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Cooperation and competition in the air transport market: current scenario, possible evolutions and analytical tools

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Regulatory framework in Italy, EU countries, world. Strengths and weak points

Up to the late seventies all airports were owned by the public sector and only small general aviation airports were privately owned. The biggest airports around Europe as well as many airports in the world were owned by the national governments: Paris, London, Madrid, Singapore, Bangkok, Sydney and Johannesburg just to name a few. Regarding US and European regional airports in both Germany and the UK, the ownership was 100% held by public sector but often at a regional or municipal level; an example was Manchester airport whose ownership was split between a consortium of local authorities resting with Manchester City Council (55%) and eight councils of other nearby towns (45% all together).
Another option – quite common in the EU countries, in particular with reference to capital city's airports - was the shared interest between local and national government. A few examples are Frankfurt, Amsterdam and Vienna. A rather unique case was the Basel–Mulhouse or Euro Airport, situated on the border between Switzerland and France, which is jointly owned by the national governments of both Switzerland and France.
Those airports are administrated as public service obligations with few importance given to marketing and commercial management. To be more clear, in some cases the airport's costs and revenues were treated as items within the government department's overall financial accounts (Graham, 2008).

In the 1970s and 1980s, however, the air transport market made a breakthrough toward deregulation and the whole industry started to be considered under a different point of view. The changing process of airport regulation, as it was for the air traffic regulation, was not even worldwide, the first step being the establishment of more independent authorities or airport companies with public shareholders. With reference to airport regulation, the countries who initially adopted the philosophy of the "commercialization of airport" were in most cases European countries; in

North America, where the pressure for air traffic liberalization was stronger than elsewhere and where a lot of transport industries have gone private, there has been a reluctance to move away from public or local ownership (Gillen, 2008). The countries pushing towards full privatization were the UK, Australia and New Zealand. In continental Europe there has been a preference for partial privatization, with the public sector holding the majority of the total shares.

The first airports that were fully privatized in 1987 were those owned – at that time (it is necessary to highlight this aspect as we'll go through this topic later on in the next chapters) - by BAA: London Heathrow, Gatwick, Stansted and Aberdeen, Edinburgh, Glasgow, and Prestwick. No notable privatization took place up to 1995 with the only exceptions being Vienna (first wave in 1992), East Midlands (1993), Belfast International (1994) and Copenhagen (1994).
In 1995 the floated share of Copenhagen airport grew to 49% and in 1996 a further 21% of shares in Vienna airport was floated.
1996: Cardiff, Athens
1997: Düsseldorf, Sandford Orlando, Naples, Rome, Birmingham, Bristol, Melbourne, Brisbane and Perth.
1998: first privatization took place in South America (Argentina); more airport were privatized in Eu (Luton and Stockholm) an Australia (Auckland and Wellington)
1999-2000: further privatization in Central and South America (Mexico, the Dominican Republic, Chile, Costa Rica and Cuba), far East and China (Malaysia, Cochin and Beijing)
2001: Frankfurt, Newcastle, Seeb and Salahah in Oman and Sharm El Sheikh in Egypt. But after 9/11 and because of the subsequent economic downturn due to terrorism's menace (SARS, Iraq War II) no notable privatization took place up to 2004

2004: Brussels in EU and private investment in Indian greenfield airports of Bangalore and Hyderabad.

2005: Larnaca, Budapest and Venice

2006: Kosice, Varna, regional airports in Peru and private involvement at Delhi and Mumbai

2007: Xi'an, Pisa, Leeds–Bradford, Antalya and Amman; the first Russian airport, namely Mukhino, was sold to foreign investors.(Graham, 2008)

2008-2010: There had been rumors about privatizing some US airports like, for example, Chicago, New Orleans, S. Juan, Baltimore-Washington, Detroit city, Kansas city, Long Beach, Minneapolis but nothing has been decided yet. St. Petersburg's Pulkovo Airport in Russia is the only actual privatization which took place in Europe while privatizations in Prague, Lisbon, Madrid and Barcelona airports have been put to a hold due to the economic crisis. A privatization plan will probably be established in Brazil to modernize Galeao International and Sao Paulo's Viracopos Airports in Rio de Janeiro by the beginning of Football World Cup in 2014 and Summer Olympics in 2016. In Mexico, the government seems disposed to the privatization of Mexico City airport and is looking for investors to modernize Guadalajara, Los Cabos and Puerto Vallarta Airports. Finally, the government of Jamaica is planning to privatize Norman Manley International Airport in Kingston after the successful privatization of its major tourist airport (Sangster International in Montego Bay). (Poole, 2011)

However, it is noticeable that the privatization process is – like most of the topics regarding air market – deeply connected to the political and economic situation: in fact, as aforementioned, the process eased down or stopped whenever a war or an economic crisis broke out (it happened so also during the crisis of 2008). Other reasons that may slow down or harm the process are bureaucracy and conflict between the government and the private investors (especially when the latter is a foreign investor) and inappropriate/unrealistic estimations of passenger/airline demand.

With commercialization, much greater attention began to be placed on financial management, non-aeronautical revenue generation and airport marketing. Nevertheless the goal of commercialization is not meant to be the full privatization; in fact at present the majority of the airports are run on a commercial basis but are still controlled by authorities with both public and private shareholders.

With reference to the governance of airport and ownership, many possible solutions are feasible; each country decides which one to adopt on the basis of political and economic reasons and framework. In fact, talking about privatization, we have to take into consideration both the ownership and the control; thus the degree of government participation in the broad range of the elements of management and strategic direction of an activity is an important issue. A comprehensive typology of airport governance would need to account for at least the following variables, presented as questions that might be asked for each airport:

1. Does primary decision-making responsibility for airport operations and development reside in a general purpose government or special purpose authority? If a general-purpose government, what are the level of government (federal, state, county, municipal) and form of government (e.g., strong legislative, strong executive)? What role do elected officials play in day-to-day airport decision-making process? Is there a delegated body that exercises some authority or oversight for the airport? To what extent is the airport subject to generally applicable rules (e.g., civil service, contracting)?

   If a special-purpose authority, what is the nature of the authority (port authority, airport authority) and what is the role, if any, of a general purpose government in decision-making (e.g., appointment of authority commissioners, etc.) process? Who chooses the commissioners or board members, and how are they selected?

2. Has significant decision-making power or operational control been commercialized or privatized?

3. How many transportation assets are under the public entity's control? Does the public entity operate multiple airports as a system? Does the public entity control modes of transportation in addition to airports?

4. Does the entity with primary decision-making responsibility for the airport own the underlying property?

5. Does the entity with primary decision-making responsibility maintain land use and zoning jurisdiction over the airport and over the surrounding areas?

As stated by the 1995 GAO Report on Privatization/Divestiture Practices in Other Nations,"*...the term "privatization" can refer to a broad range of activities that, to varying degrees, lessen the government's involvement in the provision of goods and services.... The privatization spectrum includes: contracting out, public-private partnerships, vouchers and franchising, as well as the actual divestiture of government assets and operations*".

In short, privatization can occur in many possible ways and over many elements. If an activity is not fully privatized, control will be divided; it will either be shared through some kind of partnership, or the government will regulate the activity.

1. Publically owned and operated airports

Namely: direct control and management through a Civil Aviation Authority, a Ministerial Department or a lower level of Government (Region, Municipalities) or through an autonomous entity with financial and operational autonomy established under the provision of the law.

Those airports are owned and operated by the government of the country. At a general level, no distinction is made between the level of government (municipal or federal) or whether ownership and/or operation of the airport is shared between multiple levels of government. This definition also includes public yet independent authorities to whom the government has transferred the ownership or the responsibility for the daily operation of the airport.

Public owned and operated airports are expected to operate focusing on the public interest fulfilment rather than on the commercial point of view. The objectives of these airports might be the protection of a national airline or the fostering of the economic development within a region. Nevertheless, some form of best practices and targets to achieve may be set.

The airports will develop according to the government requirements and decisions. The appointed head of the airport is focused on the daily operations of the airport and on the personnel management and is therefore responsible of the efficiency of the airport while the decisions on major investments and charges are taken at a higher level.

This ownership structure applies to entire systems of airports in countries such as Spain, Portugal, Sweden, Norway and Finland, while, despite a degree of private airport ownership, one or more airports in Switzerland, China, Indonesia, Bahrain, Qatar, Dubai, Japan and Singapore remain publicly owned. Brazil's airports are run under concession, but the airport operator is 100% state owned. In Germany, Munich Airport remains one of the few publicly owned airports. Most of the airports in the US are also publicly owned and operated. However, the airport operator effectively contracts out the majority of operations and undertakes few functions itself. In many cases, as Gillen (2010) notes, this has resulted in vertical integration with regard to the market for air transport, with the airlines effectively engaged in joint ventures with the airport

1.1 - Government owned and operated airports

The form of business model whereby the airport is entirely owned and operated by the national Government is very common in Greece, Sweden, Asia-Pacific, Africa, Latin America and in secondary airports outside USA.

Under this business model, the airport is operated directly by a Government Department, typically the Civil Aviation Authority (CAA), Ministry of Transport or in a few cases, the army.

It has been thought that only the central government would have been able to invest large amounts of money in airports and would have been competent to manage the multitude of legal, community and intra-governmental issues that arise in airport management.

The Department will generally oversee regulation, air traffic control, air navigation and in some case operation of a national airline in addition to airport operations.

Otherwise, all aviation related duties are assigned to a semi-independent government agency, rather than being a direct responsibility of the Department/Minister of Transport. The Department is responsible for the establishment of broad policy toward aviation, but the Agency is responsible for day to day regulations as well as operations. AENA in Spain presents an example of such model. In this case, the agency is only responsible for airport/airway/air navigation operations, with the Department retaining regulatory powers.

Strengths:

- direct accountability of the airport to the public and to users.
- the airport is often endowed with certain privileges. Such privileges may include exclusive right to provide certain services or even exemptions from certain laws or regulations. Therefore, they have strategic importance and are then likely to gain a dominant position from their monopoly power in the area

Weaknesses:

- the objectives are vaguely defined, and tend to change as the political situation and relative strengths of different interest groups change: also investments are affected by the changes in government priorities
- inefficient use of airport assets and lack of transparency in decision making
- poorly customer service-oriented
- airports often rely on a substantial government subsidy to break even. They survive on government subsidy for that they are much needed by population. The phenomenon may lead to combination of enterprise management with government, stiffness of managerial mechanism, overstaffing in organization and financial mismanagement.

If the semi-independent govern Agency turns in a Government Corporation we have a format where the airports ownership is held by Governments/Department of Transports (which is entitled with direct responsibility for the establishment and enforcement of regulations) while the management operate the airport on a commercial basis.

The model aims to the separation of the enterprise management from governments so as to improve the operation mechanism and economic efficiency of airports.

Although the corporation will report to the Department of Transport, it has a degree of independence due to its corporate structure: it has some independence in its financial planning because in some cases can even issue bonds to finance major projects. Under that business model, airports are recognized as enterprises and have much decision making powers and financial rights. As a consequence, they are capable to taking more flexible measures to airports operation.

Some remarkable examples are Aéroports de Paris (which manages the two major airports in Paris), Narita-Haneda-Kansai Airports (jointly managed by the Ministry of Transport and the Japanese international airport authorities), Capital Airport Holdings Company (which has exclusively invested or entrust 39 airports in Chinese airports such as Beijing Capital, Tianjin Binhai, Chongqing Jiangbei), Dublin, Sydney, Singapore Changi and Oslo Airport. While some airport corporations are wholly owned by the national government, others are jointly owned by federal and local governments (e.g., Germany, the Netherlands). (Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

1.2 - Municipal and quasi-Municipal Operation

An autonomous entity is created to operate and manage an airport with the aim of better meeting the needs of the local community. This form of governance is quite common in the US and in some EU countries. The authority may manage only the major international airports within a country or some regional, financially un-self-sufficient airports.

In the US many airports are run by the local communities: cities (Chicago, San Francisco and Los Angeles) and counties (Milwaukee and Miami). City

run airports may establish boards (which primarily consist of local business groups and social associations) which provide an advisory role. However, they have no power on day to day operation decisions of the airport. The airport head in this case might be entitled with the operation and management of air navigation services as well.
Some US airports are also operated by authorities, an independent form of government which normally operate more than one transport facility: for example the Seattle-Tacoma airport is operated by an elected port/airport authority. These authorities might exceptionally exercise taxation, zoning or veto powers.

From 2003 onwards, this form of governance has been adopted also in China: Sichuan, Guanxi, Guangdong Baiyun and Xinjiang Airport are operated by a corporation management with the ownership resting with the province or the municipality.
Besides those circumstances, airport ownerships might also be shared by multiple local governments; this is the case of Manchester Airport and also of some Italian airports. A unique airport authority or company entity is required for the airport organization, coordination and management. Finally, some airports can be jointly operated by both state and local governments.

The scope of the services and areas the airport entity is responsible of may differ from country to country; with general reference: aircraft movement area, passenger terminal and cargo facilities, aircraft parking areas; sometimes also air traffic control and meteorological services are granted. The entity may have to pay the government an annual rent and draw a financial plan; moreover each country has rules regarding the airport revenues, for example whether they are to be transferred to the country government or not. (Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

Strengths:

- the ownership of airports rests with the local level
- experiences worldwide have proven that this kind of governance is more cost-effective than the former one.

Weaknesses:

- like the previous model, the financing of airport infrastructures can be problematic as it depends on political decision making
- local governments have limited funds and priorities which place airports low on the list.

1.3 - Operations by independent not-for-profit corporations

This structure is the current regime in Canada and stems from a gradual devolution from government operation that began in the early 1990's. Canadian airport authorities operate airports under a 60 years lease agreement (extendable) after which the land and assets revert to the federal government. The authorities pay the federal government the ground lease plus a surcharge of 12% of airports' overall revenue once the airport revenue exceeds 2.5 million Canadian dollars

The Airport Authority in Canada is a private sector corporate alternative to the government corporation. The private sector corporation is not-for-profit. There are some significant differences between the government corporation format and that of the private not-for-profit airport authority model: the board's members are selected independently from the government and so the members will stay in charge even when there is a government change. Moreover, authorities are financially independent from the government, the source of the revenues being the passenger taxation. Since raising of equity capital via the shares on the stock market is precluded, the only source of financing is daily operations, trough the Airport Improvement Fee (AIF) which is charged on passengers. Similar charges on cargo users have been considered, but have been rejected due to the high degree of shippers' price sensitivity. Non-aeronautical revenues have still little importance on absolute terms. The Canadian law doesn't forbid the earning of a profit as long as these earnings are reinvested in airport infrastructure.

In case of an investment to be made, the Authority must have considerable amount of money either to finance it or begin negotiation with lenders, otherwise the investment is to be delayed.

These airports have objectives specified in their contracts with the government that largely mirror those of a publicly owned airport: maintenance of a revenue base, promoting the growth of air travel, regional development and sound financial and environmental management. (Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

Strengths:

- as not-for-profit entities, Canadian airports have not been subject to regulation (of aeronautical charges).

Weaknesses:

- it will take several years to build sufficient equity through retained earnings in order to establish the base needed to obtain partial debt financing for new investments.

2. Private participation or involvement in airport ownership and operations

A management contract, a lease as well as a minority participation in the equity share, is not to be intended as *privatization* but as *private participation* since the ownership and control rest within the government.

Again, a private entity managing retail outlets or duty free shops at an airport is not to be considered as private involvement but if a private company has acquired the right to manage the entire airport services or a single facility (a passenger terminal to make an example) versus the payment of a concession lease this is to be intended as private participation.
This is one of the new tendencies in airport business that is spreading all around the world because of the airports' urgent need of funding due to the diminishing public financial participation. Another reason for is the focus on marketing and commercial revenues: the non-aeronautical revenues share (parking, rental, shops …) has been growing since the last decades and now represents almost the 40-50% of the total revenue of an airport; it is possible to derive that information from the balance sheets of airport management companies.
Airports are generally seen as attractive organizations to investors because the airport industry is supposed to have strong growth potential; moreover there are high entrance barriers due to the large capital needed and airports, especially the major ones, are perceived to face limited competition. (Graham, 2008)
Private participation connotes either full ownership (the actual privatization) or majority/minority ownership by private investors.

Although the majority of airports are still owned by the government (State, provincial government, municipalities or a combination of these) a growing number of airports are under some form of private participation: airport entities fully or partially privatized, private entities willing to buy, own and rule airport facilities leaving the rest in public ownership. Airport privatization can occur in different ways (Carney and Mew, 2003). The selection of the most appropriate type of privatization involves a complex decision-making process which will ultimately depend on the government's objectives in seeking privatization. Factors such as the extent of control which the government wishes to maintain; the quality and expertise of the current airport operators; further investment requirements and the financial robustness of the airports under consideration have to be taken into account. (Graham, 2008)

2.1 - Public Private Partnerships – the concept of concession

A Public-Private Partnership (PPP) is broadly defined as "*a cooperative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards*".

Unlike privatization, that requires the transfer of ownership, a PPP entails the private party taking substantial risk for financing a project's capital and operating costs, e.g. designing and building a facility, and managing its operations to specified standards, normally over a significant period of time. In a PPP, the land typically belongs to the public institution, not to the private party, and the fixed assets developed in terms of the PPP are thus state property.

Privatization entails the sale/disposal of state property and functions, including all the assets and liabilities associated with that property and functions. (Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

So the key differences between public-private-partnership and 'privatization' maybe summarized as follows:

- Responsibility: under privatization the responsibility for delivery and funding a particular service rests with the private sector. PPP involves full retention of responsibility by the government for providing the service.
- Ownership: while ownership rights under privatization are sold to the private sector along with associated benefits and costs, PPP may continue to retain the legal ownership of assets by the public sector.

- Nature of Service: while the nature and scope of services under privatization is determined by the private provider, under PPP the nature and scope of service is contractually determined between the two parties.
- Risk and Reward: under privatization all the risks inherent in the business rest with the private sector. Under PPP, risks and rewards are shared between the public and the private sector.

Various PPP models, especially when applied to specific airport facilities such as Passenger Terminals, Cargo Terminals, Runways, can be found. Whatever the model is, the major objectives are to improve economic performance and the level of service by involving a highly experienced airport operator, fund infrastructure needs by private investments, find financial resources in order to fund other government projects / priorities, transfer airport project development risks to a private party and improve airport profitability. The following are some statistics on PPP model adopted in the airport industry in the last ten years, from which we can see the practices of this model used in the world:

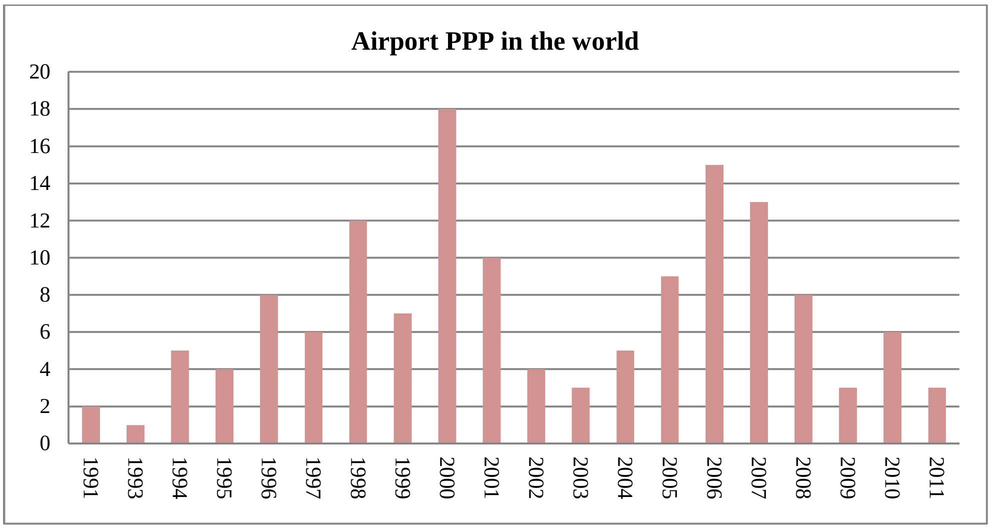


Fig.1: Number of PPP initiatives at airports in the world between 1991 and 2011. (Source: World Bank Group PPI Database)

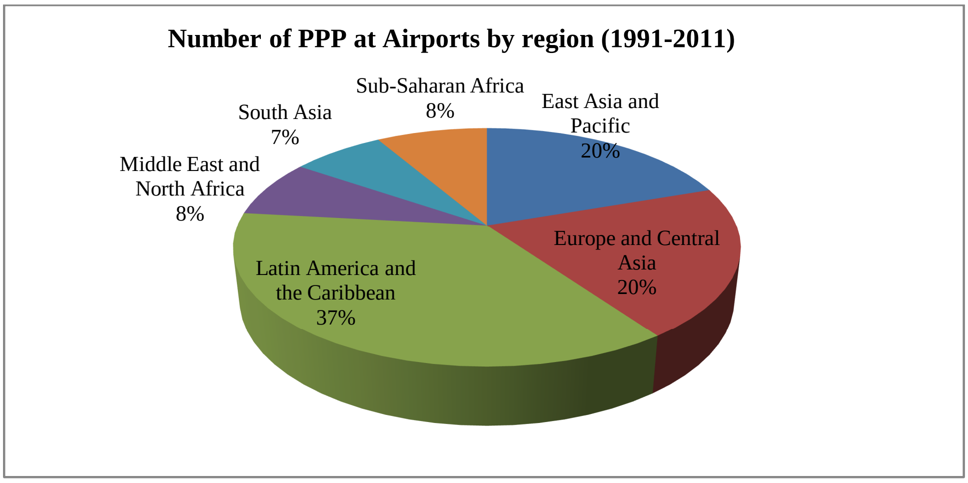


Fig. 2: Number of PPP at Airports by region, 1991-2011. (Source: World Bank Group PPI Database)

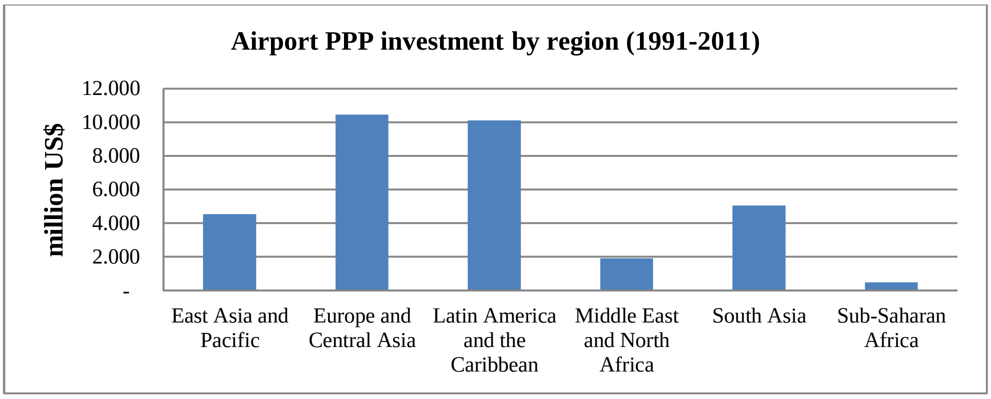


Fig. 3: Amount of PPP investments at airports by region, 1991-2011. (Source: World Bank Group PPI Database)

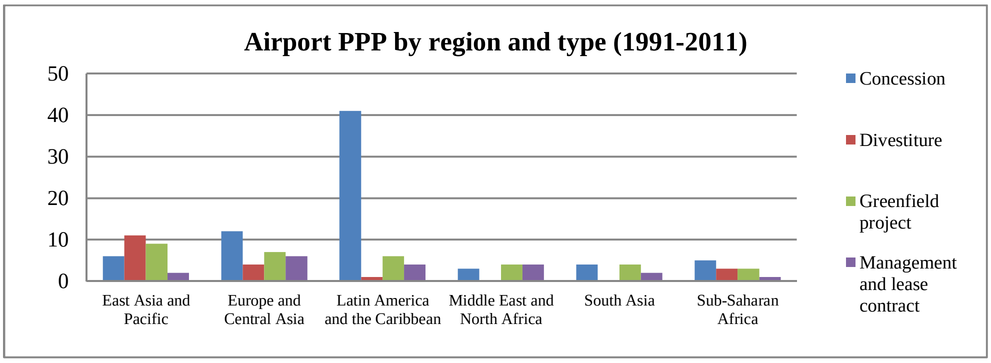


Fig. 4: PPP at airports by region and type, 1991-2011. (Source: World Bank Group PPI Database)

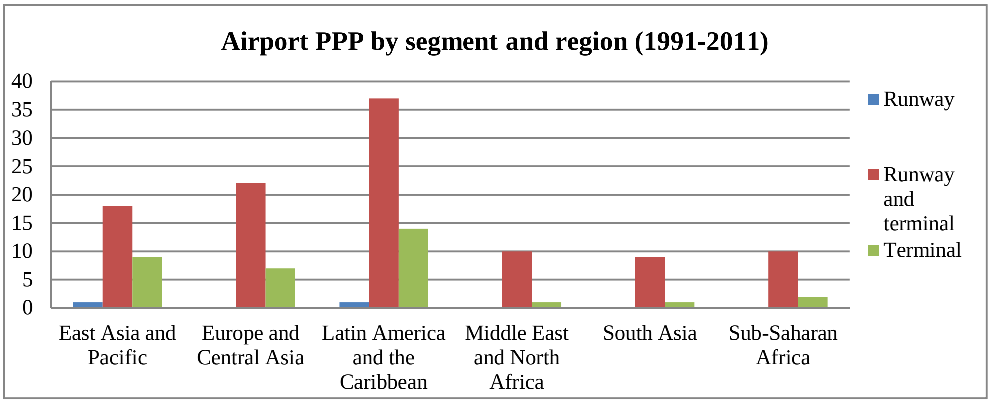


Fig. 5: PPP at airports by segment and region, 1991-2011. (Source: World Bank Group PPI Database)

Here are some of the most important PPP models used in the industry:

Project finance privatization: Project finance is the long term financing of infrastructure and industrial projects. It involves equity investors and a syndicate of banks or other lending institutions that provide loans to the operation. Recently, project financing principles have been applied to public infrastructure under public–private partnerships (PPP) or, Private Finance Initiative (PFI) transactions (e.g., school facilities) as well as sports and entertainment venues.

Several long-term contracts such as construction, supply, off-take and concession agreements, along with a variety of joint-ownership structures, are used to align incentives and deter opportunistic behaviour by any party involved in the project.

Engineering, Procurement and Construction Contract: an EPC contract provides for the obligation of the contractor to build and deliver the project facilities at a pre-determined fixed price, by a certain date, in accordance with certain specifications, and with certain performance warranties.

Operation and Maintenance Agreement: the project company delegates the operation, maintenance and performance management of the project to an expert consultant operator. The operator could be one of the sponsors or third party operator.

Off-Take Agreement: the aim of this agreement is to provide the project company with stable and sufficient revenue to pay its debt obligation, covering the operating costs and provide the required return to the sponsors.

Loan Agreement: it is an agreement between the project company (borrower) and the lenders involving the assumptions of loan drawing and repaying. It also contains the additional clauses to cover specific requirements of the project and project documents.

Tripartite Deed: it sets out the circumstances in which the financiers may "step in" under the project contracts in order to remedy any default.

Publicly-funded projects may also use additional financing methods such as tax increment financing or **Private Finance Initiative (PFI)**. The PFI is a way of creating a PPP by funding public infrastructure projects with private capital. Beyond developing the infrastructure and providing finance, private sector companies operate the public facilities, in many cases using former public sector staff who have had their employment contracts transferred to the private sector through a process protecting their entrenched rights. (Hoffman, 2007; Sorge, 2004)

<u>Build-own-operate-transfer (BOOT) or build-operate-transfer (BOT)</u> are forms of project financing, wherein a private entity receives a concession to finance, design, construct and operate a facility. Traditionally, the infrastructure is transferred to the government at the end of the concession period. Whenever the public administration delegates to a private entity to design and build infrastructure and to operate and maintain these facilities for a certain period, it is a BOT agreement. If the private entity also owns the works, we are talking about a BOOT. During this period the private party has the responsibly to raise the finance and is entitled to retain all revenues generated by the project and is the owner of the regarded facility. The facility will be transferred to the public administration without any remuneration. The private entity bears a substantial part of the risks:

political, technical and financing-related (riots, construction difficulties, rate fluctuation, over-estimation of cash flow forecast). BOT is new in airport financing and management but it is quickly spreading in the industry because it solves the problem of quickly raising large funds: for example, in India BOT concessions have been awarded for both New Delhi Indira Gandhi International Airport and Mumbai International Airport. (Smith&Charles, 1995; Sapte, 2006; Mishra, 2006)

BLT (Build Lease Transfer): the private entity builds the project and leases it to the government. After the expiry of the leasing the ownership of the asset and the operational responsibility are transferred to the government at a previously agreed price. For foreign investors BLT provides good conditions because the project company maintains the property rights while avoiding operational risk.

DBFO (Design Build Finance Operate): it is very similar to BOOT except that the government remains the owner of the facility, but it gets no direct payment from the users. The cash flows repay the investment and reward its shareholders.

DCMF (Design Construct Manage Finance): a private entity is built to design, construct, manage, and finance a facility based on the specifications of the government. Project cash flows result from the government's payment for the rent of the facility.
(Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

2.2 - Concession to operate: management contract

Generally speaking, governments impose strict restrictions to both airlines and private entities wishing to operate airports; therefore the best solutions rather than acquire market shares are the concession and the management contract.

The management contract is seen to be the least radical privatization option because ownership remains with the government and the contractors take responsibility for the day-to-day operations. The airport operator is only constrained by the terms of the contract and it is allowed to seek a return to its shareholders. A management contract can involve a wide range of functions, such as technical operation of a production facility, management of personnel, accounting, marketing services and training.

The government either pays an annual management fee to the contractor, usually related to the performance of the airport, or the contractor will pay the government a share of its revenues. In some cases, the right to operate the airport can be indefinite. In such instances, the right of the company to manage, rather than own, the airport is explicit.

In Asia, this ownership structure is becoming increasingly popular and is often linked to the partial privatization of the airport operating company; to make some examples Malaysia Airports Berhad, who operates 20 airports including Kuala Lumpur, is approximately 75% state owned while the Thai government owns approximately 70% of the shares in the company Airports of Thailand which operates Thailand's five main international airports

Concession differs from lease contract and management contract in the rights of the operator and its remuneration. A lease gives a company the right to operate and maintain a public utility, while under a management contract the private entity is also responsible for the expansion and development of the airport. In both cases investments remain the responsibility of the owner, namely the public sector. To make an example, the participation of US airlines in the ownership of terminal buildings is a lease contract which moreover allows the airlines to control the entire terminals and to approve or veto capital spending plans.

