiphol is not in the primary processes, but in the consumer services. The second “winner” is the security sector. Because of the increased security measures implemented after 9/11 and other incidents security is now a major source of expenditure.

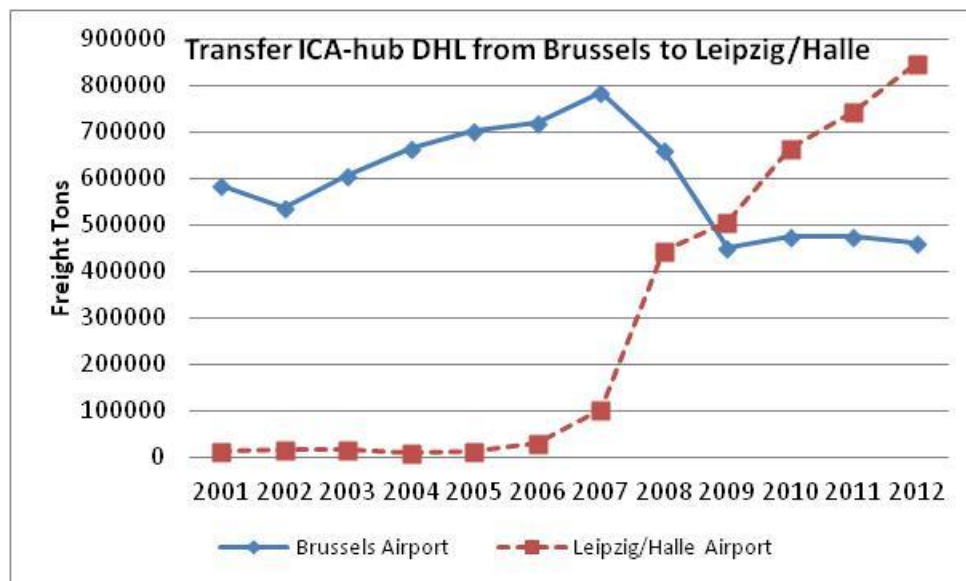
<sup>2</sup> [http://www.destinationschiphol.nl/projects/outlook/The\\_Outlook\\_Schiphol.pdf](http://www.destinationschiphol.nl/projects/outlook/The_Outlook_Schiphol.pdf)

Additionally we see that the smallest airports have a very low labor productivity, measured both in turnover as well as the amount of jobs required per WLU. Airports have a high fixed cost base related to the provision of critical services required to ensure safe and compliant operations (depreciation and maintenance of terminals and runways, fire services, air traffic control). Also in the UK costs differ with size. Costs are around 5 £ per passenger for UK airports servicing 4 to 6 million passengers and 20 £ per passenger for airports with less than ½ million passengers (Ekos & Aviasolution ,2008, p.58). So employment of small airports is generally high compared to output and productivity is low.

Regions that maintain this type of airport apparently find it is important to keep the region accessible by air (also because of the general aviation part) and are therefore willing to subsidize airports. This is similar to how regional governments subsidize other forms of infrastructure such as train routes, bus lines and stations.

It can be seen that the role (regional) governments play is important if the difference in growth and development between the Flemish and Walloon regional airports are examined. The three Flemish regional airports (Antwerp, Ostend and Kortrijk) show a stagnating development. The two Walloon airports (Charleroi and Liege-Bierset) experience a firm growth owing to the strong incentive policy of the Walloon regional government. (VLC, 2012), Cabus (2009).

Another example concerns Leipzig-Halle where the regional government was able to further develop the airport and attract DHL and Lufthansa as tenants. DHL wanted to leave its base in Brussels because it was unable to obtain additional permits for night flights. The government of Sachsen did issue these permits.



The relation between air transport and local development can be mutual. This has been investigated in the EC-ESPON project ADES (Airports as Drivers of Economic Success) where 86 regions were followed between 1990 and 2010. The research concludes<sup>3</sup> :

- *In remote regions, air transportation is even more than a facilitator; in addition that regional growth causes airport activity, air transportation may also give a boost to regional development*

<sup>3</sup> Mukkala & Tervo presentation (undated)

- *In core regions, the reverse is only true: airport activity does not cause growth, but regional growth causes airport activity.*

Airport development can be a strong instrument for regional development. It's success will largely depend on whether the region in question has a coherent development vision in which financial incentives, spatial policy and environmental considerations also play a role.

In reverse, the situation is clear: Economic growth leads to more demand for air transport.

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