A concession involves also the commitment to carrying out the needed infrastructure investment at the concessionaire's responsibility and expenses. A contract has to be signed between the government and the concessionaire; in this contract the conditions, the payment terms (down payment, partly down payment and partly annual payment or annual payment) and the commitments are listed.

After a public tendering process, the chosen private airport management operator will purchase the right to operate the 'privatized' airport for a defined period of time (commonly from 20 to 40-50 years depending on the country). This is a complex approach, which has high transactions costs and needs to be carefully designed and implemented to ensure that the private contracts achieve the government policy objectives.

At present, most airports in Latin America and Africa are operated likewise; also most of the Italian airports plus Istanbul Ataturk, Cairo in Egypt and King Khalid International Airport in Saudi Arabia are run under a concession agreement. (Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

Strengths:

- cost-effectiveness, since the developer/service provider is competitively selected, the operations are generally more cost effective than before;
- higher productivity, because gains are linked to performance;
- accelerated delivery, since the contracts generally have incentive and penalty clauses;
- clear customer focus enhance satisfaction;
- innovative decisions can be taken with greater flexibility thanks to the decentralization. Whereas user charges may exist, these are imposed in harmony with local conditions.

Weaknesses:

- fear that social, environmental or other aspects would not be given top priority;

- considerably negative financial impacts in the case the partnership has to be repudiated;
- possible transfer of risks from the private sector to the public sector, e.g. risk of bankruptcy;
- insufficient experience of the partners, particularly of the public sector while contracting out such projects; private companies use their endeavour and potential to negotiate better conditions for themselves;
- as a consequence of the long-term of concessions, the mandatory expenses grow and the hidden debt arises.

2.3 - Partial privatization

Privatization can occur through the transfer of both ownership and management control from government to private groups, foreign founded enterprises or natural persons. The process start with the establishment of joint ventures through trading shares on the stock market (IPOs) or through a private bidding process.

An initial public offering (IPO) is the first sale of stock by a company. An IPO allows a company to tap a wide pool of investors to provide it with capital for future growth, repayment of debt or working capital.

“Shares outstanding” is the total number of shares that the target company has: it includes shares owned by insiders and large institutions, “restricted” shares and the float (the “freely” tradable shares). The smaller the float is, the more volatile a stock can become: in fact, if there are few shares in the float, this means that shares are harder to buy and the price will go up fast. The advantages within a flotation are the possibility to have access to new capitals, diversify the equity base, gain a higher public profile and a greater potential to acquire new business on the stock market and have multiple financing options; while the disadvantages are the vulnerability to market fluctuation, significant costs and regulatory requirements to comply with, the necessity to disclose financial data and the relation with the equity shares' holders.

It's important to note that different sets of investors bid in auctions versus the open market: more institutions bid, fewer private individuals bid. Historically, some of IPOs have been under-priced. The effect of "initial under-pricing" an IPO is to generate additional interest in the stock when it first becomes publicly traded. This can lead to gains for investors who have been allocating shares of the IPO at the offering price. However, under-pricing an IPO results in lost capital. On the contrary, if a stock is offered to the public at a higher price, the underwriters may have trouble in selling shares.

On the other hand, a trade sale is the disposal of a company's shares or assets (and liabilities), in whole or in part. Usually, the buyer seeks to grow his business while the seller wants to generate a financial return on his invested capital. This method is used to open up the prospect of collaboration on larger projects. The term Trade Sale is mostly used in the context of Venture Capital and refers to the sale of a company in its early stages. Trade sales are largely used both in Europe both in the US. (Gregoriou, 2006; Killian, 2006)

If a partial privatization is chosen, a decision making powers shall be carefully allocated, so as to balance and protect interests of both the public and the private sector. There are two different scenarios: airports in which the private investors' share is the minority (Athens, Rome, Dusseldorf, Frankfurt, Hamburg and airports in Argentina, Chile, Colombia and Mexico to make some examples) and airports with the majority share held by a single private investor (Copenhagen, Moscow Domodedovo, Auckland and Wellington International Airports). In the latter situation, the majority share might represent a binding condition for the involvement; however there is *de facto* little difference between minority and majority ownership.

These forms of governance have been successful in bringing a more commercial orientated view to airport operations and strategies: the airport authorities decide upon air routes, retail development and commercial strategies. A significant increase in the number of carriers serving the airport (including low cost carriers) has also been noticed. The private ownership is widely seen as a mean to get to cost control and efficiency as long as the private investors are looking to earn a rate of return on their investment.

2.4 - Full privatization

The full handover of the assets and shares from public to private may be realized through IPOs or trade sale. Airports are sold to private investors among which airport management companies and/or infrastructure investment companies, along with pension funds. The ownership may be dispersed among a number of shareholders (e.g., BAA plc) or closely held (e.g., TradePort Corporation which leases and operates the Hamilton Ontario airport). The British Airport Authority (BAA) is the oldest example of an airport privatization implemented via an Initial Public Offering (IPO).

In Australia airports were corporatized in the 1980s and then privatized from 1996 onwards (Brisbane, Melbourne, Perth and then Sidney) on the base of a lease agreement of 50 years plus an automatic extension of 49 years, after which the airports revert to the federal government.

Airports entirely owned and operated by the private sector have the obligation to maximize returns to shareholders. As a result, management decisions are generally focused on ensuring that the airport generates a profit in the short term.

In some cases, the private corporation may own the airport lands and facilities outright (BAA plc), or may simply lease the land on a long term basis (Hamilton Ontario). Leases may be pay-as-you-go (Hamilton Ontario) or prepaid (Melbourne, Brisbane and Perth in Australia).

The issue of lease versus ownership is important in determining whether the government has any residual liabilities, or whether it can step in and immediately operate should an airport file for or be brought into bankruptcy. As well, lease versus ownership has implications for land development, as tenants of the airport corporation will require assurances from the government landlord that leases will be honored should the government landlord re-assume control of the property.

The recent trend towards privatization has slowed (ACI 2010). This can be attributed to the recent global economic downturn, which has adversely affected the cost and availability of finance for large projects and driven down the expected sale prices. To make some example, 30% stake in AENA was offered in 2008, but later postponed pending the improvement of market conditions; likewise the privatization process of Madrid, Barcelona, Amsterdam Schipol and Chicago's O'Hare Airports are yet to be resolved. The economic worldwide crisis is one of the reasons why at present the majority of privatizations are partial: in most countries airports fully privatized are set for general aviation and aviation clubs.(Tretheway, 2001; Zhang, 2010, Kong, 2010, AGPC, 2011)

Strengths:

- the private shareholders have permanent members in the corporation's Board of Directors, thus enhancing the coherence in long term investment orientation;
- private investors foster financial transparency;
- most important, the private sector investor can provide all or part of the initial equity needed to kick-start the financing process in case of investments to be made without relying only on the government funds; thus the risk is shared between the stakeholders. In return, the private sector investor must be given an opportunity to make a reasonable return on their investment in the airport;

- at major airports, the revenues come from both aeronautical both commercial activities; the former are more regulated but the latter are not. Moreover, the shares of private management companies in the capital stock are often on the positive;
- the concept of airport management industry is gaining importance throughout the world;
- the airport management will become much more customer service oriented and will increase competition among airlines to provide choice and cost reduction for passengers.

Weaknesses:

- the degree and intrusiveness of government intervention through regulation and oversight might limit the development of commercial value;
- the full private ownership may lead to a private monopoly at airports;
- citizens believe that the government should play an active role in developing and supervising airports (as they are perceived as strategic catalysts for local economic growth) and also be involved in regulation, supervision and ensure safety and quality of service;
- externalities and employment conditions are given low priority;
- airlines fear lower level of service, higher landing fees and user charges.

3. Remarkable examples of ownership structure in the world

3.1 - Trade sale

With this option, some parts of the airport or the entire airport will be sold to a trade partner or consortium of investors, usually through a public tender. If the trade sale involves strategic partners rather than mere investors it is usually a way to take into account also the technological managerial expertise of the partners. That is to say that the facility of the airport is privatized and the private owner has the knowledge basis to run and manage the structure so that to achieve strategic development goals: AdP bought 25% share of Liège airport in order to develop it as an alternate for freight activities.

Therefore, strategic partners or consortia which lease airports on long-term basis are either established airport operators or at least have airport management experience; notable exempla may be Malta airport (a share has been acquired by Vienna airport) and Naples (BAA). When discussing about airport privatization via trade sale, it does not seem important that the acquirer is a fully privatized entity: both former Aer Rianta and Schiphol group were public-owned entities but showed private interest in the privatization processes of several other airports in the world. In her book, A. Graham (2008) provides a table with a list of some notable privatization via trade sale which took place up to 2007.

Airport	Date	Share of airport sold (%)	Main buyer
UK: Liverpool	1990	76	British Aerospace
UK: Prestwick	1992	100	British Aerospace
UK: East Midlands	1993	100	National Express
UK: Southend	1994	100	Regional Airports Ltd
UK: Cardiff	1995	100	TBI
UK: Bournemouth	1995	100	National Express
UK: Belfast International	1996	100	TBI
UK: Birmingham	1997	51	Aer Rianta/Natwest Ventures (40%) Other investors (11%)
UK: Bristol	1997	51	Firstbus
UK: Liverpool	1997	76	Peel Holdings
UK: Kent International	1997	100	Wiggins
Italy: Naples	1997	65	BAA
Australia: Brisbane, Melbourne, Perth	1997	100	Various
Sanford Orlando	1997	100	TBI
Germany: Düsseldorf	1998	50	Hochtief and Aer Rianta
Skavsta Stockholm	1998	90	TBI
South Africa:ACSA	1998	20	ADRI South Africa consortium (Aeroporti di Roma had 69% share)
Germany: Hanover	1998	30	Fraport
New Zealand:Wellington	1998	66	Infratil
Australia: 15 remaining major Australian airports (except Sydney)	1998	100	Various
UK: Humberside	1999	83	Manchester airport
US: Stewart International	1999	100	National Express
Belgium: Liege	1999	25	AdP
Italy: Rome	2000	51	Leonardo consortium
Italy: Turin	2000	41	Benetton Group consortium
Germany: Hamburg	2000	36	Hochtief and Aer Rianta
UK: Newcastle	2001	49	Copenhagen airport
Australia: Sydney	2002	100	Macquarie/Hochief consortium
Malta	2002	40	Vienna consortium
Budapest	2005	75	BAA
Luebeck	2005	75	Infratil
UK: Exeter and Devon	2006	100	Balfour Beatty consortium
Kosice	2006	66	TwoOne Vienna consortium
UK: Leeds Bradford	2007	100	Bridgepoint
China: Xi'an	2007	25	Fraport
Russia: Mukhino	2007	100	Meinl Airports

Table 1: Airport privatization through trade sale. (Source: Graham, 2008)

3.2 - Concession

The airport Management Company or consortium will purchase a concession or lease to operate the 'privatized' airport for a defined period of time through a tendering process. Normally an initial payment plus a percentage on the total income or an annual fee is requested to the concessionaire.

It is a less strong but more complex approach if compared with the former, because the concessionaire bears the entire economic risk and is also responsible for operations and the fulfillment of the development plan. Moreover, a medium-to-long time span is fixed in order to both allow the concessionaire to recover its costs and the government to keep a control over the airport.

Airport	Date	Length of concession (years)	Concessionaire
Columbia: Barranquilla	1997	15	AENA consortium
Columbia: Caratagena	1998	15	AENA consortium
Bolivia: La Paz, Santa Cruz, Cochabamba	1997	25	AGI[a]
UK: Luton	1998	30	AGI[a] Bechtel/Barclays consortium
Mexico: South East Group	1998	15[b]	Copenhagen airport consortium
Mexico: Pacific Group	1999	15[b]	AENA consortium
Argentinean Airport System	1998	33	Aeropuertos Argentina 2000 consortium (including SEA Milan and Ogden)
Tanzania: Kilimanjaro International Airport	1998	25	Mott Macdonald consortium
Dominican Republic: 6 airports including Santo Domingo	1999	20	YVRAS/Odgen consortium
Chile: Terminal at Santiago International Airport	1999	15	YVRAS consortium
Uruguay: Montevideo	1999	25	YVRAS consortium
Costa Rica: San Jose	1999	20	TBI[a]
Columbia: Cali	2000	20	AENA consortium
Mexico: North Central Group	2000	15[b]	AdP consortium
Peru: Lima	2001	30	Fraport/Alterra consortium
Jamaica: Montega Bay	2003	30	YVRAS consortium
Peru: 12 regional airports	2006	25	Ferrovial consortium
India: Delhi	2006	30	GMR/Fraport/Malaysia Airports consortium
India: Mumbai	2006	30	GVK/ACSA consortium
Turkey: Antalya	2007	17	Fraport/IC Holding consortium

Notes: The table only shows the first new operator. In some cases there are now different operators.
[a] AGI was bought by TBI in 1999; Abertis now owns TBI.
[b] Fifteen-year contract but underlying 50-year concession.

Table 2: Airport privatization through concession. (Source: Graham, 2008)

As it is possible to derive from Table 2, this form of agreement was very common in the 1990s and in developing countries in particular (Andrew and Dochia, 2006). For example, 33 Argentinian airports were given in concession for 30 years to the consortium Aeroportuertos Argentinos 2000 a partner of whom is SEA, the Milan airport company; the consortium is due to pay 171 million US$ a year for the first 5 years of the agreement and a 2 billion US$ investment has been forecasted. In 2007 the fee was changed to 15% per cent of annual revenue due to the severe political and economic crisis the country was experimenting. In more recent years concessions have increasingly been used in Eastern Europe and Asia with many involving a public–private partnership (Hooper, 2002).

Other countries which have had concession agreements for their airports include the Dominican Republic, Chile, Uruguay, Costa Rica, Peru, Tanzania and India.

3.3 - Privatization through project finance

From a stricter point of view this form of agreement is a nuance of the previous one because a company owns the right to build and then operate an entire airport or a particular facility for a certain period of time and then the ownership reverts to the government. It is not important whether the company is fully privatized or not. Unlike the previous case, a huge capital is not requested by the owner since the project financer will have to carry on all the costs of building or re-developing the facility and this cost is often yet considerable. After the intervention, the financer holds the new or re-developed structure in order to recover the costs and earn all or a part of the revenues until the facility returns to the government.

As it has been said, the BOT (build-operate-transfer) form is the most common form of project finance which comprises many nuances like build–transfer (BT), build–rent–transfer (BRT), design–construct–manage–finance (DCMF), build–own–operate–transfer (BOOT) or rehabilitate–own–transfer (ROT) projects.

One of the first major projects of this type was Terminal 3 at Toronto's Lester B. Pearson International Airport which was developed as a BOT project by Huang and Danczkay and Lockheed Air Terminals (Ashford and Moore, 1999). The Eurohub at Birmingham airport was built under a BOT-type arrangement by a company comprising, with different amount of shares, Birmingham airport, British Airways, local authorities, National Car

Parks, Forte and John Laing Holdings. This terminal is now a fully owned and managed facility of Birmingham International Airport plc.

Likewise, in many cases it is possible to note that one of the shareholders is either a powerful airline brand or an affirmed international airport operator: a few examples may be:

- the new Athens airport at Spata Eleftherios Venizelos (the BOOT contract was awarded to a private consortium led by German construction company Hochtief (36,125%) along with ABB Calor Emag Schaltanlagen AG (5%), H.Krantz-TKT GmBH (3.75%) and Flughafen Athen-Spata Projektgesellschaft mBH (0.125%));
- Ninoy Aquino International Airport in Manila (Fraport and PairCargo won the bid to build the international passenger Terminal 3)
- Queen Alia International airport in Jordan, where The Edgo Group has been awarded the expansion project of the Airport. The Edgo Group is part of a consortium led by Aeroports de Paris Management, along with Edgo Group, Joannou & Paraskevaides (Overseas) Ltd., J&P-Avax, Abu Dhabi Investment Company (ADIC) and Noor Financial Investment Company.

Airport	Date	Length of agreement (years)	Contractor
Canada: Toronto Terminal 3	1987	Terminated	Lockheed consortium
UK: Birmingham Eurohub	1989	Terminated	Various including Birmingham airport, British Airways,
Greece:Athens	1996	30	Hochtief Consortium
Philippines: Manila International Terminal	1999	Terminated	Fraport consortium
US: New York JFK International Arrivals Terminal	1997	20	Schiphol consortium
Turkey: Ankara	2003	20	TAV
India: Hyderabad	2004	30	Siemens/Zürich airport consortium
India: Bangalore	2004	30	GMR/Malaysia Airports consortium
Albania: Tirana	2005	20	Hochtief consortium
Cyprus: Larnaca and Paphos	2005	25	YVRAS consortium
Bulgaria: Varna and Burgas	2006	35	Fraport consortium
Jordan: Amman	2007	25	Aéroport de Paris consortium

Table 3: Airport privatization through project finance - PPP. (Source: Graham, 2008)

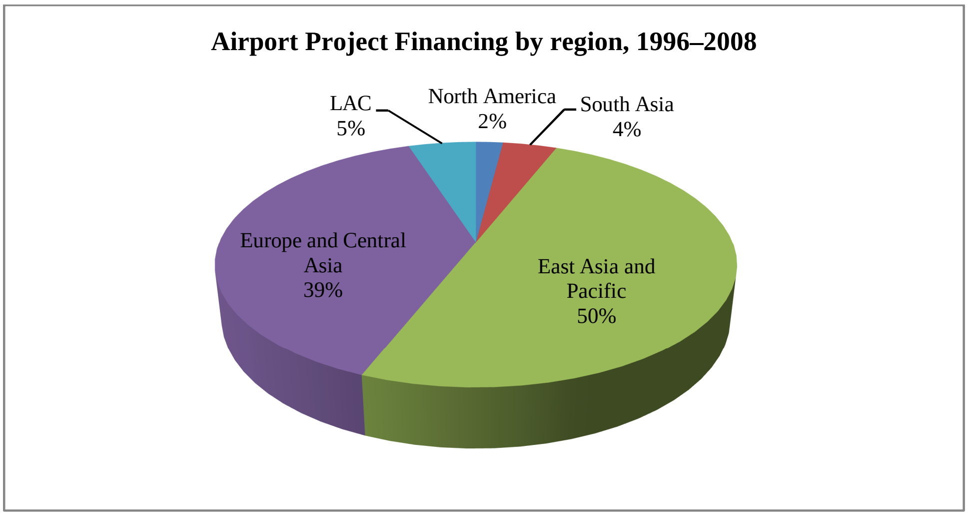


Fig. 6: Share of PPP initiative through project finance by region. (Source: Serebrisky, 2012)

In this paragraph notable cases of privatization from all over the world have been analyzed thanks to the information provided by many authors in their books and in their papers or collected on the websites of airport companies and reports. In the next paragraph and even more specifically in the next chapters, some countries will be taken into account. Information collected about movements (one movement is the combination of one landing and one take-off), passengers traffic and ownership will be presented and indexes or performance indicators will be calculated and appointed in order to describe the air traffic market and the situation with special reference to competition and cooperation.

The countries which have been taken into account have – obviously - some characteristics in common, like:

- In the target country there is not a single international airport that gathers by far the majority of the total traffic output, both from the aircraft movements and the passenger output point of view
- For each target country, data have been collected for quite a long time period, in most cases only data from 2005 to 2010 have been presented

(2011 data are still incomplete and therefore only the main trends have been reported in the next chapters) but also information for a longer time spam are available

- For each country, the top ten airports regarding the total passenger output during the target year have been taken into account plus, where present, the following airports in the chart with at least 5 million passengers handled per year; this choice has been made in compliance with the definition of ACI Europe: "*ACI Europe's Small & Medium Size Airports Action Group (SMAG) groups together airports with less than 5 million Passengers*". It has been decided to focus on this distinction because airport classifications all around the world are very different and they reflect in most cases the specific situation of the country. To make some example, Table 4 and 5 are presented.

<table>
<tr><th colspan="5">Canadian System</th></tr>
<tr><td>International</td><td>National</td><td>Regional</td><td>Local commercial</td><td>Satellite</td></tr>
<tr><th colspan="5">Us airport network classification</th></tr>
<tr><td colspan="3">National integrated airport system</td><td rowspan="3">Local interest airports</td><td rowspan="3">Military airports</td></tr>
<tr><td>Primary airports</td><td>Commercial service</td><td></td></tr>
<tr><td>Reliever airports</td><td>Public</td><td></td></tr>
<tr><th colspan="5">British national airport system</th></tr>
<tr><td>Gateway international</td><td>Regional airports</td><td>Local airports</td><td colspan="2">General aviation</td></tr>
<tr><th colspan="5">Italian national airport system</th></tr>
<tr><td>Intercontinental</td><td>International</td><td>National</td><td>Local</td><td>General aviation</td></tr>
</table>

Table 4: Canadian, American, British and Italian National Airport System Network classification. (Source: Web)

Civil Aviation Authority of the Philippines - Classification of airports		
International		
Naia	Mactan	Clark
Subic	Laoag	Pto. Principesa
Kalibo	Zamboanga	Davao
Tambler		
Principal class 1		
Bacolod	Butuan	Cagayan de oro
Cotabato	Dipolog	Dumaguete
Iloilo	Legazapi	Naga
Pagadian	Roxas	San jose
Tacloban	Tagbilaran	Tuguegarao
Principal class 2		
Antique	Baguio	Basco
Busuanga	Calbayog	Catarman
Caticlan	Camiguin	Cuyo
Jolo	Marinduque	Masbate
Ormoc	Romblon	Sanga-sanga
Siargao	Surigao	Tandag
Virac		
Community		
Alabat	Allah valley	Bagabag
Baler	Bantayan	Biliran
Bislig	Borongan	Bulan
Calapan	Cagayan de sulu	Catbalogan
Cauayan	Daet	Guiuan
Hilongos	Iba	Iligan
Itbayat	Ipil	Jomalig
Lingayen	Liloy	Lubang
Maasin	Malabang	Mamburao
Mati	Ozamis	Palanan
Pinamalayan	Plaridel	Rosales
San Fernando	Siocon	Siquijor
Sorsogon	Ubay	Vigan
Wasig		

Table 5: New classification of National airports by the Philippines' Government. (Source: Web)

The uncertainties are present also when trying to group together airports on the basis of the characteristics of infrastructures they have: in particular we have the classification provided by the FAA (Federal Aviation

Administration - US) and the one provided by the ICAO (International Civil Aviation Organization), summarized in the two tables below

Design Group	Wingspan (ft)	Example Aircraft
I	< 49	Cessna 152-210, Beechcraft A36
II	49 - 78	Saab 2000, EMB-120, Saab 340, Canadair RJ-100
III	79 - 117	Boeing 737, MD-80, Airbus A-320
IV	118 - 170	Boeing 757, Boeing 767, Airbus A-300
V	171 - 213	Boeing 747, Boeing 777, MD-11, Airbus A-340
VI	214 - 262	A3XX-200 or VLCA (planned)

Table 6: FAA Airport Design Group Classification. (Source: A.A. Trani – Virginia Tech)

Aerodrome Reference Code				
Code element 1			**Code element 2**	
Code number	**Aeroplane reference field length**	**Code letter**	**Wing span**	**Outer main gear wheel span@**
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1200 m up to but not including 1800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

@ distance between the outside edges of the main gear wheel

Table 7: ICAO Aerodrome Reference Code Classification. (Source: ICAO)

4. Airport ownership at some notable European countries

European Airports		
Publically owned and operated		
Stockholm Arlanda	Helsinki Vantaa	Dublin
Barcelona	Lisbon Portela	Madrid Barajas
Geneva Coltrin	Munich	
Corporatized		
Manchester	Oslo	
Concessioned		
Istambul Ataturk		
Partially privatized		
Amsterdam Schiphol	Rome Fiumicino	Paris Charles de Gaulle
Athens	Frankfurt	Milan Malpensa
Brussels	Hamburg	Compenhagen Kastrup
Rome Ciampino	Paris Orly	Vienna
Dusseldorf	Zurich	
Fully privatized		
London Gatwick	London Stansted	London Heathrow

Table 8: Ownership at some European Airports. (Author)

4.1 - Italy

The air traffic liberalization in Italy gave private investors the possibility to enter the market buying shares in airport management enterprises. As it will be shown in the next chapter, in Italy still survive medium-sized airport with 100% shares held by public entities on different hierarchical level side by side with airports whose management capital is mixed between public and private. Privatization allowed a more commercial oriented evolution in those airports that have been somehow “privatized”. Italy has a very complex airport network with few big airports and a lot of airport with less than 2 million passengers/year, often very close to bigger airport and therefore with little possibility to develop further. Few of those little airports are though necessary to satisfy the inhabitants’ need to get to the continental part of the country and to give, vice-versa, those territory some form of accessibility: this is the case of airports located in small islands like Elba, Lampedusa and Pantelleria but also of the airports located in the two biggest islands of the country: Sicily and Sardinia.

Therefore, while somewhere in Italy there is still the necessity of airports whose only aim is to provide accessibility and satisfy the traffic demand, there are also airports whose management are developing growing interest in the managerial side.

As a consequence of liberalization, the right to manage and develop the airport facilities switched from the central government to managerial entities. In Italy, Act n. 537/93 later revised by DM 12/11/97 n.521 and paragraphs 704-6 of "Codice della Navigazione" statue that an airport management entity must be a corporate enterprise (not necessarily Italian, provided that the foreign enterprise has a base in Italy and Italian enterprises are allowed to take part to public tenders in the enterprise's country) and must win a public tender on the basis of development plan and economic capability.

The Departments of Transport and Economy and, in particular cases, also the Department of Defense give the winner the concession to run the airport for a period up to 40 years during which the enterprise is expected to realize the investment plan, provide the level of service expected and keep the qualifications required under the periodic control by ENAC (the Italian agency for Air Traffic).

Under this kind of governance, the airport services must still be provided because they are public service utilities but they are run on a commercial basis; the management company is responsible for the supply of those services and for their quality. Italian regulation allows three different levels of concession:

- Full: the airport management enterprise is in charge of the whole airport services and collects money from air traffic royalties.

Italian airports under full concession to operate (2010)			
Airport	**from**	**Airport**	**from**
Rome FCO e CIA	1974	Bari, Brindisi, Foggia, Taranto	2003
Milan LIN e MXP	2001	Naples	2003
Venice	2001	Florence	2003
Torino	-	Bologna	2004
Genova	2009	Olbia	2004
Bergamo	2002	Trieste	2007
Pisa	2006	Alghero	2007
Cagliari	2007	Pescara	2008*
Catania	2007	Verona	2008
Palermo	2007	Lamezia Terme	2008

Table 9: Italian airports under full concession to operate. (Source: ENAC)

- Partial: the deputed Airport Management is responsible for the provision of Airport Terminal Services. The loyalties collected are those regarding boarding and debark of passengers and duties/freight. The guideline n° 141-T from the Department of transport considers mandatory the presence of at a least one private investors in the capital share to turn a partial concession to operate into a full one. Under a partial concession to operate, from the legal point of view, the airport management is not allowed to decide on repairing or extensions of airside structures, but often the central government (via ENAC) gave them the power to realize those repairing. Therefore, it has been decided to foster the transition from partial to full concession to operate. Nevertheless, the worsening economic situation in 2011, forced the Government to stop the pending transitions and to focus on the quick development of an Airports Development Plan at a National Level, a topic now seen as no more deferrable.

Italian airports under partial concession to operate (2010)		
Airport	**Airport**	**Airport**
Albenga	Parma	Grosseto
Ancona	Perugia	Lucca
Asiago	Reggio Calabria	Oristano
Bolzano	Reggio Emilia	Padova
Brescia	Rimini	Treviso
Crotone	Salerno	Venezia lido
Cuneo	Siena	Vicenza
Forlì	Trapani	

Table 10: Italian airports under partial concession to operate. (Source: ENAC)

- Government run airports: only a few, small airports have are run this way

The management enterprise is responsible for the organization of airport activities within its scope, the repairing, the extensions and the modernization of airport infrastructures.The D.L. 251/1995 stated that the control of the majority of the airport management enterprise's shares by either the Central Government, the regional government, municipalities or public entities was no longer mandatory. Regions, provincial administrations, municipalities, chambers of commerce as well as private investors might hold the majority of the shares.

Nevertheless, the procedure is due to be slow because of the public tender needed and private investors might perceive it as uncertain.

This makes the Italian path towards airport privatization, as intended by the EU, behind schedule and, according to the "Corte dei Conti", a "*clear identification of the managerial aspects is still missing*" (Corte dei Conti, 19/5/2000, n. 45/rel in Riv. Corte Conti, 2000, fasc. 3, 48).

The constraint seems to be the necessity by the public sector to dispose part of its shares because the mere change of legal personality is considered not sufficient (sent. n°466/1993, Corte costituzionale) (Masutti, 2009).

4.2 - United Kingdom

As it has already been previously said, the UK was the first country airport privatization took place in. Nowadays, the majority of British airports are partially or fully privatized.

The British Airports Authority was established in 1965 (Airport Authority Act) to take responsibility for three former state-owned airports - London Heathrow Airport, London Gatwick Airport and London Stansted Airport. In the following few years, the authority acquired responsibility for Glasgow International Airport, Edinburgh Airport, Southampton Airport and Aberdeen Airport. As part of Margaret Thatcher's moves to privatize government owned assets, the Airports Act (1986) established that the British Airport Authority was to be dismantled. BAA took its place and was then floated on the stock market to raise capital funds: the initial capitalization of BAA plc was worth £1,225 million. In the early 1990s, the company sold Prestwick International Airport (now known as Glasgow Prestwick Airport).

Baa operated airports were and currently are run on a commercial, for-profit, basis.

Three types of airport ownership are common in the UK: fully privatized airports (Liverpool airport and those owned by BAA are an example) which are owned and managed by a private stakeholder, partially privatized airports owned and operated by joint local entities and private investors (Birmingham and Newcastle airports for example) and total public ownership (Manchester). BAA-Ferrovial, Peel Airport, Macquarie and Manchester airport possess shares in most of the regional airports.

4.3 - Germany

In 1982, the Federal Government announced a program to privatize airports against the background of budget restrictions. Although for more than a decade nothing had happened, five out of 18 international airports have so far been partially privatized (in the form of minority private participation), namely Düsseldorf, Hamburg, Frankfurt, Hanover, and Saarbrücken. Several regional airports were also privatized to a varying extent and some were totally in private sector hands. Frankfurt-Hahn, Lübeck, Mönchengladbach, Oberpfaffenhofen and Schwerin-Parchim are a few examples of such regional airports.

The traditional ownership structure in the Federal Republic of Germany was a shared ownership between Land (State), Kreis (county), and/or Stadt (city). The operation of airports was corporatized as limited liability companies (GmbH) or as joint stock companies (AG).

Therefore, there are three kinds of ownership structure in Germany.

The first option is an airport owned by a corporation of public entities namely local, regional and federal government. The municipality is often in charge of managing the airport. This is the ownership structure of Stuttgard and Munich airport. The same situation was present in Berlin too with West Berlin Tegel and Tempelhof airports. In the spring of 1991, Tegel, Tempelhof and East Berlin's Schönefeld were pooled within a single holding company, the Berlin Brandenburg Flughafen Holding GmbH (BBF), which was owned by the Federal Government (26%) and the States of Berlin and Brandenburg (37% each). Then Berlin Tempelhof was closed and the same will happen to Tegel in June 2012 as Berlin Schonefeld will be expanded to become the only airport in berlin under the name of Berlin Brandenburg International.

The second option is a public-private ownership, where the ownership is usually local government entities' and the private entity manages the airport. This is the case of Dusseldorf and Hamburg airport.

The third option is less common because it normally involves small and secondary airports, like Niederrhein, which are owned and managed by the private sector.

The privatization process in Germany started in the late 1990s and it is still taking place. Queerly, the reasons leading to a partial privatization of the airport were fortuitous: a wing of Dusseldorf airport was destroyed by a fire and the state of Nordrhein-Westphalia decided to sell the 50% of the airport because there were no funds to invest in the reconstruction of the airport. Another notable airport to be partially privatized was Hamburg in 2000: the city of Hamburg still controls the 51% of the shares while the private investors were Hochtief Airport GmbH and AerRianta International; AerRianta's shares were subsequently bought by Hochtief in 2007.

The main airport of the country is Frankfurt's and it has been partially privatized too. In 2001 part of the shares were floated in the stock market via IPO and they were bought by different stakeholders, including Lufthansa (10%) and airport employees (29%).

As to Hanover, its shares are split between State of Lower Saxony (70%) and Fraport (30%), this being another example of partial privatization.

Although Federal legislative, policy and supervisory functions are vested in the Ministry of Transport, Building and Housing, administration and regulation are significantly devolved to the States. Under Section 43 of the Air Traffic Licensing Regulations, airport charges remain subject to traditional cost-based regulation with a single till approach. At a few airports involving private interests, however, incentive-based regulation such as price cap has been implemented.(Muller et al., 2009)

4.4 - France

Traditionally, the French Civil aviation sector has been heavily influenced by government. It is regulated by the DGAC (Direction Générale de l'Aviation Civile) under the authority of the French Transport Ministry, which is as well a service provider. The French state is the owner of the airports and they were operated as public institutions (ADP, Bâle-

Mulhouse) or by the Chambers of commerce (long-term concession contracts).

While the French population has a share of about 1% of the world population, its air traffic accounts for 7% of the world in 2003 (OECD, 2004). The dominant airline in France is the Air France-KLM Group, which still belongs partly to the French state (17,9 % share, Air France, 2008)

However, this frame came to a change in 2006 with the partial privatization of Aéroports de Paris (ADP). For the first time, a regulation contract between ADP and the State was signed. Moreover, the act Aéroports/2005 decided the division of French airports in 3 groups:

- The "Société Anonyme Aéroports de Paris", whose majority of the shares is in the central government's hands, owns and manages the 3 major airports in the so-called Île-de-France (Paris-Charles de Gaulle, Paris-Orly et Paris-Le Bourget) plus 10 aerodromes and heliports. The same act ratifies the partial privatization of AdP, with the only restriction that the majority of the shares must rest with the central government.
- Major regional airports, which are considered strategic in the national air transport network: Bordeaux-Mérignac, Lyon - Saint-Exupéry and Lyon-Bron, Marseille-Provence, Aix-Les Milles and Marignane-Berre, Montpellier-Méditerranée, Nice-Côte d'Azur and Cannes-Mandelieu, Strasbourg-Entzheim, Toulouse-Blagnac, AiméCésaire-Le Lamentin, PôleCaraïbes International-Le Raizet, Saint-Denis - Gillot, Cayenne-Rochambeau. The ownership of those airports rests within the central government but the management is going to be transferred from Chamber of commerce to Airport management groups (sociétés aéroportuaires) to be established with the participation of central government, municipalities, Chamber of commerce and private investors willing to enter the market.

- Small regional airports (more or less 150 airports): the ownership will be transferred from the central government to the regional government/municipalities, according to the law Libertés et Responsabilités / 2004, in order to modernize the system and assure the fulfillment of traffic demand also at not strategic airports. In this group (which handled approximately 6% of total passenger traffic in 2006) there are both general aviation airport (formerly under the direct control of the central government) and commercial airports with more than 1 million passengers/year (formerly under the competencies of national Chamber of Commerce or already conventionally transferred to collectivities). Also private sector investors are allowed to enter these societies. The established airport management societies (municipalities or consortia) will be in charge of ownership, daily operations, development and economic regulation, while the "Direction générale de l'aviation civile" is still responsible of the provision of air-navigation, security and border offices services and keeps the right of inspection. The handover is established through the signature of an agreement between the central government and the target collectivity or through a document presented by the Air transport ministry which establishes how the handover is taking place and how the airports will be exploited

Airports named in the Order n° 2005-1070 are not part of any of these groups: in most cases they are military airports or part of the so-called Collectivités d'Outre-mer.

The French airport network is not the result of a centralized organization; therefore the actual traffic demand composition has never been taken into consideration actually and this inefficient organization has led to waste of money by the central government. Because of the lack of coherence at a national level and of the lack of a strategic plan between closer airports, the majority of 3rd group airports are underused or too developed according to the traffic they handle. The devolution poses the issue of airport network reorganization and rationalization in the hands of collectivities (“Court de Comptes”, 2008)

Switching our attention to AdP’s partial privatization, an IPO between the 31 May 2006 and the 14 June 2006 was called. It envisaged different conditions for each typology of investor: French private investors, French public investors, International investors and ADP-employees. The IPO brought to this new asset: the central government keeps 67.5% of the shares, AdP-employees the 3.2% and all other investors a combined 29.2% share. (DGAC, 2007 ; ICAO, 2008 ; AdP, 2011)

4.5 - Spain

Aena Aeropuertos has a network of 47 airports and two heliports in Spain and direct or indirect involvement in the management of 127 airports worldwide. These airports range from main hubs (Madrid and Barcelona, both above 30 million passengers/year) to small airports that are used by less than 20,000 passengers/year.

The main functions of AENA, among others, are:

- The disposition, management, coordination, operation, maintenance and administration of public civil airports, aerodromes and heliports.
- The planning, execution, managing and monitoring of investments in airports’ infrastructure.

The Government has recently announced that AENA will be restructured in two ways:

- Participation of regional governments in the management of airports located in their territories.
- Participation of private companies.

Spain has appointed an independent entity to estimate the value of Aena Airports and of the companies operating in Madrid-Barajas and Barcelona-El Prat in order to privatize up to 49% of its capital. This privatization has been decided in response to the EU urge towards Spanish government to lower the public-debt load and reduce its financing needs.

The bidding process for both Madrid and Barcelona airports was launched in July 2010 and should have been completed by the end of November 2011 in order to permit the winning group to take over the airports in early 2012.
Potential bidders for Madrid Barajas include a group led by Ferrovial SA, the leading shareholder of BAA, which owns London Heathrow and Stansted airports. Groups led by GMR Infrastructure Ltd., Aeroports de Paris, Germany's Fraport AG, Spain's Grupo San José and Changi Airports International also indicated they would bid.
Spanish Abertis Infraestructuras SA is leading a bidding group for Barcelona El Prat, and the groups led by Ferrovial, GMR, AdP, Fraport and Changi Airports International are also seeking to bid.
Both airports will be operated by private companies over a 20-year period, with an option for a five-year license extension. The government also launched the sale of 49% of Aena, but the Minister said that "*the completion of the sale as well as the final percentage will depend on market conditions in order to find the maximum value for the company*".
The privatization process slowed down and then was postponed at the end of 2011 because of the fear that the effects of economic downturn would harm the evaluation of AENA's assets and of the 2 airports to be sold.

Details about AENA reform are not publicly disclosed yet, but rumors report that AENA will keep the control of the remaining major airports but private companies will now be allowed to buy shares of AENA capital. Thus, the reform does not seem to be oriented towards full privatization.

Regarding the participation of regional governments, it is also still undefined how it will be implemented. The intention seems to be that regional officials might participate in airport key planning decisions (infrastructure enlargements, allocation of commercial space, etc) but daily management would remain in the hands of AENA.

4.6 - Turkey

Starting in 1993, the General Directorate of State Airports Authority (SAA) has partially privatized the major airport terminals in Turkey by using Build-Operate-Transfer (BOT) methods. One of the main reasons for privatization was that the number of passengers served by Turkish airports doubled between 1988 and 1993. As a result, the existing capacity not only became inadequate, but also the service was granted at a low level of service. Therefore the large capital required for terminal enlargements or led the government to the first airport privatization in 1993, which was the tender of BOT for Antalya Airport Terminal 1, prepared and implemented by the SAA independent of the PA. (Özenen, 2003). Similar contracts followed over the next decade. The operating period granted for BOT contracts varied significantly, depending on the income that could be received from the operation and the cost of the terminal construction according to predetermined plans by the SAA.

The largest amount spent for BOT investment was at Istanbul Atatürk airport with 306 million USD. It was followed by Ankara Airport by 188 million USD and Antalya (Terminal 1 and 2) by 136.6 million USD.

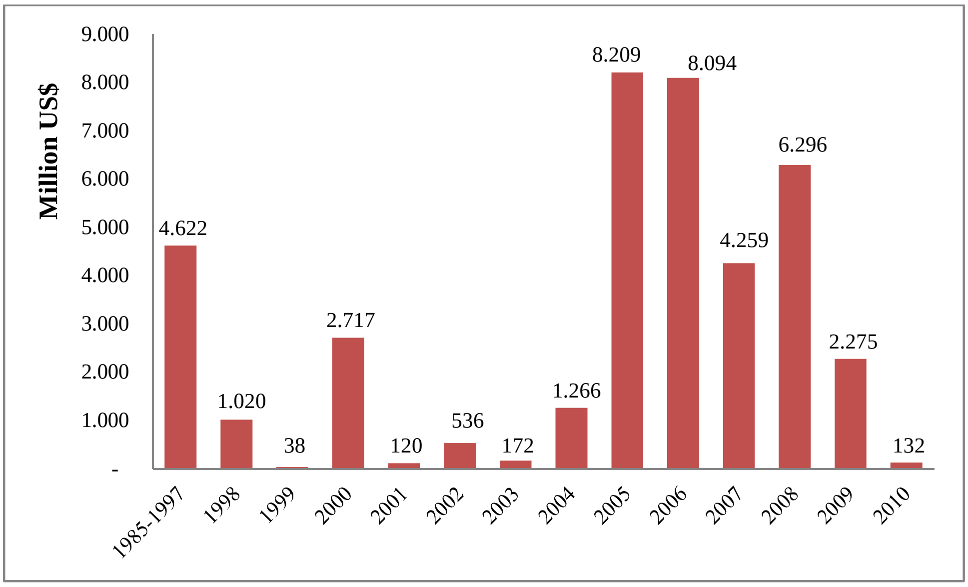


Fig. 7: Privatization implementation in Turkey. (Source: Republic of Turkey Prime Ministry Privatization Administration)

As it has been presented before, with BOT agreements the investments are financed by the private sector but in the long term the government remains the owner. The airport privatization in Turkey can be summarized as a two stage process: in the first phase the winning operating company is required to build a terminal according to the contract and gets the operating rights for that period. At the end of this period, the operating company is obliged the give all the rights back to the SAA. Since significant efficiency gains had been observed in both the construction process and the daily operations, at the end of the contract period the SAA agreed to transfer the operating rights of the newly acquired terminals via long-term leasing back to the private sector. The interested companies were asked to submit their bids in price auctions. The one with the highest bid obtained the operating rights for a predetermined period.

For Istanbul Atatürk airport, the lease period was set at 15.5 years. Four consortia originally considered taking place in the tender. However, ADP-SNC Lavalin dropped out before the auction started. Alsim-Alarko &

Corporation America was not allowed to take part in the auction, as they did not fulfill the requirements set by the SAA. Only Malaysia Airports and TAV participated in the sealed bid auction and bid 1.59 billion USD and 2.1 billion USD respectively. Following this, separate price negotiations between the parties and the SAA determined the winner TAV with a lease amount of 3 billion USD9.

The situation for Antalya airport was slightly different, as the two international terminals were operated by two different private firms following the original BOT implementation. In 2007 the SAA prepared a tender for the two international and one domestic terminal. The tender followed the same two-stage process as in Istanbul Atatürk with sealed bid auction and subsequent price negotiations. Celebi Holding was not allowed to participate in the auction, as they did not fulfill the requirements set by the SAA. Newly established consortia Fraport-IC Ictas Holding overbid TAV with 3.2 billion USD and it was given the operating rights of those three terminals until 2024.11 (SAA, 2008) (Ülkü, 2010)

4.7 - Other European countries

Portugal, Poland, Sweden, Finland, Ireland and Israel: in most cases airports in those countries are owned and operated by the central government.

In other cases, semi-autonomous bodies or companies, but still under public ownership, operate the airports. It is not important at this stage whether these organizations managed more than one airport (as the AerRianta Irish Airports, now Dublin Airport Authority) or just one major airport (Amsterdam airport) but the topic will be discussed broadly later.

Finally, there are countries in which only the major airports have been partially privatized. This is the case of Austria, Belgium, Denmark, Hungary, Czech Republic and Republic of Slovakia, Malta, Romania and Switzerland. At Zürich airport, the Zürich Airport Authority, which was owned by the Canton of Zürich, was responsible for the planning and overall operation of the airport and the airfield infrastructure, while a mixed public private company, FIG, managed and constructed the terminal infrastructure. The federal government of Austria for instance has not only sold its 50% stake in Vienna airport but also the 50% stake in regional international airports such as Graz, Innsbruck, Linz to regional and local administrations (Schneider, 2004, 150). Other countries like the Slovak Republic have done the same.

With reference to Greece, only Athens airport has been partially privatized: in 2001 Hochtief bought 45% of the shares; due to the dramatic Greek crisis, it is said that the government would plan to sell its remaining 55% share.

As to Russia, Fraport and its partners Copelouzos Group and Russian bank VTB will build a new terminal at St. Petersburg's Pulkovo Airport, Russia's fourth-largest airport. Moscow's Domodedovo airport is operated by the Eastline Group under a 75-year lease, and in October 2009 Russia's Transport Ministry announced that it intends to privatize Moscow's Sheremetyevo airport. And in July 2010, Prime Minister Putin announced that the government wants to "turn aviation infrastructure into a prospective and attractive platform for investment."

Czech politics appear to have killed for now the long-planned privatization of the Prague airport; the lower house of parliament approved a bill requiring the airport to be owned either by the state or by a company owned by the state. And recently independent Kosovo reached a 20-year, €100 million concession deal with Lyon Airport (France) and Limak Investments (Turkey) for its main airport in Pristina.

In June Ferrovial made public its intention of selling its stake in the Naples airport, and Reuters reported that the company had received offers in the range of €150-200 million. Crete has announced plans to privatize its Castelli airport, and it hopes to receive something close to €1 billion. On the lower end of the scale, Sweden's LFV Group (spun off from the country's air navigation service provider) seeks to sell six smallish airports, and Northern Ireland's Derry has sought expressions of interest from potential purchasers of its airport. Finally, Portugal's plan for a new €5 billion airport for Lisbon to be developed as a public-private partnership has been put on hold due to the government's financial difficulties.

5. Regulation at some notable Asian & Australian countries

Asia - Pacific Airports		
Publically owned and operated		
Jakarta Soekamo-Hatta	Hong Kong	Shanghai Pudong
Dubai	Incheon	Shanghai Hongqiao
Corporatized		
Singapore Changi	Christchurch	
Concessioned		
Phuket	Kuala Lumpur	
Partially privatized		
Auckland	Guangzhou Balyun	Osaka Kansai
Tokyo Narita	Beijing Capital	Wellington
Fully privatized		
Adelaide	Brisbane	Melbourne Tullamarine
Perth	Sydney Kingsford	

Table 11: Ownership at some Asian Airports. (Source: Author)

5.1 - Australia

Most of the medium-sized to large airports in Australia are privately owned and most of the smaller airports are owned by local governments. Most of the major airports have several main shareholders: foreign airport operators, banks, financial institutions, pension funds or infrastructure investment trusts. The central government always keeps a significant amount of shares. Federally-leased airports in Australia are generally only subject to Commonwealth laws. There are 138 regular public transport airfields that are under state, territory or local government control; these airports (the largest of which is Cairns) are subject to state and territory government legislation.

The privatization process in Australia took place between 1994 and 2003:22 out of the largest airports were privatized via 50 years lease agreements, among those Brisbane, Melbourne and Perth airports in 1997, Adelaide airport in 1998, and Sydney airport in 2002. The federal government kept however some involvement in operation and imposed restrictions as it is written in the Airport Act (1996).

Jurisdiction	Airport				
NSW	Sydney	Bankstown	Camden		
VIC	Melbourne	Essendon	Moorabbin		
QLD	Brisbane	Gold Coast	Townsville	Archerfield	Mount Isa
SA	Adelaide	Parafield			
WA	Perth	Jandakot			
TAS	Hobart	Launceston			
NT	Darwin	Alice Springs	Tennant creek		
ACT	Canberra				

Table 12: Australian federal airports leased. (Source: Economic regulation of Airport Services – Draft Report)

The Airports Act created an overarching system to govern airport activity. Among other things, the Act provides for:

- airport leases, the sale of airports and tripartite deed agreements
- Ownership restriction 1: a minimum of 51% of an airport must remain under Australian control (s40 of the Act). This occurs where a group of (or single) foreign person hold a total stake (including the interests of the person's associates) in the company of more than 49%.
- Ownership restriction 2: Airlines are not permitted to own more than 5% of an airport (s44 of the Act). This occurs where an airline holds in total a stake (including the interests of the person's associates) in the company of more than 5%.
- Ownership restriction 3: and there is a 15% limit on cross-ownership between Sydney/Melbourne, Sydney/Brisbane and Sydney/Perth

airports. This occurs when a person holds a total stake (including the interests of the person's associates) in both of the paired airport operator companies of more than 15%.

- Site usage obligations: an airport site must be used as an airport, and an airport operator is not to carry on ‘substantial non-airport trading or financial activities’ nor undertake ‘sensitive development’. An airport-lessee company’s sole business will be to run the airport.

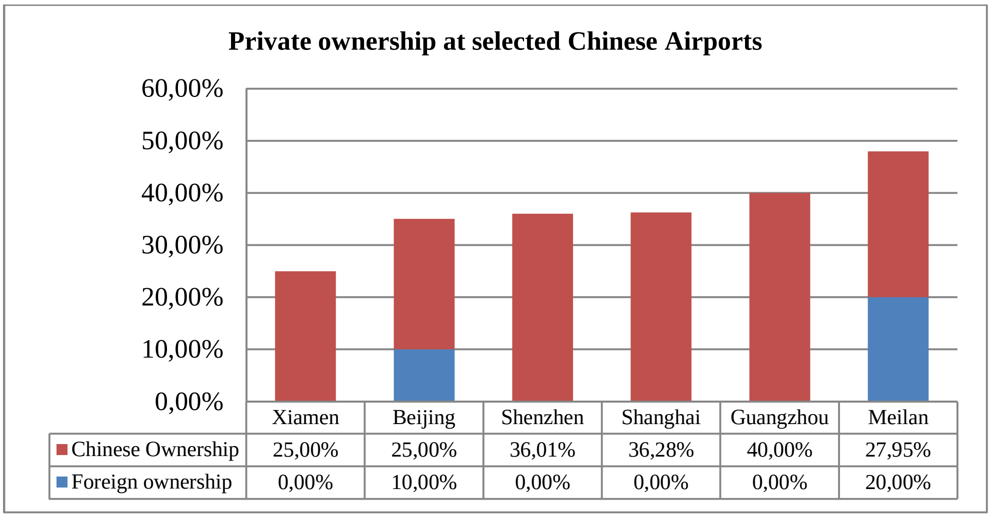
Airport leases are subject to the following key rules:

- the lessee must be a company;
- the term of the lease must not be longer than 50 years (with or without an option to renew for up to 49 years);
- the lease must provide for access by interstate and/or international air transport;
- a company can only lease one airport;
- the airport-lessee companies for Sydney (Kingsford-Smith) Airport and Sydney West Airport must be wholly-owned subsidiaries of the same holding company;
- airport leases can only be transferred with the Minister’s approval;
- the beneficial and legal interests in an airport lease cannot be separated except in the case of the enforcement of a loan security;
- If a lender acquires a lease, or enters into possession of an airport site, by way of the enforcement of a loan security, the lender must:
  (a) notify the Minister; and
  (b) transfer the lease to another company.
- An airport-lessee company can contract out the management of the airport to another company. The other company is called an airport-management company. An airport-management company must be approved by the Minister.

- The regulations may prohibit certain subleases and licenses relating to airport sites.
- The regulations may deal with the terms of subleases and licenses relating to airport sites.
- The regulations may provide that the beneficial and legal interests in subleases and licenses relating to airport sites cannot be separated except in the case of the enforcement of a loan security.
- Master plans: the airport operator must establish a master plan that is subject to Ministerial approval. The master plan is a 20-year forward plan that identifies, among other things, development objectives, future aviation requirements, noise exposure forecasts, and intentions of land use and related development. The master plan needs to align with state, territory and local government planning laws, and additionally, the airport operator must provide a ground transport plan for the first five years of the master plan. Master plans are updated every five years
- major development plans: the airport operator must furnish a major development plan, for Ministerial approval, for each major development, which, among other things, covers the construction or changes to a new or existing runway, passenger terminal, or other building, taxiway, road or railway which costs more than $20 million (Australian Government, 1996; AGPC, 2011).

5.2 - China

China currently has 142 civilian airports but the market is dominated by the 10 largest airports which gather almost 60% of the total passenger traffic. Beijing Capital International is the largest Chinese airport in terms of passenger volume and the majority of its shares is owned by Capital Airports Holding Company which is under the control of the Country Civil Aviation Authority. Capital Airports Holding Company possesses shares in more than 20 Chinese civil airports. At the moment, the most profitable airports have been partially privatized and listed in the stock market (Shenzhen, Shanghai, Xiamen, Hainan, Beijing and Guangzhou), the majority of the shares is in most cases government owned and the central government imposes strong intervention even in daily operations and regulatory requirements. The government has been recently recognizing the need for private investors' help and is phasing out subsidies for regional airports and decentralizing the administration to local CAAC offices in order to foster foreign investments. The first airport handed over to local government control was Xiamen airport in 1998 and by 2004 all major airports, with the exception of Beijing Capital and those in Tibet, were operated by local government airport corporations (Zhang and Yuen, 2008). There are still restrictions on the areas foreign investors may invest in but this step, together with the opening of air traffic market to foreign carriers also in secondary airports has been having a dramatic effect on the traffic growth. Qin (2010) in his paper describes the Chinese airport industry as a key player in the development if Chinese economy in the last decade not only because of the infrastructure provided but also for the significant multiplier effects on the economy in terms of employment and attractiveness.



	Xiamen	Beijing	Shenzhen	Shanghai	Guangzhou	Meilan
Chinese Ownership	25,00%	25,00%	36,01%	36,28%	40,00%	27,95%
Foreign ownership	0,00%	10,00%	0,00%	0,00%	0,00%	20,00%

Fig. 8: Private ownership at some Chinese airports. (Source: Zhang, 2010)

Notable examples of foreign intervention in Chinese airports system may be:

- Airport Authority Hong Kong (AAHK) in 2005 invested 1.99 billion Yuan for a stake of 35% in Hangzhou Xiao Shan International Airport, followed by the set-up of a joint venture between Hong Kong and Zhuhai airports, in which AAHK invested 198 million Yuan for a 55% of the joint venture.
- Soon after that, airports in Ningbo, Nanjing, Chengdu and Kunming started negotiating with foreign investors on stake sales. German airport operator Fraport AG (which manages Frankfurt Airport) has signed an agreement to buy 25% of Ningbo Lishe International Airport.
- The Chinese government is still reluctant to open aeronautical market to foreign investors while non-core aviation business such as retail in passenger terminal and ground handling services which are considered less essential, have been often contracted out to private companies via short-term sub-contracting or mid-term leasing. For example, at Shanghai International Airport, the retail spaces are leased out to private operators and their performance is reviewed regularly. Shanghai International Airport has also established a joint-venture company with Frankfurt Airport to provide training to airport employees.
- The government has allowed mergers and acquisitions between airports in the last few years which have produced several big airport corporations in China to achieve the scale of economy and synergy to improve management and financial strength. Although the sizes of airport corporations in China are still relatively small, the creation of airport corporations managing more than one airport highlights the Chinese government's effort in promoting operational autonomy and a strategy to achieve balanced developments between regions. The Capital Airport Holding (CAH) is an example of airport mergers and

acquisitions in the Chinese airport industry. At the end of 2008, it was holding stakes worth 67 billion CNY in more than 30 airports in China located in many parts of the country. (Yang & Yu, 2010)

5.3 - India

India is one of the fastest growing economies of the world, therefore also air traffic demand is rising at a high pace. In 1972 the International Airports Authority of India was established to manage the country's four international airports, while in 1986 the domestic airports came under the control of the National Airports Authority. These two authorities merged in 1995 under the name of AAI (Airport Authority of India) which nowadays manages more than 100 Indian airports out of which 11 are international. Private investment consortia which gather together airport operators from other countries are present too.

Government owned airports come under the jurisdiction of the AAI which holds complete control over those airports and provides a centralized financing program.

As the government recognized the need to bring airport infrastructure to world class levels and also its inability to bring in the required capital, PPP was identified as a preferred route to infrastructure provision. Greenfield airport at Bangalore was built according to this agreement between public and private sector: Siemens AG and Unique Zurich Airport invested a total amount of US $325.6 million. Similar projects have been realized also at Hyderabad airport.

Cochin International Airport Limited (CIAL) in Kerala has been a pioneer in India in the field of airport privatization because, at present, it is the only private sector airport in the country. A private company took the initiative to raise the necessary amount of money from a number of shareholders and private companies through a BOO agreement. AAI still manages Air Traffic Control. (M. Ohri, 2006; A. Bindra, 2006)

With specific regard to foreign investors' opportunity, the Indian law allows:

- In airports, FDI up to 100% is permitted however beyond 74% government approval is required. Foreign airport authorities can also participate in such investments.
- In domestic airlines, FDI up to 49% is permitted. Also, 100% is permitted for Non-resident Indians through the automatic route.
- No direct or indirect equity participation by foreign airlines is allowed.

With new airports to be built and existing airports to be upgraded in order to face the problem of capacity shortage, opportunities exist for various organizations including those involved in airport management and infrastructures projects. This potential, together with the government's decision to allow private sector participation in the running of major airports makes India a very attractive market.

5.4 - Indonesia

There are two state-owned airport operators, namely PT Angkasa I (PT 1) and PT Angkasa II (PT II) which manage the commercial activities of 21 out of 25 International Indonesian airports. PT I and II are in charge of the airports in the east and west of the country, respectively. They became public enterprises in 1987 and limited liability companies in 1993.

The smaller airports are owned or operated separately either by the provincial governments or by Units under the control of Department of Transport, but it is important to underline that Jakarta's airport is by far the largest in the country as it handled over 70% of passengers in 2004 (PT II Annual Report)

5.5 - Japan

The majority of Japanese airports is state-owned and public managed, although limited private investments are somewhere present. At present there are issues concerning the possibility of major investment opportunities. Tokyo Narita and Haneda are the most important in the country, the former is considered the most important while the latter is mainly used for domestic flights but handles more passengers.

There are also some forms of competition between airports as some of those are very close one-another and therefore are considered equally attractive by potential passengers (fig. 9)

Fig. 9: Most important 15 airports in Japan. (Source: Web)

It should be possible to distinguish between airports administered by the central government and those run by local governments. Nevertheless, the distinction is actually ambiguous because administrative responsibility has often been delegated. Airports located in major cities are kept under the control of the central government. Airport facilities are typically run and managed by multiple companies creating a difficult situation for a local government to plan future policies that capitalize on its airport.

In terms of financial operations, major airports have their revenue and expenditures pooled in a single account managed by the central government; the Airport Improvement Special Account. This means that the management of each airport lacks self-responsibility. Airports administered by local governments do not sufficiently disclose their financial data

According to the classification of airports law, there are several categories of airports. Firstly there are international airports such as Narita International Airport, Central Japan International Airport and Kansai International Airport. These airports are privatized airports via long term Lease Agreement or PPI BOO (Build Own Operate) and have an influence on Japanese International competitiveness. Then there are 20 national airports which were constructed and administrated by Japanese government whose traffic is mainly international and domestic. Thirdly there are 54 regional airports, most of those provide air transport services to isolated islands. Finally there are 21 airports for joint-use aerodromes with Japanese Ministry of Defense etc. (Shida)
Below the list of 1st and 2nd class Japanese Airport is reported

Municipality	Airport name	ICAO	IATA
FIRST CLASS AIRPORTS			
Izumisano / Tajiri / Sennan	Kansai International Airport	RJBB	KIX
Narita	Narita International Airport	RJAA	NRT
Tokoname	Chu-bu International Airport (Centrair)	RJGG	NGO
O-ta	Tokyo International Airport (Haneda)	RJTT	HND
Toyonaka / Ikeda / Itami	Osaka International Airport (Itami)	RJOO	ITM
SECOND CLASS AIRPORTS			
Akita	Akita Airport	RJSK	AXT
Asahikawa	Asahikawa Airport	RJEC	AKJ
Chitose	New Chitose Airport	RJCC	CTS
Fukuoka	Fukuoka Airport	RJFF	FUK
Hakodate	Hakodate Airport	RJCH	HKD
Higashine	Yamagata Airport	RJSC	GAJ
Kirishima	Kagoshima Airport	RJFK	KOJ
Kitakyu-shu-	Kitakyu-shu- Airport	RJFR	KKJ
Kunisaki	Oita Airport	RJFO	OIT
Kushiro	Kushiro Airport	RJCK	KUH
Mashiki	Kumamoto Airport	RJFT	KMJ
Matsuyama	Matsuyama Airport	RJOM	MYJ
Mihara	Hiroshima Airport	RJOA	HIJ
Miyazaki	Miyazaki Airport	RJFM	KMI
Naha	Naha Airport/Naha Air Base	ROAH	OKA
Nankoku	Ko-chi Airport	RJOK	KCZ
Natori	Sendai Airport	RJSS	SDJ
Niigata	Niigata Airport	RJSN	KIJ
Obihiro	Tokachi-Obihiro Airport (Obihiro)	RJCB	OBO
O-mura	Nagasaki Airport	RJFU	NGS
Takamatsu	Takamatsu Airport	RJOT	TAK
Ube	Yamaguchi Ube Airport	RJDC	UBJ
Wakkanai	Wakkanai Airport	RJCW	WKJ
Yao	Yao Airport	RJOY	

Table 13: List of Japanese 1st and 2nd class airport. (Source: web)

	Basic facilities	PTB	Parking lot	Aviation refueling facility
Privatized airport	Privatized airport company			
National airport	Japanese government	Privatized company	Privatized company Juridical foundation	Privatized company
Regional airport	local government	Privatized company	Juridical foundation	Privatized company

Table 14: Facilities provided at Japanese airports. (Source: Shida)

5.6 - Malaysia

Malaysia Airport Holding Berhad (MAHB), formerly known as Malaysia Airport SdnBhd (MASB) operates and manages 19 main airports plus 17 secondary airports throughout Malaysia. The 72% of the shares of MAHB is owned by the Government. The main airport is KLIA and it has been privatized by means of a 50 years lasting lease license to Malaysia Airports, a society wholly owned by MAHB.

5.7 - Philippines

This country's airport sector is under public control: Air Transportation Office (ATO) manages the 85 airports under the Department of Transportation and Communication (DOTC). During the first decade of 2000, a few private investments were made at Ninoy and Caticlan Airports; while the DOTC is supporting a plan of infrastructure development at both International and secondary airports.

5.8 - South Korea

South Korea has a peculiar airport governance organization if compared with the nearby countries: the Ministry of construction and Transport is responsible for the establishment and decision of air transport policies, while the daily operations of the airports are run by IIAC and KAC. The former Corporation runs the major international airport of Incheon and it is an independent public authority similar in relation to some aspects to USA and to others to European authorities because it is involved also in the management of seaports and both business and leisure facilities; the latter manages the remaining 7 international airports in the country and the whole group of domestic airports. (KPMG, 2008)

5.9 - Taiwan

There are 18 airports in this country; the whole lot is managed by the country's Civil Aviation Authority. Currently 15 out of 18 airports are severely losing money, with the only exceptions of Taiwan and Kaohsiung. The inborn problem with Taiwan is the fact that the rail and road transport are strictly competitive with domestic air transport given the area of the country, therefore the system relies only on the international traffic at the 2 biggest aforementioned International Airports of the country: the route Taiwan – Hong Kong is currently one of the busiest in the world.

5.10 - Thailand

In Thailand there is a mixed approach towards the airport management topic: the 5 most important airports in terms of passengers carried are managed by the group Airport of Thailand; between those airport there is Bangkok airport that is the 4^{th} airport in the whole Asia; the remaining 31 airport in the country are run by the Department of Civil Aviation.

5.11 - Vietnam

There are 3 major international airports (which handle all together more than the 90% of the traffic) and 18 domestic airports in Vietnam. The entity which is responsible for their management is the Civil Aviation Administration of Vietnam (CAAV), while the subsidiary Civil Air Traffic Management is responsible for air traffic control. The government is planning to invest a consistent amount of money in airport infrastructure development but also welcomes foreign capitals investments.

6. Regulation at some notable North – American countries

North American Airports		
Publically owned and operated		
Atlanta Hartsfield	Denver	Dallas - Fort worth
Fort Lauderdale	New York JFK	Washington Dulles
Los Angeles	Chicago O'Hare	Miami
San Francisco		
Publically owned and operated by independent not for profit corporations		
Montreal	Vancouver	Calgary

Table 15: Ownership at some north-American Airports. (Source: Author)

6.1 - Canada

From the 1960s up to the 1980s Canadian airports were under the responsibility of Canadian air transportation administration (CATA) which a division of Transport Canada. The whole national investment plan in airports was carried out on the basis of a capital fund; the revenues raised through the fees were left on deposit; the decisions regarding capacity and network served were made at the national level sometimes disregarding the dimension of the airport and its importance in the region. Moreover, Canadian airports were not required to be profitable. As a result of J. Dion's policy "A future framework for airports in Canada" (1987) provincial, regional or local authorities were invested of management and financial responsibility of airports on the basis of long-term ground leases; Montreal, Calgary, Vancouver and Edmonton airports experimented this new governance. Then, in 1994, the National airport policy stated that small and regional airports were to be sold to their local communities while larger airports and airports serving provincial capitals were to be leased to Canadian Airport Authorities (CAAs); in doing this Transport Canada kept commitment on airport policies. Both Local airport authorities and Canadian airport authorities (LAAs and CAAs) are private, self-financing, not-for-profit, non-share-capital corporate entities that don't pay income tax. (Tretheway, 2001; Padova, 2007)

The leases established are for 60+20 years and both LAAs and CAAs are subject to periodic performance review and public disclosure of documents; unlike other countries there is no formal economic regulation in Canada but this aspect will be discussed in the next chapters.

CANADA - National Airports System (NAS)		
Airport	**Date of transfer**	**Owner/Operator**
Kelowna	See remarks (a)	TC/Municipality
Prince George	Mar 31, 2003	TC/Prince George Airport Authority
Vancouver	July 1st, 1992 (b)	TC/Vancouver International Airport Authority
Victoria	Apr 1st, 1997	TC/Victoria International Airport Authority
Calgary	July 1st, 1992 (b)	TC/Calgary Airport Authority
Edmonton	Aug 1st, 1992 (b)	TC/Edmonton Regional Airports Authority
Regina	May 1st, 1999	TC/Regina Airport Authority
Saskatoon	Jan 1st, 1999	TC/ Saskatoon Airport Authority
Winnipeg	Jan 1st, 1997	TC/Winnipeg Airports Authority
London	Aug 1st, 1998	TC/Greater London International Airport Authority
Ottawa	Feb 1st, 1997	TC/Ottawa MacDonald Cartier International
Thunder Bay	Sept 1st, 1997	TC/Thunder Bay International Airports Authority
Toronto	Dec 2, 1996	TC/Greater Toronto Airports Authority
Montreal Dorval	Aug 1st, 1992 (b)	TC/Aéroports de Montréal
Montreal Mirabel	Aug 1st, 1992 (b)	TC/Aéroports de Montréal
Quebec	Nov 1st, 2000	TC/Aéroport de Québec Inc.
Fredericton	May 1st, 2001	TC/Greater Fredericton Airport Authority
Moncton	Sept 1st, 1997	TC/Greater Moncton International Airport Authority
Saint John	June 1st, 1999	TC/Saint John Airport Inc.
Halifax	Feb 1st, 2000	TC/Halifax International Airport Authority
Charlottetown	Mar 1st, 1999	TC/Charlottetown Airport Authority
Gander	Mar 1st, 2001	TC/Gander International Airport Authority
St. John's	Dec 1st, 1998	St. John's International Airport Authority
Iqaluit	July 1st, 1995	Government of Nunavut
Yellowknife	July 1st, 1995	Government of Northwest Territories
Whitehorse	Oct 1st, 1996	Government of Yukon Territory
(a) Airport leased to the City under a long term lease expiring 2034.		
(b) Airport transferred to a Local Airport Authority (LAA) prior to NAP implementation.		
TC = Transport Canada		

Table 16: Canada Airport divestiture program. (Source: TC)

6.2 - USA

As of January 2008, there were almost 20,000 airports in the United States. While the vast majority of these airports are privately owned and privately used (they are very small airports with, therefore, no commercial traffic), 4,150 airports are publicly owned and publicly used and serve scheduled passenger operations, cargo operations, general aviation or a combination of these operations. The responsibility of these airports often lies within cities or counties governments; there also examples of airports owned by municipalities or counties but operated by authorities: New York's, New Jersey's, Seattle's authorities are notable examples.

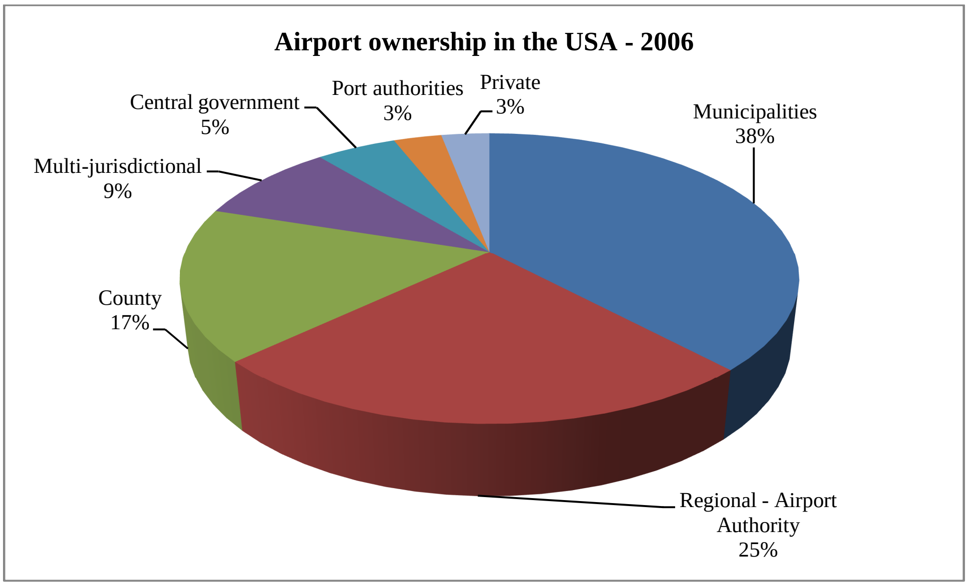


Fig. 10: Airport ownership forms in the USA. (Source: ACI north America, 2003 & TRB, 2006)

It was quite common during the 1920sand 1930s for local governments to purchase airports previously in private ownership and to acquire vacant properties to construct public airports. The U.S. Government constructed several airports during World War II and transferred the airfields to local governments after the war pursuant to the Surplus Property Act.3 During the 1950s and 1960s, several airport authorities were established to assume control over public airports. Changes in airport governance continue to occur as a result of transfers of military airfields for commercial or joint (military and commercial) use, construction of new airports, and transfers and delegations of power over existing airports.

In the USA is it possible to find:

- airports owned by the federal government and operated by an airport authority;

- airports operated by state governments (Alaska, Arizona, Connecticut, Hawaii, Maryland, Minnesota, New Hampshire and Rhode Island);
- airports operated by an airport authority; this model rivals direct control by cities as the most common form of governance structure;
- multi-airport systems operated by public entities, like the Metropolitan Washington Airports Authority (Virginia), the Port Authority of New York and New Jersey, the City of Los Angeles (California). Some public entities are responsible for modes of transportation in addition to airports;
- airports operated jointly by the U.S. Department of Defense and the authority.

There are no correlations between airport governance structure, airports characteristics and kind of service provided; therefore 2 comparable airports may have different governance structure.

US airports' funds stem from airport charges levied on passengers and airlines, commercial bonds and from the Federal Airport and Airways Trust Fund.

Private sector's investment in airport ownership is uncommon in the US, but public-private partnerships are traceable in the airport management: small airports like those in Albany, Burbank, Teterboro and Atlantic City have been privately managed on a contract basis and BAA – Ferrovial (the former British, now Spanish owned management group) has won concessionaire contract to provide retail services at Boston and Pittsburg airport and also private management contract to operate Indianapolis airport. Another form of PPI is privately financed terminals at public owned and operated airports; this is the case of JFK, Chicago O'Hare and Detroit airports. One reason to explain why US airport privatization has been somehow less strong and widespread if not different if compared with EU countries lies in the fact that the airport operator's rule is limited to the fulfillment of basic facilities (which led to lower user cost) and there was the fear to lose the possibility to have access to the Federal Fund and the tax-exemption on commercial bond sales; moreover the US regulation practice prohibits the revenue diversion to non-airport related activities. In fact, the federal Airport Improvement Program imposes economic regulation on U.S. airports in exchange for annual grant funding. Those regulations preclude airport privatization, because they require all “airport revenues” - including those stemming from a lease or sale - to be reinvested in the airport (or airport system) that generates them. That means a city, county or state that wishes to lease or sell its airport would receive zero financial benefits from so doing. The regulations also prohibit any airport operator (including an investor-owned airport company) from taking any profits off the airport, which means such a company would have no incentive to acquire a U.S. airport.

In 1996 a step forward was done: the Airport privatization pilot program allowed five airports (including no more than 1 major hub and 1 general aviation airport) to be either leased or sold without any change to the previously established grants and the acquirer would have been allowed to seek profits. The privatization of the major hub would have taken place if 65% of the airline that provide scheduled service and airlines accounting for the 65% of the landing weight had been favorable. It is a very strict condition and in fact Chicago Midway, the only airport that applied for the privatization, was unable to reach the goal. The slot for the general aviation airport to be privatized has been awarded to Briscoe field airport. From the introduction of Airport privatization pilot program on, an increasing number of municipalities, multipurpose port authorities and state government seem willing to become owner of their airport but the path towards privatization is very slow because there are many resiliencies to be overcome.

Meanwhile, independently of the recent specification in the reauthorization of the Airport Improvement Program, many individual airport authorities have embarked on privatization projects of various sorts, for example:

- the Port Authority of New York and New Jersey has entered into a contract with private investors to finance, build and operate the new International Arrivals Building at New York/Kennedy airport and a master concessionaire contract with a private company (Marketplace Development) to operate in the central passenger building at New York/LaGuardia airport;
- the airport authorities of Pittsburgh, Boston and Washington DC have similarly entered into master concessionaire agreements, respectively to BAA plc for the whole facility at Pittsburgh, and to Westfield Holdings for specific passenger buildings at Boston and Washington;
- the public authorities for Indianapolis and the Susquehanna Area Regional Airport Authority (Harrisburg) have entered into 10 year agreements with BAA plc to operate and upgrade facilities at their airports;
- the City of Chicago has entered into a contract with Standard Parking to operate the parking garages at Chicago/O'Hare airport.

The presence of a multipurpose authority managing an USA airport seems to be the one that assures the highest degree of independence from local politics in salaries and budget matters. In the US is also present a strong relation between airports and airlines, this topic will be discussed in the next chapters.

A brand new privately developed airport opened in May 2009 in country music haven Branson, Missouri. A group of entrepreneurs created Branson Airport LLC, acquired a suitable parcel of land in Branson, received airspace approvals from the FAA, and raised $155 million. With that, they created a one-runway airport with a contractor-operated control tower and a modest terminal building. Because the airport used no federal grant funds, it is not constrained by the usual FAA grant agreements. It is offering airlines two-year exclusive rights to link specific cities to Branson. As of mid-2010, Branson has signed up AirTran for exclusive service to and from Atlanta and Milwaukee, Frontier serving its hub in Denver, and Sun Country serving Minneapolis-St. Paul. In addition, the company has created its own airline, Branson Air Express, which as of mid-2010provides service to an additional eight cities. (de Neufville, 1999 ; Tretheway, 2001 ; Reimer et al., 2007).

To make an example, we provide the duties' list of each entity for San Diego Airport, an airport situated in US California

U.S. Department of Transportation, Federal Aviation Administration (FAA)

- Operates air navigation facilities
- Controls airways, air traffic and air safety
- Establishes airport design standards
- Provides airport development funding

California Department of Transportation, Division of Aeronautics

- Issues permits for, and inspects public-use airports
- Conducts statewide aviation system planning
- Administers noise regulation and land use planning laws
- Provides grants and loans for safety, maintenance and capital improvement projects at airports

U.S. Department of Homeland Security, Transportation Security Agency (TSA)

- Approves airport security plans
- Trains and deploys airport security screeners

County of San Diego Airports

- Operates and maintains all physical elements of airports including security

- Develops facilities and rents space to airlines, aviation-related and passenger service businesses
- Leases property for development supporting airport enterprise funding

National Transportation Safety Board

- Investigates aircraft accidents and reports findings

7. Regulation at some notable South - American countries

Several Latin American and Caribbean (LAC) countries embarked upon a structural reform process in the 1990s. This process included, as a major component, the deregulation and privatization of several infrastructure services. In this context, the airport sector experienced a transformation that resulted in the introduction of private sector participation (PSP) inmost LAC countries. A wide variation of PSP schemes was adopted. Latin American and Caribbean countries are facing a strong passenger traffic growth in the last decade, as it is reported in the next figure.

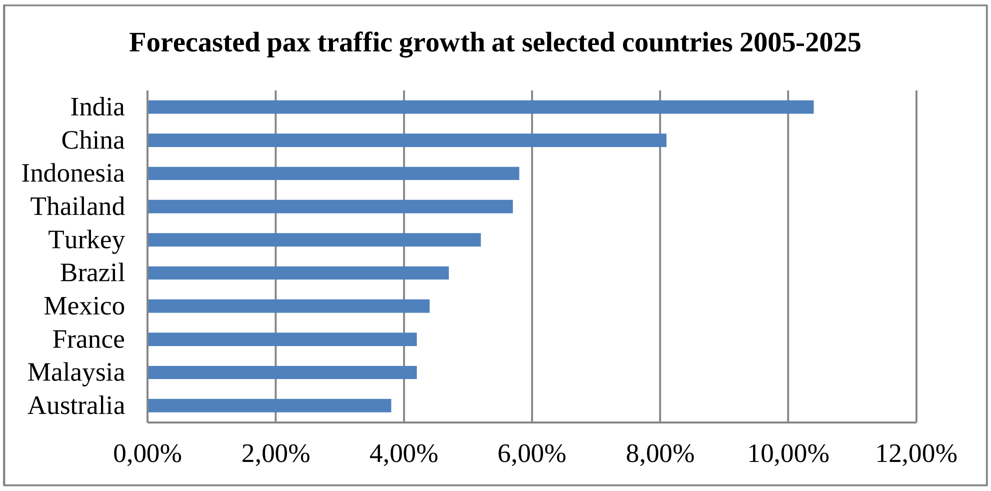


Fig. 11: Air-traffic growth rate forecast 2005-2025. (Source: Flores, 2007)

Governments have been making huge changes in their airport ownership schemes: it is sufficient to say that from 1992 to 1997 around half of the LAC airports have established some form of private operation agreement.

Unlike Europe, where the principal mode of airport privatization has been the sale of partial or 100% ownership stakes in airports, in Latin America the long-term concession model has prevailed. While Argentina opted to concession its airport network to a single operator, Chile adopted a case-by-case strategy and Mexico concessioned its airports by groups. Peru used a mix of single and group concessions, while Colombia and Costa Rica opted for the single concession scheme. Other forms of partial privatization adopted in the LAC are Greenfield projects and Management and lease contracts, but concession is by far the most used. The most important economy in the region, Brazil, continues to operate the largest airports through a state-owned corporatized enterprise. However, in 2008 the federal government launched a consultation process to introduce private participation in the airport sector.

Argentina: Aeropuertos Argentina 2000 acquired the concession to run 32 airports under a 30 years agreement predicted to finish in 2028. The concession fee AA2000 pays to the government is the equal to the 15% of the annual gross income

Bolivia: TBI acquired the management of 3 airports under a 25 years concession supposed to expire in 2025. The concession fee is the 20,8% of the annual gross income while the regulatory fee is the 0,8% of the same sum.

Costarica: ALTERRA manages the country's principal airport of Juan Santamaria under a 20 years concession agreement expiring in 2021. A two stage investment has been forecasted for a total amount of approximately 300 million US$. The concession fee is the 32,5% of the split income and the 58% of the total revenue.

Chile: 9 to 16 years concession agreements have been signed between the government and the operator of each Chilean airport between 1995 and 2000. These agreements are based on the principle of Build-Rehabilitate-Operate-Transfer therefore we can assume that the concessionaire has the right to build new infrastructure and is in charge for maintaining the existing ones

Perù: capital city airport in Lima is managed by Lima Airport Partners srl under a concession of 30 years due to expire in 2031 while the remaining Peruvian airports are managed by Aeropuertos del Perù under a 25 years concession agreement under a 5% of the annual gross revenue fee.

Mexico: the country's 58 airports were divided into four groups, namely the North-Central Group (GACN), the Pacific Group (GAP), the Southeast Group (ASUR), and the Mexico City Group (AICM). Each of these groups had at least one large airport which would make them desirable to private investors but they also had some smaller airports as well. The very small airports were not allocated to any of these groups as, although they were seen as essential for public need, they were not considered to be attractive.
Concession contracts were awarded for 15% for three out of four groups for an initial 15-year period with an underlying 50-year agreement. There had to be at least one airport operator from another country within each successful consortium to bring international expertise but only 49% could be under foreign ownership and it was also planned that there would be a subsequent flotation of remaining government shares as well. An upfront fee for buying the concession and an annual percentage of revenue had to be paid to the government by the consortia. The concession for ASUR was the first to be awarded in 1998 to a consortium formed by Copenhagen airport and consequently the rest of the shares (except 0.01 per cent which was kept by the government) were sold through flotation in 2000 and 2005. In 1999,

15 per cent of the GAP Group of 12 airports was sold to a consortium with AENA, the Spanish airport group, as a key partner, and then in 2006 the rest of the shares were floated. In 2000, the 15 per cent share of the GACN group was sold to an AdP consortium again with a further flotation of 47 per cent of shares in 2006. The Mexico City group has yet to be privatized because of uncertainty related to a new airport for the capital.

Brazil seems likely to be the new frontier for South American airport privatization, as the government gears up to modernize both Rio de Janiero's Galeao International and Sao Paulo's Viracopos. The country will host the World Cup in 2014 and the Summer Olympics in 2016.

Jamaica several years ago privatized its major tourist airport—Sangster International, in Montego Bay—via a 30-year build/operate/transfer (BOT) concession. Based on the success of that privatization, the government wants to do the same thing for its other major airport, Norman Manley International in Kingston. In March 2010 it named a committee to develop the plans and timetable. (Flores, 2007)

Increasingly, airport operators in one Latin American country are branching out into other countries. For example, Airports Argentina 2000 has developed the Carrasco airport in Montevideo, Uruguay. Brazil's Andrade Gutierrez Concessoes is one of four partners (along with Aecon and ADC of Canada and HAS Development Corp. from the United States) in Quiport, the company developing the new Quito, Ecuador airport under a concession agreement.

A source of controversy is the degree to which public and private entities control airport decision-making. International practices exemplify two main typologies of airport regulators: independent regulator versus some form of control by the government. Frequently, government control has been seen as a way to ensure that the airport were serving the public entity's goals; moreover the presence of elected officials promotes accountability (the electorate has the power to vote on the governing body's airport-related decision-making). On the other hand, the presence of an independent regulator can lead to improved performance and greater efficiency. A third approach, a blend of the two mentioned above, exists in Australia. The Australian Competition and Consumer Commission has broad responsibility for administering competition policy as well as regulation in all sectors with essential facilities.

Most countries that concessioned airport services decided to create a regulatory agency. Independent regulatory agencies were given the highest levels of administrative and legal independence and were subject to accountability before the congress. Their decision-making authority was placed within a board of directors, which would be composed of technical and nonpolitical members. The agencies were also given significant regulatory competencies to determine tariffs and minimum requirements for quality of service.

When airport services remain within the state, the role of regulator is placed in the hands of government departments with limited independence from sector authorities. These institutions, sometimes having a separate status from the government, possess overall policy implementation responsibilities, although decisions are made by policy formulators such as the line ministry.

IRAs present advantages versus government departments: transparency, accountability of stakeholders' opinions into the decision-making process, technical expertise. Despite the overall advantage of IRAs for good regulatory governance, conclusions should not be interpreted in a "one model fits all" approach. (Serebrisky, 2012).

With the focus on the USA's airport system, that has proven to be the more various so far, D.S. Reimer et al (2007) provide some examples:

- airports in which primary decision-making responsibility is reserved by a general-purpose government, counties or states → Atlanta, Chicago, New Orleans; Sacramento (California); Alaska and Hawaii;
- public entities have created boards and commissions to operate airports while retaining some degree of oversight and control → the City of Los Angeles retains decision-making authority over key aspects of four airports (Los Angeles International, Ontario, Van Nuys, and Palmdale Airports), but has delegated considerable decision-making responsibility to the Los Angeles World Airports, with its own Board of Airport Commissioners;
- commercialization and privatization bring further relaxation of public control but private participation in airport governance or management is subject to detailed agreements, leases, or similar contracts that prescribe and constrain actions and decisions by the private entity.

Airport authorities and port authorities may be subject to varying levels of oversight and control by a general-purpose government. A state or local government may retain ownership of the airport property, may appoint authority commissioners, may be authorized to veto authority decisions, and may exercise control in other direct and indirect ways. Conversely, some airport authorities have been structured and operate as separate and independent bodies from the public entities that created them, from the host jurisdictions in which the airports are located, and from the airport owners.

Chapter 2:

Economic regulation at airports, services and duties to be provided and competition issues

The operational aspects have always been seen as the main topic of airport governance. In fact, the focus on non-aviation incomes is actually a recent topic in airport management. Nevertheless, as long as a managerial point of view has been arising at privatized airports, the innovation quickly gained importance in the balance sheet of airport management enterprises. Therefore, airport directors and senior management were, and somewhere still are, basically operational specialists but side by side with them, also economics and marketing specialists play an important role in airport management and as a result, the resources and staff numbers employed in these areas were expanded. Relatively underused practices, such as the benchmarking of financial performance and quality management techniques, also began to be accepted – albeit rather slowly at the start – by a growing number of airports as essential management tools.

In some airports, the typical functional organization structure with different departments for finance, operations, administration, and so on was replaced with departments or business units more focused on customers' needs, such as airline or passenger services.

In this chapter, a quick review on economic regulation of airport is presented with an emphasis on the different techniques adopted all over the world and on the results they lead to. Then, the main activities taking place at an airport will be summarized, with the aim of pointing out which ones have to be provided by the airport management and which ones could be transferred to handling societies or other partners. In this field, some forms of competition between airports might occur.

A few representative countries in each continent will be taken into account (African countries have been left aside because air transport is still in the embryonic stage in most of the countries and in most cases a single airport gathers by far the majority of that country's traffic) and the topic of airport ownership will be further analyzed in detail, providing where possible information about the equity share composition of each airport management

enterprise and its evolution during the years. With particular attention to Italy, these data will be presented with reference to the period 2005-2010.
State of the art's information about competition issues will finally be provided.

1. Economic Regulation at Airports

An airport is a transport infrastructure characterized by a twofold business: the aviation market and the non-aviation market. Revenues come from both sides: charges levied to airlines and passengers for runway, apron and terminal use; retail and commercial activity or land leases. The shift to market oriented policies reflects the belief that airports were not natural monopolies anymore, despite the monopolistic power exercised on the revenue sources so far. (D. Gillen, H.M. Niemeier, 2006)
As competition is currently not strong enough to limit the market power of airports in such a way that airports become cost and allocative efficient, the question arises if effective regulation can achieve this aim. The main issues are whether a form of regulation is necessary and, if positive, which one is to be preferred. Regulation should be confined to those activities in which the airport has persistent monopoly power. This is the case where the airport services are essential for downstream users and cannot be duplicated without substantial costs. In the debate on how to regulate airports, three features are important: the complementarity between aviation and non-aviation activities, the degree of congestion (capacity) and the level of competition in the industry (or at the airport if it is a hub).
It has often been claimed that regulation is a way to reduce costs at airports. This is only partially true. Regulation aims at being a strong input to get to a more efficient airport management, but the mere charges reduction would attract demand and it is not always a positive issue, especially for already congested airports. The structure of charges, the allocation mechanism and

the incentives for investment become a major issue for airport regulation in order to attain a reasonable demand and a sufficient income.

Several authors have claimed that price regulation is not necessary if the airport market power is modest because uncongested airport operators are stimulated to lower charges to attract traffic (more passengers → higher revenues) (Starkie, 2001). However, congested airports have more opportunities to exert their market power and some kind of regulation is necessary (Basso, 2008). The number of passengers that an airport can attract is related with the airport's ability to set charges because it is related with its market power. In the case of larger airports, the number of flights that an airport can attract depends on both the airport's attractiveness and on its usefulness as a hub. (D. Gillen, 2008)

Fu et al. (2006) are for a certain degree of regulation since airport charges can have a marked impact on the competition between airlines. Finally, Oum et al. (2004) provide a further argument in favor of regulation because they point that price-cap regulation provides incentives for setting prices, making investments and reducing costs.

Were airports regulated or not and were their management firms public, partially or fully privatized, national regulators and competition policy authorities are in charge of carefully monitoring airports.

The first milestone in airport economic regulation was the 1944 Chicago Convention which gives ICAO members the authority for the levying of airport charges. According to Art. 15, optimal regulation of airports should meet the following criteria (ICAO, 2004; Oum et al., 2004 e 2006, Gillen & Niemeier, 2008):

– agencies, independent from political interests but accountable to democratic bodies, should be responsible for regulation;
– a formal consultation process between airports and airlines is required;

– price regulation should establish the correct incentives for cost reduction and investment in additional capacity;
– price regulation should be established on an individual basis because the market power of each airport depends on characteristics such as the volume and type of traffic or the potential competition from other airports (Starkie, 2002; Gillen, 2008, Bel & Fageda, 2010).

It is generally believed that regulation should be implemented by an independent agency; however in most European countries regulation has been introduced by a central government agency. The recent directive on airport charges (2009) reassert the necessity of this independence as it is evident that the presence of a non-independent regulator undermines the position of airports, in particular those under total or partial private control. Independent regulation has only been adopted in the United Kingdom, the Netherlands, Ireland and Austria (Gillen & Niemeier, 2006). In Germany, regional governments are responsible for regulating their airports but in the meantime they are also airports' minor/major shareholders; this is the case of Frankfurt, Hahn, Hamburg and Hannover (Niemeier, 2002).

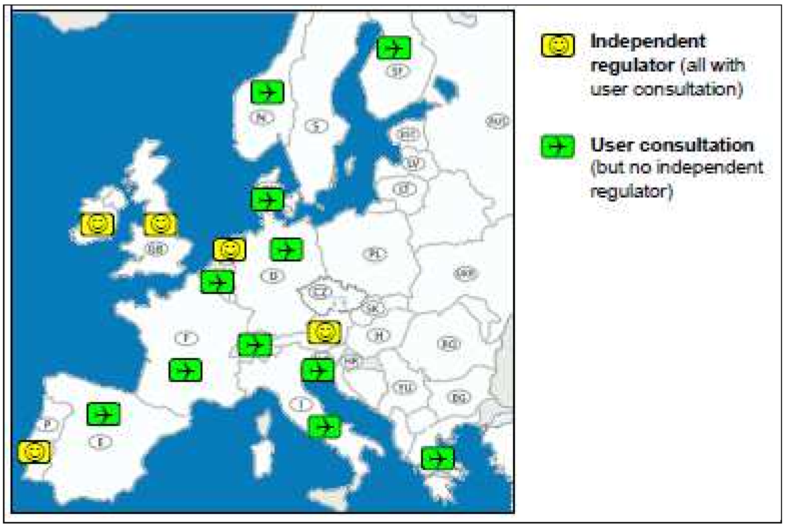


Fig. 12: Relationship between government and regulator (Source: D. Gillen, H.M. Niemeier, 2006)

With reference to the formal consultation processes, the information provided should be transparent and complete. Nevertheless "*the value of the regulated asset base and the percentage return on capital are not disclosed by ADP or the French government*" (Morgan Stanley, 2006, p. 4) and the recent decision (Dec. 2010) of Lufthansa to acquire a 9,1 % share in Frankfurt airport highlights airlines' will to take part to the board of directors in order to be better informed and – if necessary – exert veto-power on management's decisions.

Airport authorities may decide to set airport charges according to the principle of cost relatedness, that is to say the charges should cover total costs and each charge should reflect its costs. In Europe many of the public airport systems like Greece, Poland and Finland set their charges in this way. Nevertheless, if the allowed rate of return on capital is above the cost of capital the airport has an incentive to expand the capital base to increase profits (well known as Averch Johnson effect, 1962). Furthermore, there are high incentives for cost-padding leading to productive inefficiency. This kind of regulation gives the airports no incentive to adopt peak pricing, but rather fosters them "*to lower the price at peak times and charge a monopoly price at off-peak times to realize a profit*" (Sherman, 1989). Moreover, charges are often levied on the basis of aircraft weight without taking into consideration aircraft movements that is a far more consistent marker of airport congestion. Finally, the fact that many airports are not slot constrained may allow an inefficient distribution of traffic demand during time and this, according to Niemeier, may lead to concern about expensive additional capacity expansion. (D. Gillen, H.M. Niemeier, 2006)
At a national or individual airport level the degree of government control varies considerably as Fig. 13 reports with reference to a 2006 EU's sample of airports (ICF SH&E, 2006).

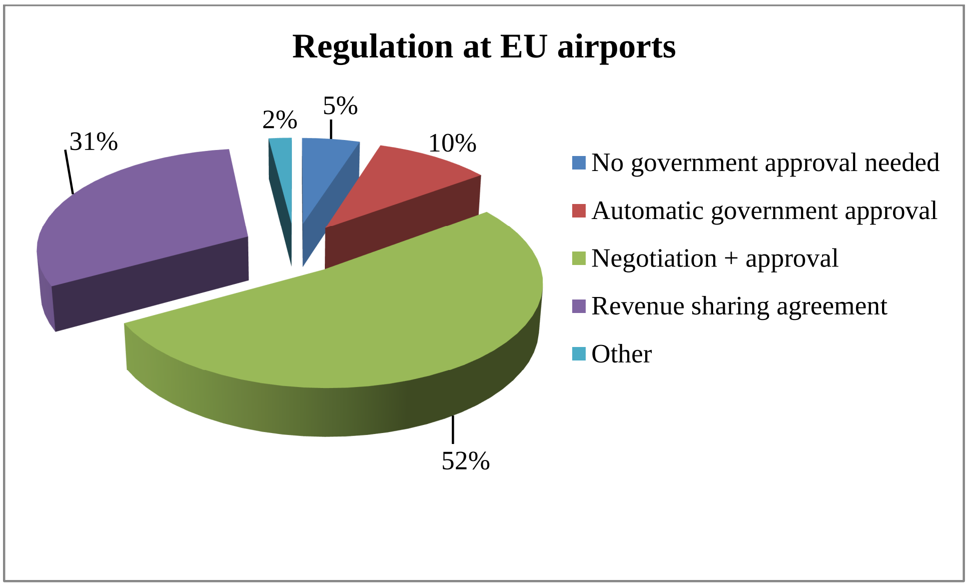


Fig. 13: Regulation form at EU airports (Source: ICF SH&E, 2006)

The Directive 2009/12/EC of the European Parliament and the Council of 11 March 2009 on airport charges may lead to major changes in the regulation procedures of European countries. This directive should have been incorporated within corresponding national legislations by March 2011 and is applicable to all airports in the European Union handling more than five million passengers each year, as well as to each country's main airport should it handle fewer than five million passengers. The directive establishes that the entity should be independent and it confirmed the necessity that airports and airlines should exchange information concerning the cost structure, the traffic forecasts and the requirements about equipment and level of service before charges are finally approved. However, each country keeps considerable powers of discretion as regards the specific mechanism regulating the behavior of the airport operator. Level of service agreements should be revised every 2 years, while tailored services in dedicated parts of a terminal should be set versus additional fees and security charges, provided that security standards are met (European Commission, 2007).

Generally speaking, two kind of regulation are present: basic regulation versus detailed regulation.

- Basic regulation → prices are set and adjusted according to costs. There is a strong dependence on regulations and administrative rules, but the costs determinants are not explicit. Generally, airports and airlines do not enter into a formal consultation process. Regulation is never under the responsibility of an independent agency.
- Detailed regulation → a formal mechanism establishes the assets that are to be regulated. Prices are set and adjusted each year according to costs, revenues, evolution in traffic volume and depreciation rates. Regulation might be accompanied by a formal consultation process between airports and airlines. However, regulation is not usually under the responsibility of an independent agency. Prices are set directly by the firm (public or private) that manages the airport in case of non-regulation.

It has been noted by Bel and Fageda (2010) that basic regulation becomes less common as the weight of private ownership in the airport management increases. In the case of public owned airports, basic regulation is clearly the dominant form, while a significant proportion of (fully or partially) private owned airports are subject to some form of detailed regulation. Moreover, the probability that the airport is subject to detailed regulation depends on the amount of traffic handled. Finally, concessions are subject to more detailed regulation than public management, which would explain the move from basic regulation to more detailed regulation with privatization.

Whereas the EU Commission and airlines are demanding more regulation, others (Starkie, 2002, 2005) maintain that the governments should introduce a more light-handed approach because most of the current regulatory systems are time-consuming, bureaucratic, costly and sometimes unfitting with national competition law. Price cap formula with a single till approach has been by far the most common regulation system in Europe (IATA, 2006); nevertheless some shifts to other kinds of regulation are taking place.

Among the mechanisms applied in detailed regulation, we should distinguish between:

- Rate Of Return regulation
- Price Cap regulation
- Reserve Regulation
- Airport – Airline Agreements

In both ROR and Price cap regulation, airport management and the regulator have to shortlist which airport facilities and services are to be considered under the pricing regime in order to determine the Price cap. The so-called single till approach includes both aeronautical and non-aeronautical revenues in the determination of the price cap. Alternatively, the dual till system only considers aeronautical revenues. The single till principle was recommended by ICAO and has been widely used but this long tradition is slowly breaking down: Hamburg Airport was the first EU airport to shift to a dual till regulation in 2000, followed in 2001 by Malta airport and in 2006 by Budapest airport.

The major arguments for dual till regulation is that, with a single till approach, activities such as food, rental and parking concessions result in perverse incentives at capacity constrained airports or may create costs at un-congested airports. If we have a capacity constrained airport, the probability to have larger incomes from non-aviation related activities is higher than at un-constrained airports; if there is a single till approach, therefore, aeronautical charges must be lowered to remain under the price cap. Nevertheless, this is not an efficient decision: lower aeronautical charges mean higher traffic demand at already congested airports when the efficient solution would be raising charges to relieve traffic. On the other hand, un-congested airports are willing to attract traffic and therefore they try to lower aeronautical charges; therefore, single till price-cap regulation at un-congested airports appears not necessary.

When considering the need for infrastructure investments, a dual till regulated airports would not consider the non-aeronautical related incomes due to the extra capacity and so it would invest less money or delay the investment. On the other hand, a single till regulated airport would balance the investment for airside capacity with the incremental revenue from landside activities.

Under a dual till regulation, airside charges would rise since they would no longer be cross subsidized by non-airside revenue and therefore the airport could experience a reduction in traffic. (D. Gillen, 2008)

1.1 – Rate of return (ROR) regulation

The Rate of Return approach is based on the principle that prices must be set high enough so as to generate revenues that cover total costs, including the depreciation of capital as well as a sufficient profit rate. Hence, rate-of-return regulation limits the profits of the airport operator on the basis of its historical costs. Therefore, a price increase is allowed only after an increase in costs. This system is seen as:

- incapable of providing incentives to reduce costs;
- irrespective of efficiency (cost inefficiencies might be built into the cost structure and then passed on to the consumers through increased prices);
- capable of encouraging over investment

1.2 – Price Cap regulation

Price caps leave the structure of charges unregulated, setting incentives to balance price structure in the direction of efficiently rationing peak and excess demand.

Price cap regulation was introduced to lower the overall costs of regulation and to provide the incentives for firms to act in a way to improve economic welfare. Unlike ROR, with price-cap regulation airport operators are allowed to increase prices.

While ROR depends on the airport operator's historical costs, price-cap mechanism is forward-looking and therefore this method provides better incentives for reducing costs and investing in capacity (Gillen and Niemeier, 2008).

Price cap regulation began to be used in the 1980s; the maximum price is established by a formula that takes into account inflation, efficiency factors and the external costs Y:

$$Price\ cap = CPI\ (or\ RPI) - X + \tag{1}$$

where *CPI* is the Consumer Price Index, *RPI* the Retail Price Index, and *X* measures the expected productivity growth.

The difference between *CPI* and *RPI* consists in which items are taken into consideration (*RPI* includes mortgage interest costs and council tax) and in the fact that *RPI* is an arithmetic mean while *CPI* is a geometric mean. The geometric mean is seen as more capable of reflecting changes in consumer spending patterns due to changes in the price of goods and, moreover, is never higher than the arithmetic mean. The value of *X* is determined by the regulator on the basis of a range of criteria including, for example productivity, the performance of the firm in the previous period and boost to reduce costs.

A high positive *X*-factor (thus resulting in lower price cap) might be the result of cost savings in the past or disclose the will to further improve efficiency. On the other hand, a high negative *X*-factor (thus enabling an increase of the price cap) might hint a rise in the firm's costs or the need of infrastructure investments. The little incentive to investments is the main negative aspect of price cap, this is due to the difference of life span between investments and regulation period.

In order to calculate the total revenue required a Regulated Asset Base (*RAB*) is defined and valued at the beginning of the price control period and then consequently enlarged to take account of the projected capital expenditure. The regulators have to pay attention to overestimation of *RAB* value by the airport management as well as to the level of quality of the services provided by the airport (lowering quality might be an unsound way to cut costs).

D. Gillen and H.M. Niemeier (2006) distinguish between "pure" price cap, when there is no reference to benchmark costs and "hybrid" price cap, if benchmarking techniques are used. Hybrid price cap provides fewer incentives for cost reductions but it is more common in EU than the pure price cap method. Hybrid price caps have been used for UK airports, temporary for Australian airports and for some European airports.
Another issue with Price cap is the way to calculate *CPI* or *RPI*: first of all, *CPI* or *RPI* is an average price; moreover the airport management may choose between a method relying on the predicted revenue/passenger (revenue yield) and a weighted average price (tariff basket) to define *CPI*/*RPI*. The latter is independent on traffic forecasts and is therefore simple and less prone to be manipulated; . In general the tariff basket approach is usually considered to give airports greater incentives to move to a more efficient pricing structure. ICF SH&E (2006) reports that the tariff basket approach is used in the majority of EU airports adopting Price cap regulation.

1.3 – Reserve regulation (Light-handed regulation)

Also known as "light-handed" approach, it consists in the intervention of the regulator whenever either the airport's market power is abused or the airport management and the airlines cannot reach an agreement. It is the threat of regulation rather than actual regulation which provides a safeguard against anti-competitive behavior (Toms, 2003).

This kind of regulation is common in Asia-Pacific countries like Australia and New Zealand. The three main New Zealand airports, Auckland, Wellington and Christchurch, were corporatized in the late 1980s. Government shareholdings in Auckland and Wellington airports were partially sold to private investors in the late 1990s, while Christchurch is still owned by the local government.

New Zealand did not formally regulate its airports after privatization, though it did provide for a review of airport pricing behavior with the threat of more explicit regulation should this behavior be unacceptable.

In Australia airports under federal ownership were first corporatized in the 1980s but beforehand they were expected to achieve cost recovery as a group, though there were cross subsidies from large to smaller airports. As stated in the previous chapter, in the 1980s the federal government transferred ownership of smaller airports to local governments while airport privatization began in 1996-97. Formal regulation under a dual till price cap was put in place by the government and the Australian Competition and Consumer Commission (ACCC). In 2001 The Australian Productivity Commission's report recommended the end of price cap regulation and, in 2002, the government decided to monitor only the seven major capital city airports instead, without regulating nor monitoring other airports. (D. Gillen, 2008)

Three aspects are worth to be taken into account to make light handed regulation a credible option. Firstly, monitoring needs a credible threat (Kunz, 1999), that is to say "*Is there an independent regulator with sufficient information and democratic support?*" This might be the case in Australia and in New Zealand (Australian Productivity Commission, 2001), but it is not in other parts of the world, as it has been stated above. Secondly, the guidelines have to be clearly and precisely stated. Thirdly, the

incentives towards efficiency depend on whether the guidelines demand cost-based pricing or are incentive-based.
This system may work well in countries with uncongested airport and with absence of competition due to geographical reason (for example it might be the case of Canada, China and USA to some extent). It remains to be seen if monitoring can set incentives towards efficient pricing if capacity is scarce and airlines oppose such changes as they cannot pass higher charges to passengers as easily (H.M. Niemeier, 2009).

1.4 – Airports – airline agreements

Finally, what is not often considered in the debate on airport regulation is that airports can directly contribute to the degree of airline competition through pricing and capital investment decisions. Therefore policy makers should not only consider the welfare effects of airport regulation in relation to airports and their customers, but also the associated welfare effects on airline competition that result from airport pricing and investment decisions under the various regulatory regimes. (D. Gillen, 2008)

Revenue sharing agreements in the European airport industry are often built in order to inversely bind the level of charges to the passenger growth over a certain period, configuring a sort of mutual agreement between the airlines and airports. These so-called sliding scales might also be combined with price cap regulation, as in the case of Hamburg, Vienna and regional Austrian airports. These agreements might be the result of Memorandums of Understanding between the airports and its users, in the form of a public contract.
The average charge per passenger is determined according to the future passenger growth rate (for example, expected traffic growth +4% → charges +2%). In case of disagreement the charges are determined in a cost related way. If the actual growth rate were higher than it was expected, airlines

would give the airport management part of the additional revenues so as to balance revenue losses; on the contrary (lower growth rates), the airport would cover the whole or part of the airline's revenue losses through higher charges. (D. Gillen, H.M. Niemeier, 2006)

Also Low cost airlines, such as Ryanair and easyJet, have sought long-term deals at their base airport, but these agreements were sometimes rejected by the country's Competition Board. (A. Graham, 2008)

Within the contract period, these contracts offer both the airport and the airlines stability if demand fluctuates. However, the incentives for cost reduction and for traffic increase are rather. Very often these agreements highlight the airlines' bargaining power (and this power could be high or extremely low depending on the kind of service the airports provide). Moreover, fast rising demand leads to lower charges and lower demand to higher charges and the mathematical form of the sliding scale might reduce the incentives to differentiate charges.

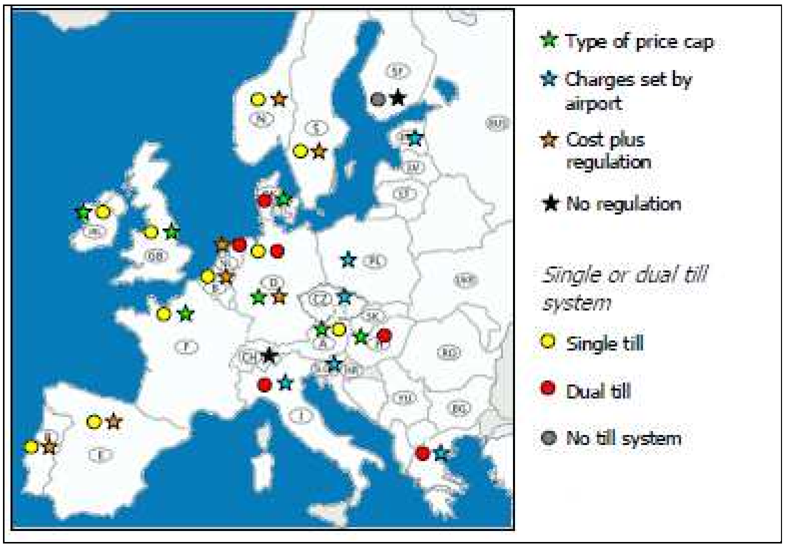


Fig. 14: Regulation form at some EU countries (Source: D. Gillen, H.M. Niemeier, 2006)

Country	Airport	Form of regulation	Single/dual till
South Africa		Price cap	single
Malta	Malta	Price cap	dual
Hungary	Budapest	Price cap	dual
Australia		Reserve	dual
Canada		-	-
New Zealand		Reserve	
USA		-	-

Table 17: Regulation form at some extra-EU countries. (Source: Gillen, Graham)

The initial regulatory framework for the privatized Australian airports was fairly similar to that adopted by the UK airports, but in this case 100% of the charges were allowed to be passed through to the airlines. There was also a dual till rather than a single till. The Australian airports used the basket tariff rather than the revenue yield approach. The price cap was supposed to last 5 years after its approval, but the Australian regulatory framework had more formal conditions relating to airport access and quality of service monitoring (Forsyth, 2004). Unfortunately, this regulation system entered a severe crisis after the 9/11 and the bankruptcy of former Australian's second largest carrier (Ansett) and therefore in October 2001 the Australian government suspended the price regulation at all but the four largest airports (Sydney, Melbourne, Perth and Brisbane). APC's final report recommended that price regulation should be replaced by a light-handed price surveillance provided that airports would not abuse their freedom. (A. Graham, 2008)

The US is the largest aviation market in the world and has what appears to be the least progressive airport governance and regulatory institutions. The US is essentially a cost-of-service form of regulation although airports that still adhere to the principles of residual financing are under a single till form of price-cap regulation. The US form of indirect regulation provides incentives for neither static nor dynamic efficiency. The use of revenue bonds by airports, which are owned by municipal or regional governments, for investments in capacity can have a deleterious impact on downstream airline competition. The reason is airlines provide the bond guarantees and this in turn gives the airline some power over capacity investment.

Canada's lack of formal airport regulation stems from the Canadian form of airport governance. As it was presented in the previous chapter, the Canadian federal government has been devolving airports since the mid-1990s but it did not want airports to be privatized.

The government chose a not-for-profit model: fees and charges are not regulated or subject to review; Airport Authorities are allowed to set charges but all the revenues must be reinvested; new airport infrastructure have to be financed only through the Airport Improvement Fee (AIF). This policy was experimented at Vancouver, Edmonton, Calgary and Montreal airports and subsequently extended to the remaining Tier 1 airports. (D. Gillen, 2008)

In the United Kingdom, only BAA owned airports in London (Heathrow, Gatwick, Stansted) are under some form of regulation at present. Regulation at Manchester airport was suspended in 2009 as the Department of Transport's review established that Manchester airport's market power was not so extensive. As for Manchester, airports which do not have enough market power are not regulated according to UK's government decisions although the CAA is allowed to take measures against non-regulated airports would they engage in any anti-competitive practices such as unreasonable discrimination between users, artificially low prices in order to influence competition with neighboring airports or the use of their market power against airlines operating at their sites.

The process of price-capping ensured that annual price increases would be limited to the *CPI - X* formula, where the value of the factor *X* comes under review every 5 years. During the 5 year regulation period, the airport operator is allowed to profit from efficiency improvements without having to reduce prices. The CAA establishes the value of *X* after consulting with the Competition Authority and the airlines. When a new terminal or runway is planned, the Civil Aviation Authority (CAA) allows the airport to increase its prices above *RPI-X* to reflect the increased cost of the new facilities. Nevertheless, A. Graham in her book (2008) states that UK's regulation is gradually drifting to an ROR form with revenue yield method.

The value of the factor *X* is set to guarantee a minimum level of profitability consistent with the cost of capital. This profitability is calculated on the basis of predictions of the following elements (Starkie, 2004): air traffic at the airport; total revenues; operating expenses (taking into account potential efficiency improvements) and investment plans for the following years.

The latter two elements are used to determine the regulated asset base.

A major impact of this single till regulation at the London airports has been that the commercial aspects of the business have been considerably expanded which has simultaneously led to a substantial reduction in real charges to airline users. Since 2003, a specific price-cap formula has been established for each airport so as to avoid the distortions caused by cross-subsidies between BAA airports. It was also decided that there should be rebates for users were certain service quality standards not achieved.

Airport	**1987-1991**	**1992-1993**	**1994**	**1995-1996**	**1997-2002**	**2003-2008**
Heatrow	-1	-8	-4	-1	-3	6,5
Gatwick	-1	-8	-4	-1	-3	0
Stansted	-1	-8	-4	-1	1	0
Airport	**1986-1992**	**1993-1994**	**1995**	**1996-1997**	**1998-2002**	**2003-2009**
Manchester	-1	-3	3	-3	-5	-5

Table 18: Evolution of UK price cap factor *X* at regulated airports (Source: Graham)

The regulation process in the UK is complex because there are two regulators involved, both independent of the Ministry of Transport (Graham, 2008). There is the sector regulator with detailed knowledge of the aviation industry, the Civil Aviation Authority (CAA), and the Competition

Commission that is a very experienced more general trading regulator, appointed by the government to advise and monitor the CAA.
It is the Competition Commission that undertakes the detailed review of the airports' operations every 5 years and then offers advice to the CAA about the level of price control. The CAA takes the final decision after a consultation. Whilst the skills of these two regulators should be complementary, the two bodies have not always been in agreement: for example in 2001 the CAA asked for the shift from single till to dual till but the Competition Commission rejected the proposal.
In general, the owners of the firms responsible for managing German airports have been either the federal, regional or local governments, in variable proportions. Since 1990, the main driver behind the change in the ownership structure of Germany's airports has been the disinvestments (trough concessions) made by the federal government.
No legal framework operates to condition the price regulation of airports in Germany (Müller, Konig and Müller, 2008): two federal laws establish that the prices charged by airports should be approved by the corresponding regulatory agency.
Contrary to the rest of Europe, regional governments (rather than the federal government) are responsible for regulating airport prices. Thus, there is a potential conflict of interests with the regional governments acting as both regulator and airport manager.
Some regional regulatory agencies have implemented rate-of-return regulation, while others have implemented price-cap regulation. In both cases, a formal consultation process between airlines and airports is conducted before charges are finally approved.
Some partially privatized airports, including Dusseldorf, Frankfurt, Hamburg and Hanover, have entered into private contracts with their airlines. Anyway, these contracts require the approval of the regional regulatory agency; they are in force for relatively short periods (4-5 years)

and envisage an annual adjustment of prices according to a *CPI – X* formula. The factor *X* takes into account both parties' past and future costs and revenues (Niemeier, 2002; Gillen and Niemeier, 2008; Müller, Konig and Müeller, 2008) through, usually, a sliding scale method.

Fees must be levied according to the principles of cost-covering, public transport policy and appropriateness. This raises the problem that incentives for cost-cutting are limited. (Heymann, 2006) The majority of German airports follow a single till regulation policy, whereas Hamburg and Frankfurt have implemented dual-till regulation. (J. Müller, T. Ülkü and J. Živanović, 2009)

Aeropuertos Españoles y Navegación Aérea (AENA) is a public firm, dependent on the Ministry of Transport, which owns and manages on a centralized basis more than 40 commercial airports in Spain. AENA and the Ministry of Transport take all the relevant decisions regarding airports including investments, charges and slot allocations (thus disabling competition between airports).

The prices charged by the Spanish airports to the airlines are, therefore, proposed by AENA and ratified by the Spanish Parliament.

In theory airport charges are based on the total costs of all airports managed by AENA. However, in practice these charges are approved by Parliament, so they are annually adjusted in line with charges for other public services.

The Spanish CAA sets the goals of national airport policy but it has no power in setting charges. Finally, there is no consultation process between airports and airlines for the fixing of airport charges.

The evolution of airport charges is not associated to the evolution in costs and this is one of the reasons why AENA has recently experienced several economic downturn. A recent issue is the forecasted partial privatization of AENA or at least of some of the profitable assets (namely Madrid and Barcelona airports) to recover partially the debt, but due to the worldwide crisis nothing has been decided yet. (G. Bel, X. Fageda, 2010)

2. Services provided by airport management

The functions and responsibilities at airports vary according to the airport's size. Here we provide a short list of the main functions and offices present at a target mid to big-size airport; each function is under the responsibility of a duty manager who reports straightforward to the CEO of the airport.

- Security, immigration, health & custom: they are general services usually provided by the State. They should be accorded the full cooperation of airport management. At some airports, an airport police or security force may exist to cooperate in providing or to provide itself certain functions.
- Safety: airport management have to close cooperate with the flying squad, the rescue and fire-fighting team in case of accidents and emergencies.
- Air traffic operation: the function deals with the movement of aircraft apporaching the airport, taxing on the runway and taxiways from/to the apron and after take off. In addition, meteorological services, pilot briefings and aeronautical documentation and information are provided. This services, as well as the previous ones, are often the responsibility of the State in which the airport is located.
- Administration and finance: this function is usually responsible for overall management of personnel and general administrative matters including management of buildings and land and the supply and managements of stocks. It is also responsible for accounting, budgets, budgetary control, the assessment and collection of charges and other revenues as well as making payments and possibly the operation of airport data processing systems.
- Corporate affairs: this function is appointed the administration of relations with governmental entities, rental and leases of airport land, concessions and other legal matters.

- Operations: the function is invested with either the duty of actually providing handling services or with a supervising role when one or more handling agencies are present at the airport. In both cases, information to passengers and airlines as well as other services are provided through the Operation office: scheduled and un-scheduled inspections of the airport's infrastructures as well as decisions about operative restrictions or closures of the airport to commercial traffic in specific circumstances.
- Infrastructures: this function assures maintenance services for airport installations, equipment and it also supervises civil engineering work at the airport. The maintenance area covers the internal equipment of the air terminal (baggage belts, stairways, heating and conditioning systems), the external equipment (lights, ILS, meteorological equipment) as well as airport vehicles and ground handling equipment. The engineering area is responsible for the definition of the master plan and for the planning of works and repairing at the airport.
- Business, Strategy & performance: this function is responsible for the definition of airport's long term objectives as well as of development and investment plans. Moreover, it deals with the assessment of airport's performance, comparing results with forecasts, budget and trying to understand the rationales behind the improvements or deteriorations of the services.
- Human resources: this function deals with the management of the working force at the airport.
- Traffic & marketing: this function's aim is to promote the airport to the airlines, to develop and manage commercial agreements and contracts with existing and new airlines wishing to start operation from/to the airport.
- Public relations: this function's aim is to promote the airport to general public, through the use of the web, media, advertising, brochures and guided tours of the airport.

Therefore, to summarize, three main activities take place at an airport:

- essential operational services and facilities like air traffic control system, meteorological services, telecommunications, police and security, fire, ambulance and first aid services plus runways, aprons, taxiways, grounds and buildings maintenance;
- handling services to aircrafts and to passengers;
- commercial activities.

While the first and the second activity fall into the aeronautical services group, the latter category is clearly not related with aeronautical operations.

The activities included in the first group determine the degree of safety in airport operations and hence they are considered essential and “at the core” of the airport business. Most of these activities, even at partially privatized airports, are under the jurisdiction of the Central Government entities. With reference to the activities concerning airside infrastructures’ maintenance, there are differences among the countries: indeed, these activities may rest within the scope of the airport management or not, depending on the degree of control the Central Government has on the airport operations.

Handling aircraft related activities include ramp handling, cleaning, the provision of power and fuel and the loading and unloading of luggage and freight; passengers related handling activities refer mainly to check-in and boarding operations (differences between countries are present as not everywhere check-in activities are run by handling agencies’ personnel) and the processing of passengers, baggage and freight through the terminal building.

The definition of commercial activities involves a lot of services that might be located either at the terminal building or around the airport: duty free shops, retails, restaurants and bars, leisure services, hotel accommodation, banks, car rental, parking services, conference and communication facilities (O. Betancor, R. Rendeiro, 1999).

2.1 – Ground handling

This function concerns the airport management only for those airports that provide all or part of the ground handling services at the airport. Otherwise, after liberalization (for EU countries, after 1996 and only at certain conditions), handling agencies (or airlines themselves) have been allowed to enter the market; thus the airport management's responsibility is to monitor the provision of the services and the level of service provided. The function may be separated into terminal handling and ramp handling. If the airport management provides straightforwardly handling services to airlines and passengers, these activities might be considered part of the Operations function. In terms of staff employed, this is actually one of the most important activities at airports. As it has been anticipated above, several activities are ground handling related; some out of those might be partly or wholly subcontracted.

The majority of handling agencies operating as a third part (n°1 and n°2 being the airport and the airline) at airports is private owned, but they offer a public utility service. The Standard Ground Handling Agreement (SGHA) is a standard document which airlines, airport management and handling agencies refer to when establishing a ground handling service at an airport. The SGHA defines and shortlists the activities a target ground handling agency should provide; as it is possible to note from Table 19 below, additional security services and catering are not part of these activities.

GROUND HANDLING ACTIVITIES		
AIR SIDE		LAND SIDE
baggage handlig	refuelling	check-in operations
cargo and mail handling	cleanings of the aircraft	boarding operations
transport of passengers from terminal to aircrafts	ramp agent	transfer of transit passengers
aircraft loading/unloading	pushback	cleanings of the terminal
in-flight pilot briefing	balance of aircraft at take off	customers care

Table 19: Ground Handling services (Source: Masutti, 2009)

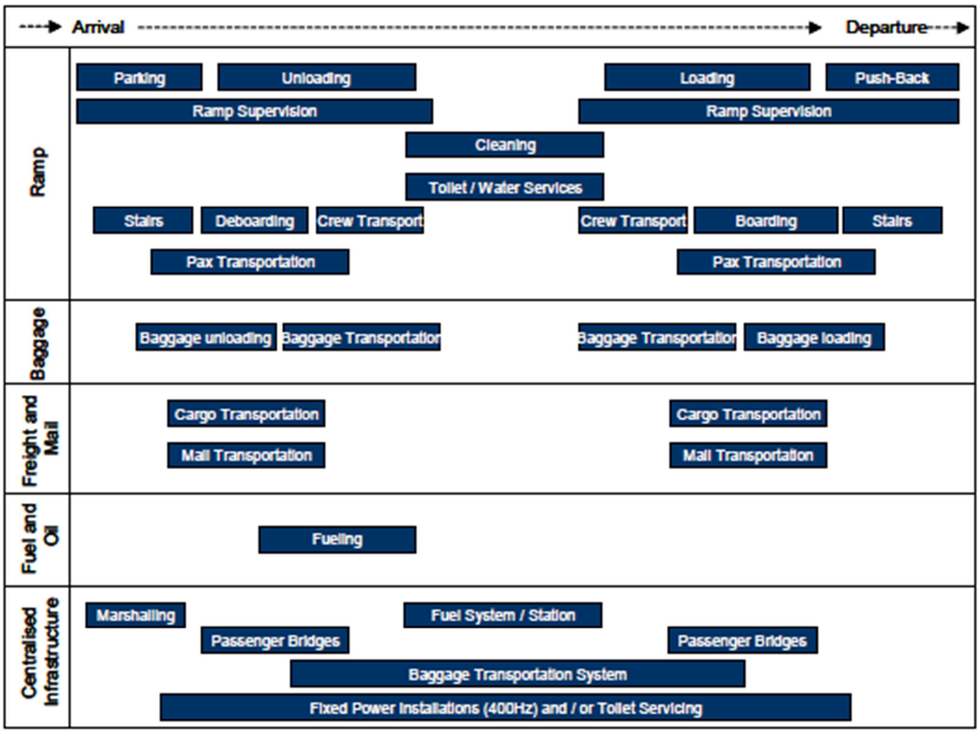


Fig. 15: Gantt diagram for handling activities (Source: Airport Research Center, 2009)

The EU Justice Court, in 2002, established and confirmed that handling agencies have to comply with the CE Treaty in terms of competition (Sentence 24 Oct 2002, C-82/01 against Aéroport de Paris). Ground handling activities were liberalized in principle, in 1996 with the Directive 96/67/CE that permitted self-handling and the presence of handling providers at airports. Up to 1996, handling services at airport were, as most of airport activities, monopolistically provided by airport management with self-handling usually permitted only to the national carrier: thus, there was only one handling agent and discriminatory practices and higher prices charged to airlines were frequent. This trend was particularly evident at southern countries' airports in the EU (Spain, Portugal, Greece, Germany, France and Italy among others) if compared with Netherlands and UK, where a partial liberalization had already taken place. The directive had not been issued with the aim of allowing the presence of an indefinite number of competing agencies: indeed, the number of handling agencies allowed to operate at a target airport was set according to safety issues and airside capacity; nevertheless at least 2 agencies should exist.

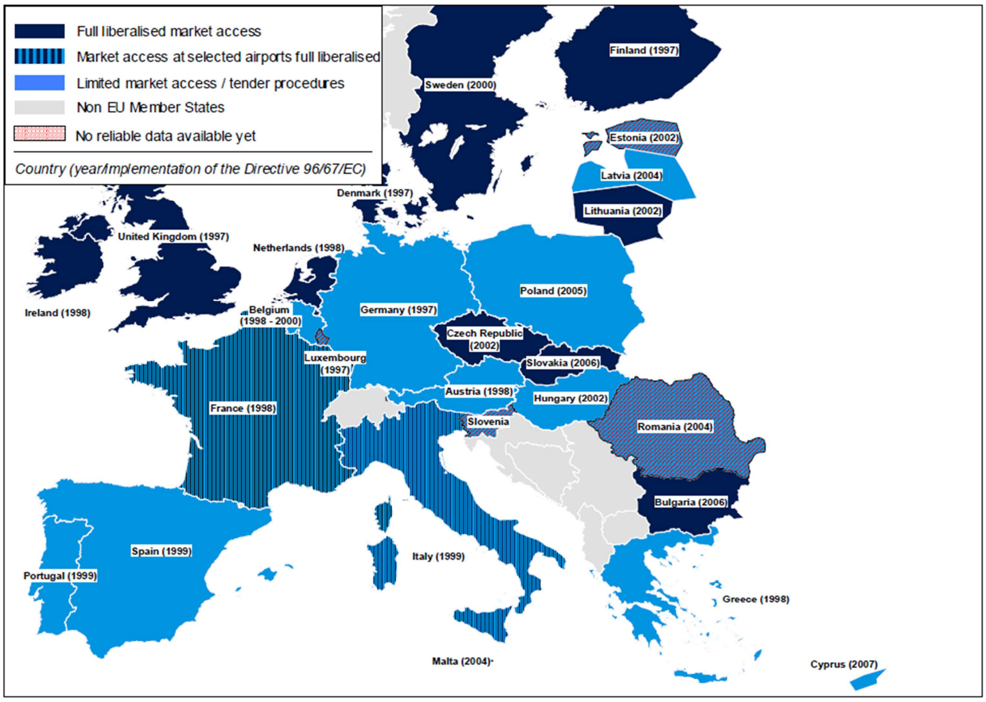


Fig. 16: State of the art of GH liberalization in Europe (Source: Airport Research Center, 2009)

	EU COUNTRIES
Unlimited market access	Denmark, Finland, France [(*)], Ireland, Netherlands, Portugal [(*)],
Limited market access over 2 mil. Pax/year	Austria, Belgium, Bulgaria, Cyprus, Czech Rep., Germany, Greece, Hungary, Poland, Slovakia, Spain, Sweden, UK
Limited market access over 1 mil. Pax/year	Estonia, Latvia, Lithuania, Luxembourg, Malta
Subcontracting always allowed	Belgium, Bulgaria, Denmark, Estonia, Finland, France, Germany, Ireland, Italy
Subcontracting limited / allowed with license	Austria, Cyprus, Czech Rep., Hungary, Latvia, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden
Subcontracting prohibited	Greece
[(*)] at major airports limited access is in force	

Table 20: Market access to GH Services in the EU (Source: Airport Research Center, 2009)

The guidelines established by the Directive 96/67 are:

- at least 2 third part handling enterprises operating at airports handling more than 3.000.000 pax/year (or more than 75.000 tons of freight/year);
- gradual application;

- temporary dispensations are afforded in case of capacity shortage;
- unbundling, that is to say the legal and accounting separation between handler and airport management in order to avoid cross-subsidies;
- additionally, from 2001 onwards, at least one supplier must be independent from the airport's management body and from any dominant airline (market share of more than 25% of total airport passengers during one year period) at the specific airport;
- the provision of self-handling applies to every airport in the Community. Moreover, for airports with either more than 1 million passengers/year or 25.000 tons of freight/year, member states are allowed to limit the number of self-handling airlines to no fewer than at least 2 for the following categories: baggage handling, ramp handling, fuel and oil handling, freight and mail handling.

Eurocontrol estimates that Ground handling activities have the following impact: revenues 50 billion€ worldwide, at least 60.000 employed in Europe, airlines expenditures for ground-handling services is from 5 to 12%. The "Airport Package" presented at the end of 2011 provides different solutions to solve the problem of lack of efficiency at airports:

- increased choice of ground-handling solutions at EU airports plus full opening of the self-handling market. At large airports and for restricted services, the minimum number of service providers will increase from 2 to 3;
- the airport managing body would be established as coordinator of ground services and so he would be in charge of setting minimum quality standards. Subcontracting rules would be further clarified;
- provisions to strengthen the training and stable employment conditions of staff;

- mutual recognition of national approvals for ground-handlers issued by Member States to break down barriers to providing services across borders;
- greater transparency in airports' charging mechanism for airport centralized infrastructures and clarification of conditions on which airports can provide ground-handling services themselves.

Country	Airports whose annual traffic is more than 2 million passengers or 50.000 tons of freight in 2008
AUSTRIA	Wien
BELGIUM	Brussels, Charleroi, Liege, Oostend
BULGARIA	Sofia
CYPRUS	Larnaca
CZECH REP	Praha
DENMARK	Copenhagen, Billund, Aarhus, Aalborg, Esbjerg, Bornholm
ESTONIA	
FINLAND	Helsinki
FRANCE	Paris CDG, Paris Orly, Nice, Lyon, Marseille, Toulose, Bale-Mulhouse, Bordeaux, Nantes, Beauvais
GERMANY	Berlin tegel, Schonefeld, Bremen, Dortmund, Dusseldorf, Frankfyrt, Hahn, Hamburg, Hannover, Koln, Munchen, Stuttgard, Leipzig, Nurnberg
GREECE	Athens, Iraklio, Thessaloniki, Rodos, Corfù, Kos, Chania
HUNGARY	Budapest
IRELAND	Dublin, Shannon, Cork
ITALY	Rome Fiumicino and Ciampino, Milan Malpensa and Linate, Venice, Bergamo, Catania, Naples, Palermo, Bologna, Pisa, Verona, Turin, Cagliari, Bari
LATVIA	Riga
LITHUANIA	Vilnius
LUXEMBOURG	Luxembourg
MALTA	Luqa
NETHERLANDS	Amsterdam, Maastricht
POLAND	Warszawa, Krakow, Katowice
PORTUGAL	Lisboa, Faro, Porto, Madeira
ROMANIA	Bucarest
SLOVAKIA	Bratislava
SLOVENIA	
SPAIN	Alicante, Barcelona, Bilbao, Fuerteventura, Girona, Gran Canaria, Ibiza, Lanzarote, Madrd, Malaga, Menorca, Palma de Mallorca, Sevilla, Tenerife norte, Tenerife sur, Valencia
SWEDEN	Goteborg, Stockholm Arlanda and Skavsta
UNITED KINGDOM	London Heatrow-Gatwick-Standsted-Luton-City, Manchester, Birmingham, Edinburgh, Glasgow, Bristol, East Midlands, Liverpool, Belfast International and City, Newcastle, Aberdeen, Leeds, Prestwick

Table 20: EU Airports falling under the Directive 96/67/CE (Source: Official Journal of the EU)

2.2 – Non-aeronautical activities

Airport revenues from non-aeronautical activities consist of fees for the rights to operate businesses at the airport, rental of leased land and premises and receipts from commercial activities operating off the airport but relying on airport traffic for their customer base. The current financial reporting at airports makes it difficult the measurement of non-aviation revenues as there is no homogeneity in the definition of the activities to be taken into account among authors in scientific literature. Privatized or partially privatized airports have proved capable of providing more detailed information than small publicly owned airports, as they are legally required to disclose those information (M.J. Zenglein & J. Muller, 2007). Usually the definition of retail activities includes shops, food and beverage. In most world regions the most significant single revenue item is retail, except in North American where car parking (31%) and car rental (14%) are more important. (Airport Council International, 2007). Moreover at North American airports, food & beverage has a greater share than in Europe.

Over the years, the development of commercial revenues at airports has been highly dependent on two key factors: commercialization/privatization and airlines' pressure for the lowering of aeronautical charges. Therefore the need to cut cost and the possibility to better exploit the commercial potential of the terminals have led the way to innovative terminal design.

According to the Airport Council International (ACI) annual World Airport Economic Surveys, commercial revenues accounted for 46% in 1995, peaked at 54% in 2000 and then fell at a slow pace but almost constantly to 47% in 2008.

However the importance of commercial revenues varies by global region: in 2006, commercial revenues on average represented 53% of all revenues at North American, African and Middle Eastern airports, compared to 48% in Europe and 46% in the Asian/Pacific region. By contrast in the Caribbean and Latin America they only represented 29% of all revenues. Even then these regional figures hide very considerable differences between individual airports. (Graham, 2009).

In Fig. 17 and Fig. 18 it is possible to analyze the commercial revenues' structure from an ACI's worldwide analysis in 2007 and a further analysis restricted to EU airports in 2008 and 2009. From Table 21 we can derive the fact that, at EU airports, revenues have been slightly diminishing but the split between aeronautical and non-aeronautical revenue didn't change.

In 2009 aeronautical revenues worldwide declined by 2,5%, while non-aeronautical revenue sources generated around -1,5% revenue when compared to 2008. Aeronautical revenue from passenger and airline user charges accounted for 53,5% of industry wide income, while non-aeronautical revenues worldwide made up 46,5%.

Revenues from the core commercial areas rose by 3% in 2009, driven by retail (+2%), real estate (+10%), car rental concessions (+9%) and Food & Beverage (+7%). Car parking (-3,5%) and advertising (-11%) revenues dropped (Annual Analysis of the EU Air Transport Market, 2010).

Several authors agree in considering the use of the non-aviation revenues' share misleading to express a performance index of an airports because, as it has been said before, airports experiment different operational and accounting structures according to the country they are located in.

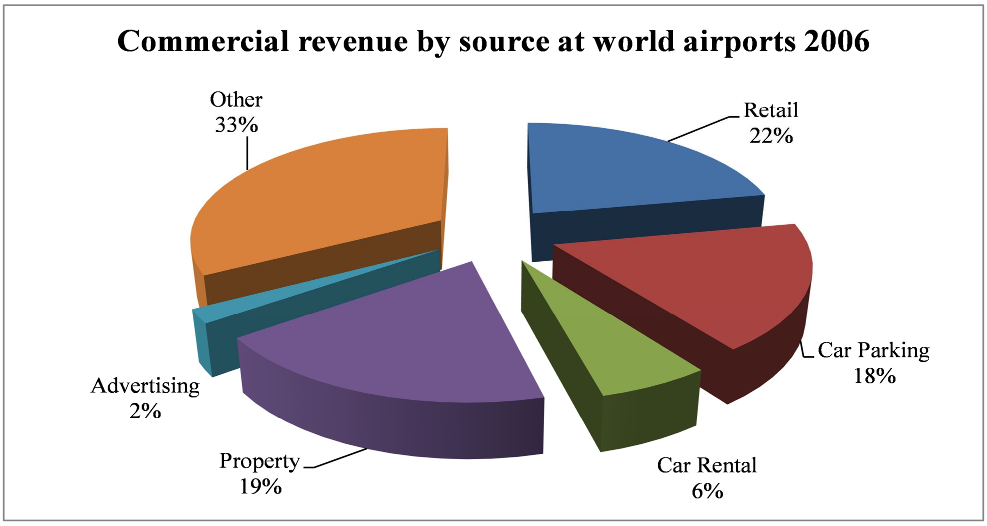


Fig. 17: Commercial revenue by source at world airports (Source: ACI, 2007)

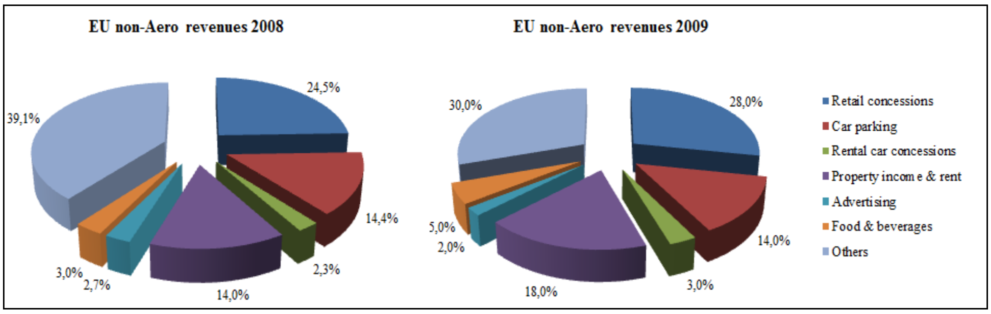


Fig. 18: Commercial revenue by source at EU airports, 2008 versus 2009 (Source: ACI Europe Economic Reports)

EU Airports 2008 vs 2009	2008		2009	
	billion €	%	billion €	%
Total revenues	26,9	100%	26	100%
Aeronautical revenue	14,3	53%	13,9	53%
Non-aeronautical revenue	12,6	47%	12,1	47%

Table 21: EU Airports general sources of revenue in 2008 and 2009 (Source: ACI Europe Economic Reports)

Within each global region and each country, commercial revenues will vary according to a multitude of factors including the volume and nature of traffic, dwell time and stress levels, contractual agreements with commercial concessionaires and space/location considerations. As it has been anticipated, the economic regulation of a target airport is a crucial aspect in the assessment of the commercial revenues: indeed, the single till approach considers all revenues while the dual till treats separately aeronautical and commercial activities. A study conducted by Vogel and Graham (2006) at 31 EU airports found that the commercial revenues' share is deeply related to the traffic output: below 4 million passengers the share was 35%, between 4 and 20 million passengers it was 45% and finally it was 56% for those airports over 20 million (Vogel and Graham, 2006). The Airport Retail Study of 2006–07, which covers airports from all major world regions, found that commercial revenues/passenger were nearly twice as large for airports handling more than 20 million passengers/year if compared with airports of less than 10 million (The Moodie Report, 2007).

In general, it has been experimented that commercial revenues (and, therefore, profits) at airports are deeply related – as happens for air passengers demand also – to security scares and to economic conditions.

The last decade or so has been particularly challenging for airport commercial managers: in 1999 intra-EU duty and tax sales were abolished, the further expansion of the EU to eastern countries fostered this phenomenon, bureau de changes outlets at airport have been diminishing since the adoption of the Euro, terrorism's menaces introduced periodic shocks in traffic demand and restrictions in the items (and in their quantities) passengers were allowed to carry onboard. Finally, cheaper on-line sales and increasing restrictions on tobacco or alcohol had an impact on the kind of product sold.

Passengers terminal are more crowded and dwell time have been increasing due to the strengthening of security controls, but space can be earned or saved thanks to new technologies like on-line check-in and kiosks (N. Gualandi, L. Mantecchini, F. Paganelli, 2009 and 2011).

The pressure on cost reduction exerted by airlines due to both the "low cost threat" and the rising fuel costs has been encouraging airport to take additional steps to exploit their commercial potential: additional facilities are being provided or concessioned and, if economically sustainable, "aerotropolis" are gaining importance in the world scenario (Kasarda, 2001-2006-2011). Business parks, enterprise zones, supermarkets, cinemas, restaurants as well as participations in other core activities in the surrounding areas are for sure a vital area to invest money in. Moreover, a growing interest is being paid nowadays also to the working force of the airport. This provision permits the airport management a more profitable use of the building and land spaces other than the terminal.

It is important to note that giving in concession or leasing terminal spaces to retail, shops, advertisement, offices and other premises occupied by airlines or governmental agencies and food & beverage is also a form of private participation at airport but those private investors don't have any decision power nor representatives in the airport's management board. At 100% public owned airports, though, these are the unique private stakeholders (as it largely happens at USA airports). Normally, as it may happen for example for hotels and other facilities, airports own the space where the facility is located or the facility itself but they contract out the expertise to operate it while retaining ownership and collecting the revenues generated. Airports may also be interested in making the concessioners or lessees responsible for finishing and furnishing the premises they occupy, obviously in conformity with airports' plans not to alter harmony and architectural balance in layout appearance.

Food & beverage facilities are likely to earn significant market shares in the future as a crescent number of airlines (not only LCCs but also NCs) is giving up with the provision of on board catering. The service they provide will have a crescent impact on passengers' perception of the airport as a whole and therefore they have to be appropriately designed and located so as to attract passengers but also provide 0-km and high quality food in order to improve passengers' opinion.

"Walk-through" shops near the departure lounge and the boarding area have been developing at many airports and other are re-designing their terminals in order to canalize the passenger flow into those shops, avoiding retail offer duplication and providing greater choice for passengers.

Attention is placed on advertising revenues: the increased ability to transport easily and quickly passengers within an airport giving them the possibility to peruse their surroundings. Jet bridges, floors, revolving doors, baggage claim areas are useful place for advertisement provided that they don't compromise the signage.

Normally duty free are only for departing passengers, but recently some airports placed duty free also for arriving passengers or off airports, but they have to comply with customs laws and regulation.
Airports' websites are the last form of advertisement: from mere information providers on scheduled times they are now capable of giving information also on shops and retail sitting.

Leasing contracts concerned with the occupation and use of airport property are usually less complex in terms of variety of terms, although in some cases certain clauses may need to be expressed in greater detail among those the provisions for periodic reviews of the rental charges and the reversal of ownership to the airport management when the contract expires. Repossession might also take place if the lessees defaults on payment, due to operational requirements or in public interest.
The length of the contract period would normally be influenced by the type of business involved: longer terms contracts would usually be offered in cases where significant investments are involved.
While the length of concession contracts vary from 1 to 5 years. Leases of airport premises are usually for somewhat shorter periods, while for the rental of airport land involving the construction of buildings by the lessee, the general range appears to be 10-40 years. Generally, contracts are renewable, to permit the lessees to amortize the usually large investments involved. (ICAO, 2006)

2.3 – Operating expenses and source of revenues at airports

Airport balances usually distinguish between aeronautical revenues and non-aeronautical revenues. Not everywhere it is possible to find cohesion between accounting reports of different countries due to differences in treating the single items. For example, handling revenues are usually treated as aeronautical revenues unless handling is undertaken by handling agents or airlines' personnel but its associated revenues (rent or fee based on turnover) are included under rents or concession. Same issue might concern the incomes received by the airport from fuel companies or from airlines as fuel refueling fees.

Overall, landing and passenger fees are by far the most important aeronautical revenue sources. Most of the non- aeronautical revenue comes from concessions and rents. (Graham, 2008)

From airports balance sheets, it is usually possible to identify the three separate cost items: labor, capital and other operating costs. In this field too, there is no consistency between the relative influence of each item on the total, nor certainty about which operations does each item fall in. For example, labor cost might include also handling staff at those airports that provide handling while this same voice is not considered at airports where handling activities are outsourced to third part handlers.

If we establish a comparison between US and Europe in terms of aviation revenues sources, aircraft landing fees and fuel charges are common items; revenues stemming from the rents and the leases of land, terminal space or hangars used by airlines are more important at US airports, while incomes from passengers charges, handling services (generally speaking, only at smaller airports but the national law has to be taken into account) and ATC services are present only at EU airports. Table 22 below explains the situation at some notable airports in Europe, Americas and the rest of the world.

For most US airports, the airport charges represents less than 30% of revenues and the staff costs are also less than 30% of total costs. Elsewhere in the world the situation is more mixed: the Australian and New Zealand airports tend to generate just less than half their revenues from aeronautical sources whereas the Mexican airports are very reliant on this source. The share of staff costs for most of the airports tends to be comparatively low relative to European airports which reflects both minimum involvement in additional activities (as for Australia) and lower local labor costs (as for Mexico) (Graham, 2008)

Airport	Revenue shares (%)			Cost shares (%)		
	Aero	Rents	Non-aero	Labour	Depreciation	Other
EUROPE						
Amsterdam	61		39	20	21	59
Basel-Mulhouse	47		53	21	30	49
Birmingham	56		44	32	23	45
Berlin	64		36	39	16	45
Cologne	73		27	39	15	46
Copenhagen	50		50	51	20	29
Dublin	37		63	36	12	52
Florence	75		25	44	19	37
Frankfurt	62		38	56	13	31
Geneva	48		52	41	18	41
Glasgow	54		46	34	17	49
London Gatwick	43		57	28	18	54
London Heathrow	48		52	23	22	55
London Standsted	43		57	34	22	44
Manchester	50		50	25	27	48
Milan	58		42	32	28	40
Oslo	46		54	20	28	52
Paris	60		40	37	16	47
Rome	59		41	35	24	41
Salzburg	77		23	42	19	39
Vienna	76		24	53	18	29
Zurich	52		48	33	20	47
USA						
Atlanta	10	23	67	29	21	50
Baltimore	23	31	46	14	38	48
Boston	20	33	47	25	35	40
Chicago O'hare	29	33	38	24	29	47
Dallas fort worth	40	14	46	25	39	36
Detroit	28	15	57	23	37	40
Houston	25	45	30	22	42	36
Indianapolis	20	22	58	28	45	27
Las vegas	8	33	59	34	20	46
Los angeles	27	21	52	45	13	42
Memphis	36	34	30	18	50	32
Miami	16	56	28	33	24	43
Minneapolis	17	22	61	24	50	26
NY JFK	28	41	31	16	18	66
NY La guardia	35	25	40	25	12	63
NY Newark	25	40	35	18	25	57
Orlando	8	25	67	19	35	46
Philadelphia	24	45	31	22	32	46
Phoenix sky harbor	13	24	63	22	27	51
Seattle	14	42	44	25	39	36
Washington dulles	14	34	52	24	33	43
Washington reagan	17	35	48	31	29	40
OTHERS						
Auckland	48		52	29	35	36
Christchurch	49		51	30	38	32
Melbourne	47		53	28	48	24
Perth	41		59	19	65	16
Sydney	49		51	11	35	54
Thailand	67		33	16	43	41
Hong Kong	48		52	20	41	39
Indonesia	80		20	46	12	42
Mexico asur	71		29	19	35	46
Mexico gap	81		19	18	40	42
Mexico oma	81		19	13	59	28
South africa	55		45	30	39	31

Table 22: Revenue and cost structure at some world airport, 2006-2007 (Source: Graham)

Many of the cost and revenues structures are somehow inversely dependent on the airports' traffic throughput. Although, at small airports the impact of fixed costs will push up the unit costs because the traffic levels will be certainly lower.

An ICAO survey found that, on average, airports with more than 25 million passengers generated 58% of their revenue from non-aeronautical sources compared with the sample average of 36%. (O. Betancor, R. Rendeiro, 1999)

Costs associated with international passengers tend to rise as this type of traffic requires more space in the terminal for customs and immigration, and in effect these passengers have to spend longer time in the terminal. Toms' research (2000) showed that the cost associated with an international passenger is likely to be 1,62 times greater than the cost of domestic passengers and 1,36 times greater than that of a EU passenger; nevertheless international passengers tend to spend more money on commercial facilities thus pushing up unit revenues.

Economic comparisons in any industry have to acknowledge the accounting policies adopted by individual operators as a different ownership form usually means a different accounting form: airport's land might be considered as an airport asset or not as well as the depreciation rate of building might differ significantly.

Landing charges → In most cases this fee is weight-related on the basis of maximum takeoff weight (MTOW) or maximum authorized weight (MAW). The simplest method is to charge a fixed amount unit rate (e.g. US$ per tons) regardless of the size of the aircraft. This approach favors smaller aircraft since tonnage tends to increase faster than aircraft capacity but also airlines which have high load factors or seating capacities.

Some airports use the "ability to pay" principles, that is to say that airlines with larger aircraft will pay higher charges.

Very few airports, finally, have adopted a movement-related charge which tends to be very unpopular with airlines flying small aircraft types. Notable variations consist in a fixed charge for all aircrafts above a certain weight.
Elsewhere other airports modulate landing charges by time of day to reflect the peaking of demand.
The amount of landing charge normally includes also a contribution for lighting and ILS.
ATC charges → typically this charge is related to the weight of the aircraft but this appears quite unusual as each aircraft movement, regardless of the size of the aircraft, imposes the same costs on the ATC infrastructure. Alternatively, the airline will directly pay the ATC agencies and the airport operator will not be involved in the financing of ATC services at all.
At some airports, domestic or short-haul services have traditionally paid a reduced landing fee. This is not a cost-related charge but it tends to exist to figure a support to local and regional services and sometimes is comparable to a subsidy. The European Commission is against the setting of different landing charges for domestic and intra-EU traffic, because it would be contrary to the principles of the Single Market.
Passenger charges → these charges are most commonly levied per departing passenger for the use of the terminal and passengers processing facilities. The French airports have four types of charges, namely domestic, Schengen-EU, non-Schengen-EU, and international.
As with the landing charge in some cases, there may be political or social reasons for keeping down the cost of domestic travel as well. Historically, such policies are often maintained to subsidize the national carrier although domestic passengers usually generate less commercial revenues. A number of airports charge a smaller fee for transfer passengers while elsewhere this fee is waived hook (ACI-Europe, 2003a, b).
Ground handling and fuel charges → Airlines, in addition to landing and passenger fees, pay ground handling fees for the provision of specific

services (extra-cleanings, power supply …) and a fuel charge levied by the fuel companies if they are independent of the airport operator (at certain Middle Eastern airports, the fuelling is provided by a government agency).

These fees are usually negotiable and the prices depend on: the size of the airline, the scale of its operation at the airport and whether the same fuel company serves other airports used by the airline.

If the airport management provides handling services, the incomes from the charges will be recorded as aeronautical activity while if handling activities are provided by a third part operator, the airline will pay the airport management only the rental of the structure; thus the revenues will be recorded as non-aeronautical.

Security charges → the provision of security services may be performed – according to the country's law - by a government agency, by the airport's employees or by a private company or airlines.

In some countries, security costs are financed directly by the airport operator who will have a special security charge or include it in the passenger charge.

Other charges

- Parking charge → it is a charge collected from aircraft operators for the parking of aircraft on the apron or for their housing in airport-owned hangars, including any revenue from the leasing of such hangars to aircraft operations. The amount usually depends on the weight of the aircraft or on its wingspan. There is normally an hourly or daily charge with, perhaps, a rebate for using remote stands or un-congested slots. Most airports charge airlines after the 4th hour to allow them to turnaround without incurring any fee.
- Air-bridge fee → it is typically charged per movement or on the basis of the actual time of utilization.
- Cargo charges → they are based on the weight of loaded or unloaded cargo

- Fire-fighting fee → it is levied on those airlines wishing to do refueling with the transit passengers on board at unsupplied airports. In those cases, fire-fighting brigade has to be in the proximity of the aircraft in event of mishandling that might lead to a fire.
- Noise related charges: a growing number of airports have noise-related surcharges or discounts, associated with their landing charges, as a result of increasing concerns about the environment.

Government taxes → finally, airlines or their passengers often have to pay an additional government tax, which is different from the airports' passenger charge. This taxes might stand for some airport service or investment project; notable examples are the Government Airport Development Fund in Greece, the tourist tax on international arriving/departing passengers in Mexico, Hong Kong, Australia, UK, France, Denmark (the fee is usually differentiated for economy and business class passengers). (Graham, 2008 and ICAO Airport Economics Manual, 2006)

Table 23 shows that the different sources have a different % weight in the total amount of taxes depending on the continent.

	Europe	Americas	Africa, Australia, Middle East
Landing	24	11	29
Air Traffic Control	7	3	3
Passenger	36	11	50
Security	10	5	4
Other (park, terminal use ...)	7	15	6
Taxes	16	55	8

Table 23: Relative % importance of different aeronautical charges and taxes by world region (Source: Graham)

From the airports' management point of view, the following are the main sources of revenue from non-aeronautical activities (ICAO Airport Economics Manual, 2006):

- Aviation fuel and oil concession → for distributing aviation fuel and lubricants
- Restaurants, bar, cafè and catering services concessions → for operating restaurants bars and catering services at airports
- Duty free shops (in or outside the airport) concessions plus the revenues collected from duty free shops operated by the airport itself
- Automobile parking paid by commercial enterprise for the right to operate parking facilities at the airport or any revenues derived from such facilities when operated by the airport itself
- Rentals paid by enterprises for the use of airport owned building space, land and equipment (check in desks, offices, power plant supply)
- car rentals, banking and exchange bureau as well as admission fees charged for entry to areas of special interest or guided tours
- Other revenues from non-aeronautical activities

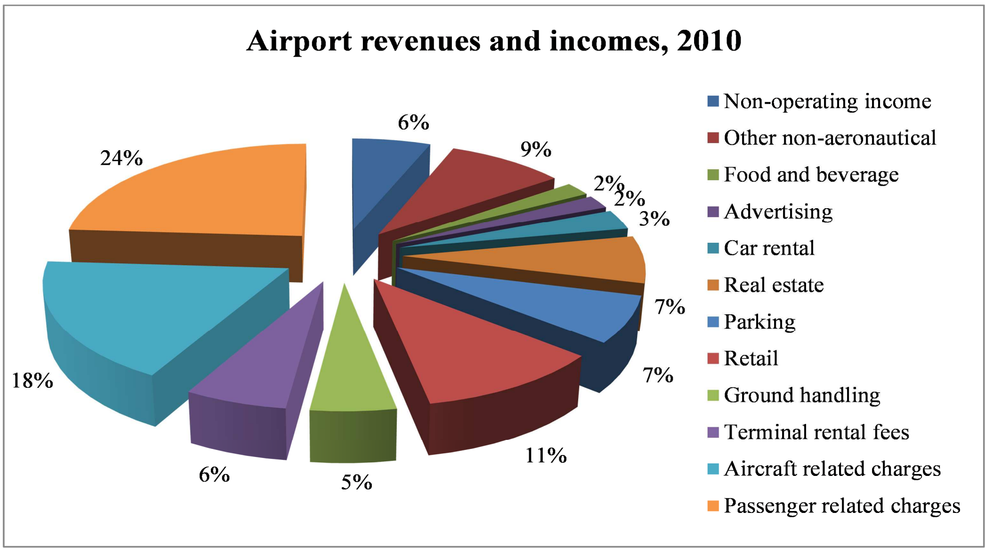


Fig. 19: Airport revenues and incomes worldwide - 2010 (Source: ACI Europe Economic Report, 2010)

3. Remarks on competition

In chapter one and two the key topics regarding air traffic and airport market competition have been analyzed.

In this paragraph a quick summary is provided before shifting the attention on the case study and analyses made.

The four topics investigated are: airport privatization, airport regulation, forms of state aid and ground handling. A fifth topic, slot allocation, exists as well but it has not been taken into consideration for the following reasons:

- it is currently under review by regulators;
- it is a topic related both to the airports' and the airlines' side;
- it does not impact on the whole lot of airports worldwide but only on the congested ones. It is clear that, nevertheless, if the air traffic demand meets the IATA forecasts up to 2030 this topic will have a considerable impact on a growing number of airports.

According to many authors, four forms of competition might be taken into account:

- Hub competition: passengers can choose between different airlines to fly through different hubs to their long haul destination. Airports compete between each other trying to attract airlines to operate from/to the target airport. Although, hub competition is limited by an high switching cost for airlines because hubbing is an expensive investment. Moreover, while in the Americas and large Asian countries the hub switch is at least likely, in the EU this a remote possibility as European hub and spoke networks are still deeply related with former national carriers (Burghouwt and de Wit, 2005).
- Hub and secondary hub: for example Heathrow versus Manchester or Frankfurt versus Koln. Traffic rights played an important role in the past

since, ante recent open skies agreements, only major airports were designated as landing points in air service agreements. Thus, hub airports gained a material competitive advantage on secondary airports.

- Primary and secondary airport: it takes place when a relatively large airport competes against a mid-sized secondary airport, provided that the passengers target is the same and the airport management bodies are independent. A notable example is the competition between Vienna and Bratislava; Vienna attempted to buy Bratislava, but the *Slovak Competition Authority* rejected the opportunity. (Forsyth et al, 2009)
- Potential competition: In competitive markets with strong growth and persistent excess demand, entry would occur and competition would be intense.

The commercialization of airports led to concession, partial or full privatization of airport ownership. It has been proven positive and efficient in proposing a new form of designing, planning, financing and managing airports. Although, commercialization is an attractive option only for profitable airports.

The divestiture of airports' share by local government may also be intended as a source of revenue to cover or reduce budgetary deficits due to the lack of funding from central government at several countries.

Privatization is possible as well in non-aeronautical activities; the aim will be to offer the passengers improved and efficient services through, for example, a periodic assessment of retail operators' performance. The passengers' opinion would be a critic factor in deciding the renewal of contracts. Shorter duration of concessions and leases might be another driver for high quality of service and competition.

The aim of profit maximization relies also on the improvement of airport infrastructures. The use of scientific methods and the analysis of passengers flows and dwell times are key issues airport managements have to take into account. The presence at the airport of an open-minded and improvement-oriented engineering board might be useful to cut cost and work efficiently.

In general competition creates positive effects, but it does not imply good results. Airport competition can certainly increase welfare in many cases but it might result in tight oligopolistic markets. The divestiture of airports' assets and the transfer of ownership from central government to local authorities has proven not to be the solution to the problem of operational and accounting efficiency of airport. Many authors claim that partial privatizations (with the government/local authority detaining the majority share) together with the regulation power still in the hand of a non-independent authority might cause inefficiencies but also harm the interests of private partners. Strategic decision should be made on the basis of operational requirements rather than on political interests. Cross interests, lack of transparency, unclear development programs and legislative framework as well as asymmetric information are all together capable of distorting the market and the competition.

Regulation plays an important role as it safeguards private investors from opportunistic behavior (Wolf, 2003) and reduces conflicts and litigations (Niemeier, 2004). This is certainly relevant for countries with a relatively high density of airports (for example the UK, Germany and Italy), but not for countries like Russia, Australia, New Zealand, Canada and China.

Countries with a high density of airports could experiment such a fierce competition that regulation would not be necessary anymore, were the system fair (Starkie 2008, Malina, 2009). Regulation ought to be complementary to a slow developing process of competition: regulation criteria should be periodically revised. Regulation must be designed to be compatible with airport competition. Therefore it is necessary to establish independent regulators in order to permit a balanced exchange of information on costs and demand forecasts.

Airports might influence regulation to receive subsidies, erect barriers to entry in order to keep their monopolistic power and their high revenues and profits; moreover, cost regulation, cost orientated monitoring and revenue sharing agreements does not encourage competition. Price caps set upper limits, but airports are allowed to react to shock and competition changing the price structure. Price cap form is also supposed to have strong incentives for cost savings and efficient pricing and investment.

In some instances, airport entities have been established without being given the necessary financial autonomy: all the revenues are deposited directly to a common national treasury's account resulting in the airport then having to apply for all funds required to cover airport expenses. This tend to significantly reduce the incentive of airport management to develop new revenue sources or increase income from existing sources. Financial independence, on the contrary, permits and encourages airport managements to exercise closer control over revenues and costs. It also offers the possibility of negotiating loans best suited to meeting the airport's needs (provided the entity is empowered to negotiate its own loans).

Competition in the long run needs enough capacity to accommodate traffic from other airports. Therefore the regulation of investment, environmental management and planning restrictions become important: over-development of infrastructures is not an efficient way to boost the local economy as developments must be consistent with the demand. Otherwise, airports go in the red because the traffic is far lower than the planned capacity. Uncontrolled competition is due to create lack of cooperation and exacerbated focus on local interest between municipal governments that would rather to cooperate. Therefore, privatization must be tempered with public interests.

An airport charging policy has its greatest impact on airline operations when taking into consideration the existence of airport incentive schemes or discounts offered to encourage demand growth especially at regional and secondary airports on determined routes. This incentive aims at attracting airlines that would have never chosen to use the airport otherwise. Such discounts are, in many cases, a critical factor in low-cost carriers' choice of a suitable airport for their operations.

State aids are not allowed if they distort competition. The aid provided might take the form of grants, interest relief, tax relief or preferential access to services but also restructuring aid and exclusive rights concessions. Aid is allowed to be provided under some conditions, such as a regional development program, but such aid must be available to all parties.

In November, the EU Commission authorized, as rescue aid, a loan facility of 52 million € for Air Malta. By May 2011, the Maltese Authorities must present a restructuring plan, or a liquidation plan, or proof that the aid has been reimbursed.

In the aviation market, subsidies can take a number of forms: cross-subsidies from profitable airport to loss-making ones as decided in Spain by AENA; central government assistance (as for Schiphol, Charleroi and Strasbourg); capital subsidies; route support in the form of cheaper landing charges, guarantee of a target load factor (that is to say that the airlines decides to start operations from a target airport provided that the airport or the local authority guarantees a target load factor; if this target is not reached, the local authorities pays the airline a fee)

Bel and Fageda (2010) show that the prices set by private, non-regulated airports were higher than those set by either public airports or regulated private airports. This phenomena might be explained with a certain degree of market power at private non-regulated airports or with the fact that prices at public airports (especially when basic regulation is in force) are kept artificially low.

Ahmed Fadlaoui's research on the impact of price regulation on airport charges demonstrates that airports with a high number of passengers are likely to charge higher prices. This is in accordance with general views in literature provided by Bel and Fageda (2009) and Bilotkach et al. (2010): congested airports with heavy volumes of traffic are most likely to fix high prices and this is particularly truer at hub airports if compared with medium sized and regional airports; this happens thanks to the less competition hub airports face from other transport modes due to their high volume of passengers on long haul connections. Price cap regulated airports charge lower prices than airports regulated by the rate of return regulation scheme.

Directive 2009/12/EC of the European Parliament and of the Council of 11 March 2009 on airport charges is aimed at creating a common framework for the regulation of airport charges at EU airports. It shall apply to any airport located in a territory subject to the Treaty whose annual commercial traffic is over 5 million passenger and to the most congested airport in each country if its commercial traffic is under the above-mentioned threshold.

This directive shall not apply to charges related to air navigation, ground handling and assistance to disabled passengers and passengers with reduced mobility.

Airport charges must not discriminate between airport users, although they may be modulated for issues of general and public interest or environmental interest.

The managing body of an airport network may decide to introduce a charging system to cover the entire network in a transparent manner.

An airport managing body shall be authorized to apply a common and transparent charging system for airports serving the same urban community.

Consultation shall take place at least once a year (unless agreed otherwise) with respect to airport charges, level of charges and quality of service

Airport users shall be informed about the components serving as a basis for determining the level of charges (services and infrastructures, revenue, presence of any financing from public authorities) and whenever plans for new infrastructure projects are finalized. On the other hand airlines have to inform the airport management body about their traffic forecasts, fleet and development projects.

EU countries shall be required to establish an independent supervisory authority which ensures the correct application of the measures.

The Council Directive 96/67/EC of 15 October 1996 on access to the ground handling market at Community airports applies to all Community airports open to commercial traffic whose annual traffic is not less than two million passenger movements or 50.000 tons of cargo.

The managing body of an airport, the airport user or the supplier of ground handling services must, under the supervision of the designated auditor, rigorously separate the accounts of their ground handling activities from the accounts of their other activities.

The Member States may:

- set up, for each of the airports concerned, a committee of representatives of airport users to represent users' interests;
- require that suppliers of ground handling services be established within the Community; they may limit the number of suppliers authorized to provide categories of ground handling services such as baggage handling, ramp handling, fuel and oil handling, cargo and mail handling;
- reduce to two the number of users able to provide self-handling for ground handling services such as: baggage handling, ramp handling, fuel and oil handling, cargo and mail handling;
- benefit from exemptions (limited in time) where at an airport, specific constraints of available space or capacity make it impossible to open up the market and/or implement self-handling;
- reserve for one body, under certain conditions, the management of the centralized infrastructures which cannot be divided up or the cost of which does not allow for duplication. In parallel, subject to certain conditions, Member States may grant exemptions to airports where

specific constraints make it impossible to open up the market and/or implement self-handling to the degree provided for in the Directive;

- oblige the supplier chosen at an airport to also operate on islands forming part of the territory of the Member State;
- subject the activity of suppliers of ground handling services to the requirement to obtain a license issued by a public authority independent of the airport, in order to guarantee safety, security, environmental protection and compliance with social legislation;
- take the necessary measures to ensure that suppliers of ground handling services and airport users wishing to self-handle have access to airport installations. Where access to these installations is subject to a fee, the fee shall be determined according to relevant, objective, transparent and non-discriminatory criteria.
- adopt, subject to the other provisions of Community law, the necessary measures to ensure the protection of workers' rights and respect for the environment.

Historically, ground handling was a monopoly provided by either the airport (Germany, Italy…) or the airline (national carrier), as in Spain.

The push for opening the market to competition came from carriers, while the airports had to “bite the bullet” as in many cases their profits were reduced.

The outcomes differed across countries: in the UK the market became completely open, in Germany the airports lobbied and obtained that only one independent competitor would be granted access to the market; in Spain one independent provider was allowed to break the former monopoly of the national carrier. In France, Airport de Paris kept its monopoly while at other airports the market was opened to independent handlers.

The Study on the Impact of Directive 96/67/EC on Ground Handling Services 1996-2007 commissioned to Airport Research Center and released in February 2009 highlighted that:

- the number of third party handling provider increased in each of the limitable categories (baggage, freight and mail, ramp handling, oil and fuel) whereas the growth between 1996 and 2002 was higher than in the period between 2002 and 2007.
- The number of handling airlines increased as well, with a slight exception in the freight and mail handling category between 1996 and 2002 (-1 handler) and in the fuel and oil handling category (-1 airline) in the second period.
- In general, the ground handling prices at airports decreased following the introduction of the Directive and the subsequent increase in competition.
- The trend of decrease in prices is maintained thanks to competition pressure at airports covered by the Directive; however the extent to which prices decreased was influenced by other factors such as improvements in ground handling technology or competition between airports to serve as hubs for airlines (GH are in competition even if they are not at the same airport).

4. Definition of a sample of airport to analyze and understand air transport market worldwide

In this thesis, a sample of countries has been taken into account to represent the situation of airport ownership and management at different parts of the world. Passengers traffic and aircraft movements are the most important indicators collected from available sources and for a significant time span. In most cases, the time span considered is 2005-2010 (2011 data are not available yet or are somehow partial); although, there are countries in which the disclosure of traffic data is compulsory and therefore time series are available. On the other hand, the data collection for countries in which air transport is still little liberalized has been incomplete and therefore the results drawn are only partially significant.

Only airports compliant with the two following criteria have been taken into account for each country:

- being in the top 10 airport of the target country with reference to passengers traffic and aircraft movements;
- beyond the top 10 airport, other airports are considered significant only provided that their traffic output is bigger than 5 million passengers/year

In most of the cases, there were not 10 or more airports handling more than 5 million passengers; so only the first criteria has been used in defining the sample. This is probably due to the huge number of secondary airports that makes the market fragmented, to the presence of a significant hub and to the scarce attitude to flight in certain countries. For China, USA, India and Brazil also the second criteria has been used to avoid omitting airports which processed a significant share of the country's air traffic. It's no coincidence that the threshold of 5 million passengers/year has been chosen: indeed, the Directive 2009/12/EC of the European Parliament and of the Council of 11 March 2009 on airport charges apply to airport handling more than 5 million passengers. This threshold has been overdrawn to the whole sample of extra EU airports in order to make comparison between consistent data. Data processing has been done in order to collect some useful indexes and information; the results will be presented partly in the following paragraph and partly in chapter 4:

- Research on airport / airport management body ownership on the basis of the distinction provided in chapter 1. With reference to Italy, the evolution of the sharing system is presented for the period 2005-2010 in order to highlight trends. News and recent developments will be presented and thoroughly explained in chapter 3. Moreover, judgment verdicts passed by Competition Authorities and Regulators will be reported. The aim of this research is to determine the actual partition of airport governance methods at the airports taken into consideration.

- With the help of the search engine www.flightstats.com scheduled flights on a typical working day (Tuesday, Wednesday, Thursday) of a winter season's mean month have been collected. Departing and arriving flights have been separated, a further distinction has been made according to airline. The search engine provides also information on aircraft, difference between Scheduled Times and Estimated Times or Scheduled Times and Actual times of arrival / departure (enabling thus to draw information on airport's or airline's delay).
- Given that an aircraft movement is one departure and one arrival, a research on this data has been done to find the % incidence of each airline during a typical day; in particular top1, top2, top3, top5 and top10 airlines' % incidence has been calculated. The greater the number of an airline's movement, the greater is its operational impact on the airport. For each airport the Normalized Herfindahl–Hirschman index has been calculated in order to draw information on the airline movements concentration. The grater the NHHI, the stronger is the presence of the dominant airline at the target airport.
- The distance between the target airport and the target country's principal airport has been measured to draw information about the passengers traffic concentration in the vicinity of the nation's principal airport (a maximum distance of 500km for EU country and of 1000km for the others has been considered).
- Thanks to the tool available on the website http://www.wessa.net/co.wasp, Gini index and Lorenz curve during time have been calculated for the whole countries analyzed with reference to

passengers and movements. This way, a numerical and graphical comparison of the results has been possible.

- For each airport, the top-to-down airline movements rank has been taken into account. Starting from the top, only airlines contributing to reach the threshold of 80% of the total movement were considered. The more frequently a target airline is taken into consideration, the higher is its market share in that country. The kind of service provided by each airline has been reported too (National/network carrier, Low cost, Charter, Freight, Regional).
- For each airport only the top5 airlines with reference to movements have been taken into account. The first gets 10 points, the second 8 points, down to the fifth that takes 2 points. The main parameters taken into consideration have been the total score and how many times the target airline got points. The total score by the relative frequency (that is the ratio between the target airline frequency and the number of airport taken into account for the target country) has been named Dominance Index. For each country, airlines are ranked with reference to the Dominance Index.
- At EU airports and only for the year 2010, the potential attractiveness of the airports has been calculated as the ratio between the passengers carried and the population living up to 25km far from the airport. For those cities served by more than one airport (Paris, London, Milan, Frankfurt, Rome …) the numerator will be the sum of the passenger handled by the airports.

Below it is reported the list of the countries taken into consideration. The airports considered for each country will be mentioned in the next paragraph together with the information about airport / airport management body ownership:

- Africa: traffic is still too much gathered at the principal airport of the country to make the secondary airports interesting for our analysis; moreover very few airports – sometimes, not even the principal ones - were compliant with the second criteria. Finally air transport industry is at an embryonic stage, with a persistent dominance of national carriers. IATA is urging African countries to remove the barriers to liberalization.
- Americas: Brazil, Canada, USA
- Asia: China, India, Turkey
- Australia
- Europe: France, Germany, Italy, Spain, United Kingdom

5. Airports' ownership and management at the countries taken into account

The distinction between public and private is not homogeneous among different countries (ACI Europe, 2010):

- a Public Limited Company (Plc) may be quoted on the stock exchange and be owned by a large number of private individuals (alongside pension funds etc);
- concession companies have their assets held by different organizations, generally at least one of those is within the Public Sector (central/federal or provincial/regional Government as well as local). Moreover, airport concessions are based on the rental of the land on which the airport stands but also they often bring with them an obligation to develop new facilities, ownership of which at the end of the concession passes to the grantor of the concession;
- the airport operator may be a government department, an airport authority with a degree of independence from government but ultimately controlled by it, or may have been corporatized into a Joint Stock

Company (JSC) and comply with all/most laws applying to commercial companies. Those associated with a JSC often regard it as being private, even though part of its shares may be owned by government (perhaps through some wider state holding company or national pension or property fund).

In this paragraph the aforementioned countries taken into consideration will be analyzed in terms of airport management ownership. From a general point of view, it is going to be made a distinction between:

1. Airports totally publically owned
2. Airports with mixed ownership, with the majority of the shares in public hands
3. Airports with mixed ownership, with the majority of the shares in private hands
4. Airport totally privatized

No distinction will be made then at this stage between the different level of public ownership as it has been already presented in chapter 1. Likewise, no distinction has been made between the different path of privatization, that is to say for example concession versus privatization via IPO or some forms of PPP. Specifications will be added on a case by case basis.

The three countries analyzed in the Americas show a vast majority of public ownership: the central government is directly involved only in Brazil but the process of privatization is still at its start.

In both USA and Canada the management of the airports' structures has usually been entrusted to local authorities (cities administrations or counties administrations) and multi-purpose authorities (port authorities). Private airports might, on the contrary, be privatized. The substantial difference between Canada and USA lies in the ownership of the land: in Canada it usually is still in the hands of the government through TC (Transport Canada) while in the USA local entities and authorities own also the land the airports are situated on.

In Tables 24,25,26 it is possible to find the airports taken into consideration at those countries.

12 Brazilian airports handled more than 5 million passengers in 2010 and have been considered; in 2005 only 4 airports reached that traffic output thus highlighting that Brazil is one of the fastest growing countries in the world with reference to air traffic. As it has been previously said in chapter 1, Brazil is starting considering the idea of airport privatization as well as other countries in South America. In the case of Brazil the main rationales are the forthcoming World Cup in 2014 and Olympic Games in 2016 which are expected to bring with them a huge increase of passenger and traffic demand that existing infrastructure are seen – at present – not capable to comply with.

Brazil

BRAZIL			
Airport	**IATA code**	**Management**	**Kind**
São Paulo-Guarulhos	GRU	Infrastructure and Investment Holdings SA	3
	49%	Infraero	
	51%	Invepar	
		ACSA global ltd - Airports Company South Africa	
Brasilia	BSB	InfrAmérica	3
	49%	Infraero	
	51%	Engevix Participacoes SA	
		Corporación America SA	
Viracopos	VCP	Brazil Airports Consortium	3
	49%	Infraero	
	51%	TPI Triunfo Participacoes e Investimentos SA	
		UTC Holdings SA	
		EGIS Airport Operation	
Congonhas-São Paulo	CGH	Government managed - Infraero	1
Rio de Janeiro-Galeão	GIG		
Santos Dumont	SDU		
Deputado Luis Eduardo Magalhães	SSA		
Tancredo Neves	CNF		
Salgado Filho	POA		
Guararapes-Gilberto Freyre	REC		
Afonso Pena	CWB		
Pinto Martins	FOR		

Table 24: Brazilian airports taken into consideration, IATA code, management and ownership (Source: Author)

10 Canadian airports (only the top 5 airports handled more than 5 million passenger in 2010, the 10th Canadian airport is comparable to a small Italian secondary airport like Genova or Alghero - ranked 22nd in Italy).

Canada

CANADA			
Airport	**IATA code**	**Management**	**Kind**
Toronto Pearson	YYZ	Greater Toronto Airports Authority	1
Vancouver	YVR	Vancouver International Airport Authority	
Calgary	YYC	Calgary Airport Authority	
Montréal-Pierre Elliott Trudeau	YUL	Aéroports de Montréal	
Edmonton	YEG	Edmonton Airports	
Ottawa Macdonald-Cartier	YOW	Ottawa Macdonald-Cartier International Airport Authority	
Halifax Stanfield	YHZ	Halifax International Airport Authority	
Winnipeg James Armstrong Richardson	YWG	Winnipeg Airports Authority	
Victoria	YYJ	Victoria Airport Authority	
Kelowna	YLW	City of Kelowna	

Table 25: Canadian airports taken into consideration, IATA code, management and ownership (Source: Author)

55 airports in the USA, by far the country with the highest number of airports handling more than 5 million passengers/year due to the considerable surface of the country, to the distances between the principal cities and to the weight of USA in the world economy. Those reasons explain why airport traffic output has been constantly over the threshold of 1,3 billion passengers/year for a long time, that is approximately equal to the total population of China (National Bureau of statistics of China, 2010).

USA

UNITED STATES OF AMERICA			
Airport	**IATA code**	**Management**	**Kind**
Hartsfield–Jackson Atlanta	ATL	City of atlanta - department of aviation	1
O'Hare	ORD	City of chicago - chicago airport system	1
Los Angeles	LAX	City of Los Angeles - Los Angeles world airports	1
Dallas/Fort Worth	DWF	Cities of Dallas (63,6%) and Fort Worth (36,4%) - DFW Airport Board	1
Denver	DEN	City & County of Denver - Department of Aviation	1
John F. Kennedy	JFK	City of ny - Port Authority of New York and New Jersey	1
George Bush Intercontinental	IAH	City of Houston - Houston Airport System	1
McCarran	LAS	Clark County	1
San Francisco	SFO	San Francisco Airport Commission	1
Phoenix Sky Harbor	PHX	City of Phoenix - Phoenix Airport System	1
Charlotte/Douglas	CLT	City of Charlotte - Charlotte	1
Miami	MIA	Miami-Dade County - Miami-Dade Aviation Department	1
Orlando	MCO	Greater Orlando Aviation Authority	1
Newark Liberty	EWR	City of Newark - Port Authority of New York and New Jersey	1
Minneapolis−Saint Paul	MSP	MAC Metropolitan Airport Commission	1
Detroit Metropolitan Wayne County	DTW	Wayne County - Wayne County Airport Authority	1
Seattle–Tacoma	SEA	Port of Seattle	1
Philadelphia	PHL	City of Philadelphia	1
Boston Logan	BOS	Massachusetts Port Authority	1
LaGuardia	LGA	City of ny - Port Authority of New York and New Jersey	1
Washington Dulles	IAD	Metropolitan Washington Airports Authority	1
Fort Lauderdale – Hollywood	FLL	Broward County	1
Baltimore/Washington Thurgood Marshall	BWI	Maryland Aviation Administration	1
Salt Lake City	SLC	Salt Lake City	1
Ronald Reagan Washington National	DCA	Metropolitan Washington Airports Authority	1
Chicago Midway	MDW	City of chicago - chicago airport system	1
San Diego	SAN	San Diego County Regional Airport Authority	1
Tampa	TPA	Hillsborough County Aviation Authority	1
Portland	PDX	Port of Portland	1
Lambert-St. Louis	STL	City of St. Louis	1
Memphis	MEM	Memphis - Shelby County Airport Authority	1
Kansas City	MCI	City of Kansas City	1
Oakland	OAK	Port of Oakland	1
General Mitchell	MKE	Milwaukee County	1
Cleveland Hopkins	CLE	City of Cleveland	1
Raleigh-Durham	RDU	Raleigh-Durham Airport Authority	1
William P. Hobby	HOU	City of Houston - Houston Airport System	1
Nashville	BNA	Metropolitan Nashville Airport Authority	1
Sacramento	SMF	County of Sacramento	1
Austin-Bergstrom	AUS	City of Austin	1
John Wayne	SNA	Orange County	1
San Jose	SJC	City of San Jose	1
Louis Armstrong New Orleans	MSY	City of New Orleans	1
Pittsburgh	PIT	Allegheny County Airport Authority	1
San Antonio	SAT	City of San Antonio Aviation Department	1
Cincinnati/Northern Kentucky	CVG	Kenton County Airport Board	1
Dallas Love Field	DAL	City of Dallas	1
Indianapolis	IND	Indianapolis Airport Authority	1
Southwest Florida	RSW	Lee County Port Authority	1
Port Columbus	CMH	Columbus Regional Airport Authority	1
Palm Beach	PBI	Palm Beach County Department of Airports	1
Albuquerque Sunport	ABQ	City of Albuquerque	1
Jacksonville	JAX	Jacksonville Aviation Authority	1
Bradley	BDL	State of Connecticut	1
Buffalo Niagara	BUF	Niagara Frontier Transportation Authority	1

Table 26: USA airports taken into consideration, IATA code, management and ownership (Source: Author)

As for China and India, these two countries have been recently undergoing, and still are, a phase of modifications and of gradual opening to the market. Together with these phenomena, also the traffic is having a quick development: in 2002, there were only 10 airports handling more than 5 million passengers/year while in 2010 that number was trebled. Likewise in India, the number of airport grew from two to six in the same period. In China there is still a strong control exerted by the central or the local government even if some forms of privatization is taking place. Where more than one airport is present at a target town, it is accepted the presence of a single management entity. 33 airports have been taken into account with regard to 2010 passengers traffic data, as it is possible to see from Table 27.

China

CHINA			
Airport	**IATA code**	**Management**	**Kind**
Beijing Capital	PEK	Civil Aviation Administration of China	2
Hong Kong - Chek Lap Kok	HKG	Airport Authority Hong Kong	1
Guangzhou Baiyun	CAN	Guangzhou Baiyun International Airport Co. Ltd.	2
	57,60%	Guangzhou Baiyun International Airport Group Company	
	42,40%	Air China	
		China Civil Aviation Airport Construction General Company	
		Guangzhou Baiyun International Airport Company Limited	
		Guangzhou Communications Investment Co., Ltd.	
Shanghai Pudong	PVG	Shanghai Airport Authority	2
Shanghai Hongqiao	SHA	Shanghai Airport Authority	2
Shenzhen Bao'an	SZX	Shenzhen Airport Company Ltd.	2
Chengdu Shuangliu	CTU	Sichuan Province Airport Group Co.,Ltd	1
Taiwan Taoyuan	TPE	Taoyuan International Airport Corporation	1
Kunming Wujiaba	KMG	Yunnan Airport Group	1
Xi'an Xianyang	XIY	XXIA	1
Hangzhou Xiaoshan	HGH	Hangzhou Xiaoshan International Airport Co. Ltd	2
Chongqing Jiangbei	CKG		1
Xiamen Gaoqi	XMN	Xiamen International Airport Group Co., Ltd.(XIAGC)	2
Changsha Huanghua	CSX	Government	1
Nanjing Lukou	NKG		1
Wuhan Tianhe	WUH	Wuhan Tianhe International Airport Co. Ltd.	1
Qingdao Liuting	TAO	Qingdao International Airport Group Co., Ltd.	1
Dalian Zhoushuizi	DLC	Dalian Zhoushuizi International Airport Co., Ltd.	1
Sanya Phoenix	SYX	Civil Aviation Administration of China	1
Ürümqi Diwopu	URC	Xinjiang Airport Group Co. Ltd.	1
Haikou Meilan	HAK	Meilan Airport Company Limited	2
Zhengzhou Xinzheng	CGO	Henan Administration of CAAC	1
Shenyang Taoxian	SHE	Shenyang Taoxian Airport Authority	1
Tianjin Binhai	TSN	Civil Aviation Administration of China	1
Harbin Taiping	HRB	Civil Aviation Administration of China	1
Jinan Yaoqiang	TNA		1
Fuzhou Changle	FOC	Xiamen International Airport Group Co., Ltd.(XIAGC)	1
Guiyang Longdongbao	KWE		1
Nanning Wuxu	NNG	Civil Aviation Administration of China	1
Wenzhou Yongqiang	WNZ	Wenzhou Airport Group Co. Ltd.	1
Guilin Liangjiang	KWL		1
Taiyuan Wusu	TYN	Civil Aviation Administration of China	1
Macau	MFM	Sociedade do Aeroporto Internacional de Macau	2
	55,40%	The Macau SAR government	
	33,03%	Sociedade do Turismo e Diversoes de Macau	
	11,57%	Others	

Table 27: Chinese airports taken into consideration, IATA code, management and ownership (Source: Author)

The situation in India is quite similar to a certain extent: the central government keeps gold share at privatized airport through the presence of AAI. The presence of international expertise has been traced at principal airports (Fraport and MAHB at Dehli Airport) together with private national interest (for example GMR at Dehli and Hyderabad Airports). Five out of seven Indian biggest airports in terms of passengers carried have been partially privatized; the other airports are still under the ownership and management of AAI. Table 28 presents the Indian sample of airports.

India

INDIA			
Airport	**IATA code**	**Management**	**Kind**
Indira Gandhi	DEL	Delhi International Airport Private Limited	3
	54%	GMR Group	
	26%	AAI	
	10%	Fraport	
	10%	Malaysia Airports Holdings Berhad - MAHB	
Chhatrapati Shivaji	BOM	Mumbai International Airport Limited	3
	50%	GVK	
	26%	AAI	
	14%	Bid services division	
	10%	ACSA global ltd - Airports Company South Africa	
Bengaluru	BLR	Bangalore International Airport Limited (BIAL)	3
	74%	Siemens Projects Ventures, Larsen & Toubro and Unique Zurich Airport Others	
	26%	AAI	
Rajiv Gandhi	HYD	GMR Hyderabad International Airport Ltd.	3
	63%	GMR Group	
	11%	Malaysia Airports Holdings Berhad - MAHB	
	13%	Government of Andhra Pradesh	
	13%	AAI	
Cochin	COK	Cochin International Airport Society Limited	2 or 3
	33,36%	Kerala government	
	66,64%	Emke Group - Galfar Group - Majeed Bukatara Trading - Synthite Group Air India, Bharat Petroleum Corporation Limited (BPCL), AAI Federal Bank, State Bank of Travancore (SBT), and Canara Bank Others	
Netaji Subhash Chandra Bose	CCU	AAI - Airport Authority of India	1
Chennai	MAA		
Sardar Vallabhbhai Patel	AMD		
Amausi	LKO		
Coimbatore	CJB		
Trivandrum	TRV		
Dabolim	GOI		

Table 28: Indian airports taken into consideration, IATA code, management and ownership (Source: Author)

As for Australia, 10 airports have been taken into account; 6 of those handled more than 5 million passengers/year in 2010 (+1 with reference to

2005) while the 10th Australian airport's traffic is - again - comparable with the traffic of Genova airport in Italy (ranked 22nd).

Airports were mostly privatized through long lasting lease agreements. The federal government kept some involvement in operation and imposed restrictions in particular on the accepted % of foreign ownership, cross ownership and airlines' ownership of airports. The land is still Government owned and airport operator are not allowed to change the usage, to carry on substantial financial activities nor developments. Usually there are a lot of shareholders, the majority of the shares must stay with Australian ownership but foreigner investors might as well detain a substantial power. Table 29 presents the ownership status at the Australian airports taken into account.

Australia

AUSTRALIA			
Airport	**IATA code**	**Management**	**Kind**
Sydney Kingsford Smith	SYD	Sydney Airport Corporation Limited	3
	22,50%	HSBC Custody Nominees (Australia) Limited	
	19,80%	Macquarie LAH Pty Ltd	
	22,90%	J P Morgan Nominees Australia Limited	
	10,70%	National Nominees Limited	
	3,10%	Citicorp Nominees Pty Limited	
	6,00%	Others	
	12,00%	HOCHTIEF AirPort GmbH	
	3,00%	Australian super funds	
Melbourne Tullamarine	MEL	Australia Pacific Airports Corporation Limited	3
	51%	AMP Capital Investors Ltd	
	33%	Deutsche Asset Management	
	16%	Hastings Fund Limited	
Brisbane	BNE	Brisbane Airport Corporation	3
	0,63%	AMP Capital Investors Ltd	
	1,27%	City of Brisbane airport corporation Pty Ltd	
	1,19%	Colonal first state Private capital Ltd	
	3,95%	CFCL Structured invest fund	
	10,41%	CFS Airport fund	
	8,06%	JP Morgan	
	3,95%	National nominees Ltd	
	4,87%	Motor trades association of Australia Super fund	
	37,38%	Gateway Investment Corporation Pty Ltd	
	12,67%	National asset management - Brisbane airport trust	
	15,62%	Schipol Australia Pty Ltd	
Perth	PER	Westralia Airports Corporation	3
	38,26%	Utilities of Australia Pty Ltd - ATF Utility trust of Australia	
	29,74%	Hastings Fund Management - Australia Infrastructure fund	
	17,34%	Utilities of Australia Pty Ltd - Perth Airport Property Fund	
	4,27%	Hastings Fund Management - TIF	
	5%	Westscheme Pty Ltd	
	3,17%	Citicorp - Officer Superannuation fund	
	2,23%	Colonial First state Private capital Ltd	
Adelaide	ADL	Adelaide Airport Limited	3
	49%	Unisuper	
	19,50%	Local super	
	15,30%	Colonial First state Private capital Ltd	
	12,80%	Industry fund management	
	3,40%	Perron investment	
Gold Coast	OOL	Queensland Airports Limited	3
	49,10%	Australian infrastructure fund	
	36,70%	Queensland-based infrastructure fund	
	14,20%	Perron investment	
Cairns	CNS	North Queensland Airports Group	3
	50%	Cairns Mackay Investment - JP Morgan	
	20%	Australian infrastructure fund	
	25%	Auckland international Airport Limited	
	5%	Perron investment	
Canberra	CBR	Capital Airport Group Pty Ltd	3
Hobart	HBA	Hobart International Airport Pty Ltd (oper)	3
	50,10%	Macquarie - MAP Airports	
	49,90%	Retirement Benefits Fund Board	
Darwin	DRW	Northern Territory Airports + RAAF	3
	55,60%	Industry Funds Management Managed Funds	
	28,23%	Hastings Funds Management/AIX	
	16,17%	Palisade Investment Partners Limited	

Table 29: Australian airports taken into consideration, IATA code, management and ownership (Source: Author)

The un-readiness of States to finance airport infrastructure and the liberalization of EU aviation has exposed airports to increasing competitive pressures. The combination of the current global economic crisis and strong long-term demand forecasts is throwing additional focus on airport financing. With public finances gradually diminishing, private sector involvement in airports is likely to increase either through the provision of privately financed facilities (such as passenger terminals) or through the partial or total sale of the airport company, be it just the operator of the airport concession or the owner of the assets.

Over 20% of European airports are already privatized or are run as a Public-Private Partnership. This applies in particular to the largest European airports. Equally significant, most publicly-owned European airports are run as corporatized entities abiding to commercial and fiscal discipline - just like any other competitive business. (ACI Europe, 2010)

Partially/Fully privatized airports in EU may be listed on the stock exchange with or without a majority shareholder. Some of them might be sold to a strategic investor, other airport operators or financial institutions.

Very often full privatization is restricted as the former public owners want to secure certain political interests to be guaranteed by a golden share or a wide ownership clause. Currently at most airports privatization consists in a PPP with the private owner detaining up to 49% of the shares or in a minority share of less that 25%. Only the airports of Bratislava, Copenhagen, Malta and Vienna are by majority private.

With reference to 100% public airports, the form of airport corporation vertically separates the airport system from regulatory functions: the Department of Transport retains direct responsibility for the establishment and enforcement of regulations but operations are assigned to a private/state owned corporation. The corporation is state-owned, but it keeps a degree of independence due to its corporate structure: airport expenditures are not to be included in the annual government budget review process, thus avoiding conflicts of interest. An example is Aéroports de Paris (ADP). While some airport corporations are wholly owned by the national government, others are jointly owned by federal and local governments (e.g., Germany, the Netherlands) and others have some forms of private participation (Italy and UK for example).

In continental Europe (EU-27 + 18 Non-EU countries) there are 404 airports, the majority of them is 100% public owned (at different level) while the 100% private owned airport are less than 9% of the total. In terms of passengers carried in the EU-27 countries, the partition between public owned airport and partially/fully privatized airport is almost equal thus highlighting the fact that airports with some forms of privatization usually are the most important ones (Frankfurt, London, Rome, Moscow …).
Among the 100% privatized airports in EU-27, 14 are in the UK.

	N° airports	Public owned	%	Mixed owned	%	Private owned	%
All	404	317	78,47%	52	12,87%	35	8,66%
EU-27	306	237	77,45%	43	14,05%	26	8,50%
% traffic		**52%**		**48%**			
Non-EU	98	80	81,63%	9	9,18%	9	9,18%

Table 30: Ownership of airport operators in continental EU (Source: ACI Europe, 2010)

With reference to the public owned airports, a further distinction is to be made between those run by public administrations and those run by Corporatized administrations (that is to say, more public entities bearing the economic risks of managing the airports). No surprise in saying that the most popular kind of administration in continental EU is the second one (even taking into consideration the shortage of public fund, but also the notable interests an airport brings with at different governmental levels).

100% Public	N° airports	Public Administration	%	Corporatized	%
All	317	81	25,55%	236	74,45%
EU-27	237	70	29,54%	167	70,46%
Non-EU	80	11	13,75%	69	86,25%

Table 31: Governance at Public owned airports in continental EU (Source: ACI Europe, 2010)

With reference to the partially privatized airports, the topic is about who has the majority of the shares: public sector, private sector or whether there is a substantial equivalence. People would say that the public sector majority is by far the most common form, but surprisingly there is not so much difference between the number of airports with public majority and those with private majority.

Mixed	N° airports	majority public	%	majority private	%	equidistribution of the shares	%
All	52	24	46,15%	20	38,46%	8	15,38%
EU-27	43	23	53,49%	18	41,86%	2	4,65%
Non-EU	9	1	11,11%	2	22,22%	6	66,67%

Table 32: Governance at Mixed-owned airports in continental EU (Source: ACI Europe, 2010)

EU-27 Countries		Non-EU Countries	
Austria	Sweden	Albania	Serbia
Belgium	Uk	Armenia	Switzerland
Denmark	Bulgaria	Belarus	Turkey
Finland	Cyprus	Bosnia-Herzegovina	Ukraine
France	Czech Rep.	Croatia	
Germany	Estonia	Georgia	
Greece	Hungary	Iceland	
Ireland	Latvia	Israel	
Italy	Lithuania	Kosovo	
Luxembourg	Malta	Macedonia	
Netherlands	Poland	Moldavia	
Portugal	Romania	Montenegro	
Spain	Slovakia	Norway	
	Slovenia	Russia	

Table 33: Countries in the continental EU as for 2010

The analysis in this thesis focuses on 5 EU-27 countries and 1 non-EU country (at present). Fig. 19 below shows the scenario of airport ownership at those countries.

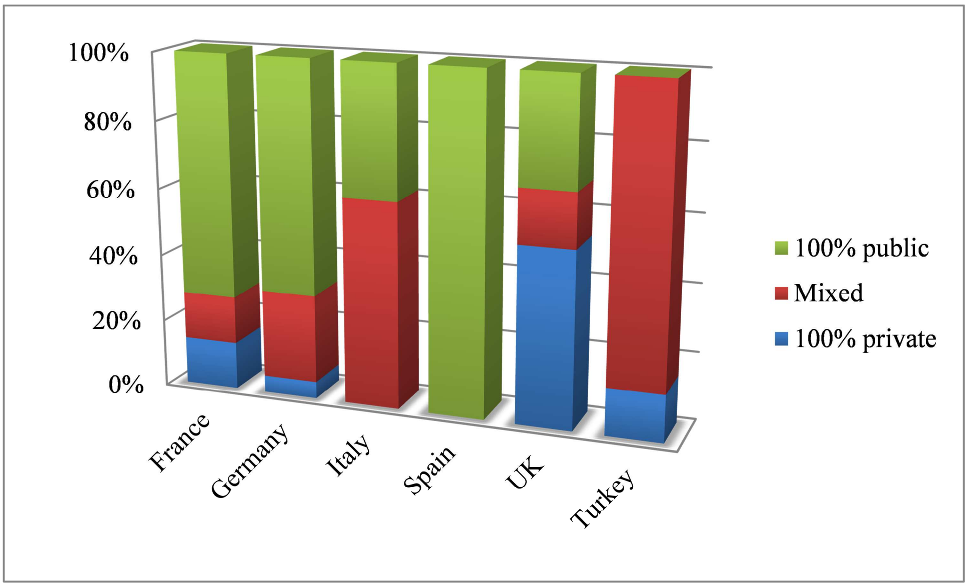


Fig. 19: Type of ownership at EU sample airports (Source: ACI Europe, 2010)

Privatization of the principal Turkish airports happened through usually short PPPs (BOT) limited to the Terminals. Except for a few exceptions, the General Directorate of State Airports Authority of Turkey (DHMI) is the owner of the land and the operator of all airside assets and facilities, while private entities operate the terminal on the basis of a temporary BOT concession. The PPPs have to be intended as mixed ownership.

Likewise, labels 3 or 4 in table 34 below, have to be intended as limited to the private shares while it is to be taken for granted that those are concessions while the ownership rests in the hands of DHMI.

The traffic is growing at a quite fast pace, but the number of airports processing more than 5 million of passenger has not changed from 2008 to 2010.

Turkey

TURKEY			
Airport	**IATA code**	**Management**	**Kind**
Atatürk	IST	TAV Airports Holding	3
Esenboga	ESB		3
Adnan Menderes	ADB		3
	26,06%	Tepe İnşaat Sanayi Anonim Şirketi	
	26,12%	Akfen Holding Anonim Şirketi	
	4,03%	Sera Yapı Endüstrisi ve Ticaret A.Ş.	
	3,52%	Other Non-Floating	
	40,27%	Other Free-Float	
Antalya	AYT	ICF Airports	4
	51%	Fraport	
	49%	IC Ictas Holding	
Sabiha Gökçen	SAW	ISG	4
	20%	Malaysia Airports Holdings Berhad - MAHB	
	40%	GMR Group	
	40%	Limak	
Dalaman	DLM	ATM Airport Construction and Management, Inc	4
		Turkuaz	
		YDA Group	
Milas-Bodrum	BJV	Turkish Republic General Directorate Of State Airports Authority	1
Adana Sakirpasa	ADA		
Trabzon	TZX		
Diyarbakir	DIY		

Table 34: Turkish airports taken into consideration, IATA code, management and ownership (Source: Author)

Taking into consideration the 5 EU countries, it is possible to highlight some similarities:

- France and Spain are the two country with the most centralized form of ownership; in Spain the government through AENA owns and operates all the airports while in France only the airports in the so-called Ile de France are managed by the Central Government through Aéroport de Paris.
- In both France and Spain some form of devolution is taking place at present: in France, airports' management has been given – partly or as a whole, depending on the dimensions of the airports - to local Chambers of Commerce and local authorities, while in Spain the process has been forecasted for the next future (especially with the aim of taking deeply into consideration the autonomy of the Speech Communities) but is still not in force.
- Both French and Spanish innovative system of airport governance will become similar to those already adopted and in force in Germany and

Italy with each airport managed by one management entity (although some exceptions are present). As to Spain, this is true but only to a certain extent, as AENA will keep some powers that no other EU countries' regulator has even after the partial devolution of the system.

- The strongest difference between Germany and Italy lies in the form of governance: in Italy there is the Concession to operate, in Germany "Gesellschaft mit beschränkter Haftung" (GmbH) have the right to operate the airport (the current translation in English is "Limited Liabilities Company", but there are constitutional differences as well).
- In UK, the majority of airport management entities are private. Moreover it is common that a single management entity is in charge of several airports at the same time. This has led to issues about competition, so the matter is to be carefully analysed.
- 10 airports for each country have been taken into account; 6 to 9 depending on the country analysed handled more than 5 million passengers in 2010. Each country has at least one airport processing more than 20 million passengers/year, so in this analysis both main hubs and bigger secondary airports have been taken into account.

French airport system consists in local Chamber of Commerce managing the airport with the only exception being Paris, whose airports are managed by Aéroport de Paris, a government owned entity. The "White book on French regional airports" in 2002 highlighted the lack of autonomy, of central government investments and of efficiency of French airport with reference to other countries. In 2004, the government decided the devolution of small regional airports' assets to local communities; then in 2005 autonomous corporatized entities were created to manage the most important airports, namely Paris, Lyon, Nice, Toulouse and Marseille. The central government kept a substantial share at those airports, with the remaining shares split between local authorities and Chambers of Commerce. For Aéroport de

Paris, also a private investors' participation up to 47,6% is possible. As it is possible to derive from Table 35 below, French airports are either Public owned or have a mixed ownership with the majority of the shares in public entities' hands.

France

FRANCE			
Airport	**IATA code**	**Management**	**Kind**
Paris Roissy	CDG	Aeroport de Paris	2
Paris Orly	ORY		2
	56,48%	Central government	
	3,92%	Caisse des depots et consignations (CDC)	
	8%	Schiphol Group	
	21,10%	Other Institutional Investors	
	8,50%	Individual and non identified shareholders	
	2%	Company employees	
Nice Cote d'Azur	NCE	Aéroports de la Côte d'Azur	1
	60%	Central government	
	25%	Chamber of Commerce and Industry	
	15%	Local authorties	
Lyon Saint Exupery	LYS	Aéroports de Lyon	1
	60%	Central government	
	25%	Chamber of Commerce and Industry	
	15%	Local authorties	
Marseille Provence	MRS	CCI de Marseille	1
Toulouse Blagnac	TLS	SA Aéroport Toulouse-Blagnac	1
	60%	Central government	
	25%	Chamber of Commerce and Industry	
	15%	Local authorties	
Bordeaux Merignac	BOD	Société Aéroport de Bordeaux Mérignac SA	1
	60%	Central government	
	25%	Chamber of Commerce and Industry	
	15%	Local authorties	
Nantes Atlantique	NTE	CCI de Nantes-Saint Nazaire	1
Beauvais Tille	BVA	Chambre de Commerce et d'Industrie (CCI) de l'Oise	1
Strasbourg Entzheim	SXB	CCI Strasbourg et Bas-Rhin	1

Table 35: French airports taken into consideration, IATA code, management and ownership (Source: Author)

Each German airport is managed by a single management entity. The management entities' shares are in the hands of municipalities, landers, federal government or private investors. Management entities are named GmbH. Private investors are usually present at principal airports and their share is not negligible. However, the majority of the share is always public. In September 2010, Germany's competition authority fined the air carrier Condor €1.2 million for illegally fixing prices on routes to Turkey, having colluded with Lufthansa joint venture airline SunExpress. Table 36 below shows the airports taken into consideration in this analysis.

Germany

GERMANY			
Airport	IATA code	Management	Kind
Frankfurt	FRA	Fraport AG	2
	31,52%	State of Hessen	
	20,13%	City of Frankfurt	
	10,33%	Julius Bär Gruppe	
	9,93%	Deutsche Lufthansa AG	
	3,47%	Artisan Partners	
	3,02%	Arnhold and S. Bleichroeder Holdings, Inc	
	2,94%	Morgan Stanley	
	18,66%	Others	
Munich	MUC	Flughafen München GmbH	1
	26%	Central government	
	51%	State of Bavaria	
	23%	City of München	
Düsseldorf	DUS	Flughafen Düsseldorf GmbH	2
	30%	Hochtief	
	20%	Aer Rianta	
	50%	Landeshauptstadt Düsseldorf	
Hamburg	HAM	Flughafen Hamburg GmbH	2
	51%	Hanseatic City of Hamburg	
	34,80%	HOCHTIEF Airport GmbH	
	14,20%	HOCHTIEF AirPort Capital GmbH & Co. KGaA	
Cologne/Bonn	CGN	Flughafen Köln/Bonn GmbH	1
	30,94%	Central government	
	30,94%	State of North Rhine Westphalia	
	31,12%	City of Cologne	
	6,06%	City of Bonn	
	0,59%	Rhein-Sieg district	
	0,35%	Rheinisch Bergish district	
Stuttgart	STR	Flughafen Stuttgart GmbH	1
	65%	State of Baden-Württemberg	
	35%	City of Stuttgart	
Berlin Schoenefeld	BER	Flughafen Berlin Schönefeld GmbH	1
Berlin Tegel	TXL		1
	37%	State of Brandenburg	
	26%	Central government	
	37%	State of Berlin	
Hanover	HAJ	Flughafen Hannover-Langenhagen GmbH	2
	35%	Land Niedersachsen	
	35%	City of Hannover	
	30%	Fraport AG	
Nuremberg	NUE	Flughafen Nürnberg Nürnberg GmbH	1
	50%	State of Bayern	
	50%	City of Nürnberg	

Table 36: German airports taken into consideration, IATA code, management and ownership (Source: Author)

Spain is the only big EU country with a 100% centralized system of airport governance. AENA is in charge of deciding on investments and air charges, of negotiating with the airlines and with the non-aeronautical activities' providers plus handling activities and air traffic control.

AENA has substantially the highest powers among European regulators: with its decisions it stops competition between airports and hands out funding on an arbitrary basis. A new structure was proposed for AENA:

AENA will keep the air traffic control while AENA Aeropuertos SA will be created in order to manage the Spanish airports. Moreover, the major airports will have established a management board whose majority will be held by the Central Government together with members appointed by municipalities, Chambers of Commerce and autonomous regions. As AENA has control on slot allocation too, the sample of airports chosen reflects the government strategy. It is possible to note from Table 37 that among those airports 6 out of 10 are situated in islands, thus highlighting a likely strong seasonality of the traffic.

Spain

SPAIN			
Airport	**IATA code**	**Management**	**Kind**
Madrid	MAD	AENA SPA - Government owned entity	1
Barcelona	BCN		1
Palma de Mallorca	PMI		1
Malaga	AGP		1
Gran Canaria	LPA		1
Alicante	ALC		1
Tenerife Sur	TFS		1
Ibiza	IBZ		1
Lanzarote	ACE		1
Valencia	VLC		1

Table 37: Spanish airports taken into consideration, IATA code, management and ownership (Source: Author)

While Spain is the country with the highest percentage of public owned and operated airports, UK is the country where this percentage is the lowest. Indeed all UK airports are - at least partially – privatized. BAA-Ferrovial had been managing 7 airports up to 2006: London Gatwick, London Heathrow, London Stansted, Aberdeen, Edinburgh, Glasgow and Southampton; that is to say 5 out 10 airports considered in the sample, as reported in Table 38. Owning and managing 5 out of 10 major airports in the country and 3 out of 5 airports in the surroundings of the capital city has been perceived as a threat to competition by the British Competition Commission "*BAA's seven airports together account for over 60% of all passengers using UK airports. More significantly, Heathrow, Gatwick,* *Stansted and Southampton account for 90% of airport passengers in south-east England, and Edinburgh, Glasgow and Aberdeen account for 84% of airport passengers in Scotland*" that expressed "*strong criticisms both of the regulatory regime and of the way it has been applied to the detriment of users. In particular, […] the recent regulatory review […] resulted in significant increases in airport charges especially at Heathrow"*. Finally "At […] *the BAA Scottish airports […] we found a much slower development of routes than at other regional airports […] and a lack of ambition in the development of Aberdeen. […] At the south-east airports BAA currently shows a lack of responsiveness to the interests of airlines and passengers […] which is also attributable to weaknesses in the regulatory system: […] weaknesses in consultation, lack of responsiveness to the differing needs of its customers […], asymmetry of information […] and apparent unwillingness to consider options of separate terminal development, co-investment or longer-term contracts; a failure to ensure operating excellence, including a failure to market test some key activities and the likelihood of consequent higher costs than would be expected in a more competitive environment; and deficiencies in the level and quality of service, as shown also by the continued public concern about the effects of shortage of capacity, particularly at Heathrow*"

Therefore, the Competition Commission (2009) decided "*the divestiture of both Stansted Airport and Gatwick Airport to different purchasers; the divestiture of either Edinburgh Airport or Glasgow Airport; the strengthening of consultation procedures and provisions on quality of service at Heathrow, until a new regulatory system is introduced; undertakings in relation to Aberdeen, to require the reporting of relevant information and consultation with stakeholders on capital expenditure and recommendations to the Department for Transport in relation to economic regulation of airports*."

BAA-Ferrovial decided to sell Gatwick airport in 2008, even before being told to do so by the CC sentence, to GIP – Global Infrastructure Partners. which is also the owner of London City airport, and to other shareholders. BAA appealed to the Competition Appeal Tribunal and obtained a deferral of terms of the commitment to sell London Stansted. Currently BAA-Ferrovial seems oriented to divest Edinburgh airport to either Global Infrastructure Partners, JP Morgan Asset Management or a Consortium led by The Carlyle Group LP and 3i Infrastructure Plc.

United Kingdom

UNITED KINGDOM			
Airport	**IATA code**	**Management**	**Kind**
London Heathrow	LHR	BAA Ferrovial	4
London Stansted	STN		4
Edinburgh*	EDI		4
Glasgow	GLA		4
	55,87%	Ferrovial Consortium	
	26,48%	Caisse de depot et placement du Quebec	
	17,65%	GIC Special investment	
London Gatwick	LGW	Gatwick Airport Limited	4
	42%	GIP	
	13,10%	National Pension Service of Korea	
	15%	Abu Dhabi Investment Authority	
	12,70%	California state pension fund	
	17,20%	Future Fund Australia	
Manchester	MAN	MAG	1
	55%	Council of the City of Manchester	
	5%	Borough Council of Bolton	
	5%	Borough Council of Bury	
	5%	Oldham Borough Council	
	5%	Rochdale Borough Council	
	5%	Council of the City of Salford	
	5%	Metropolitan Borough Council of Stockport	
	5%	Tameside Metropolitan Borough Council	
	5%	Trafford Borough Council	
	5%	Wigan Borough Council	
London Luton	LTN	London Luton Airport Operations Ltd	4
	90%	Abertis	
	10%	AENA	
Birmingham	BHX	Birmingham Airport Holdings Ltd	3
	49%	Consortium of West Midlands local authority councils	
	28,65%	Ontario Teachers' Pension Plan	
	19,60%	Victorian Funds Management Corporation	
	2,75%	Employee share ownership	
Bristol	BRS	South West Airports Limited	4
	50%	Macquarie European Infrastructure Fund I	
	49%	Ontario Teachers' Pension Plan	
	1%	Macquarie Group	
Liverpool John Lennon	LPL	Peel Airports	4
	35%	Peel Holdings Limited	
	32,50%	Vancouver Airport Authority	
	32,50%	Citi Infrastructure Investors	

Table 38: UK airports taken into consideration, IATA code, management and ownership (Source: Author)

Chapter 3:

Current situation of air traffic market

The previous chapter ended with the characterization of the airports sample in several EU and extra-EU countries. Italy was left out on purpose in order to be presented in this chapter together with an analysis on its situation. Therefore, data collected from 2001 to 2010 on airports shareholders will be presented with reference to both the sample of the 10 airports taken into account and other secondary airports, outlining which is the most common management form in Italy and whether the system is moving or not.

Then EU and other continents' transport market will be analyzed in order to outline possible future trends and developments.

Finally, three major recent trends will be described: vertical integration between airport and airline, merging and acquisitions in order to concentrate ownership (this is a recent trend for both airports and airlines) and, as a consequence, multi airport systems. It will be highlighted the fact that the countries which have been taken into consideration have not been developing at the same pace. Talking about concentration of ownership, a quick theoretical introduction will be inserted in this chapter.

1. The case of Italy

In Italian there are more or less 100 airports, 47 of those have commercial traffic; but the principal airports taken all together handle a significant share of the national passengers traffic. As for 2010, 11 airports had more than 5 million passengers/year. Italy seems to have too much airports and moreover, not even the most important ones are comparable with other European major hubs.

The airport network is fundamental for the national economic system but, even more important is how this network is connected to the rest of the country: Italian airports are in most cases isolated from the major highways and railway junctions and provide a level of service which is seen incapable of complying with the forecasted traffic volume for 2030. The EU

Commission in 2007 highlighted the likelihood of an airport capacity crisis in the majority of EU countries; Italy is among those countries as national airports have limited infrastructures. The conclusion that should be drawn is therefore that Italy doesn't need an higher number of airports (this is seen as an expensive and economically harmful solution) but bigger and more efficient infrastructures.

The fragmentation of Italian airport network has deep roots in the pronounced individualism of the past that, unfortunately, is still present at some regions. This background led frequently to the establishment of close airports, in exacerbated contrast between each other, in open contradiction with the principles of airport system cooperation cases. Forms of cooperation – also those fostered by the Government – have not been successful.

The building of a new airport in an already served and uncongested area means a likely waste of money (which usually comes from the central government and the EU funds); moreover it would harm or stop the development of nearby airports. Airports have to be economically viable and therefore they need a sufficient catchment area of potential passengers. The Central Government seems to have realized the problem as it ordered KPMG a study on the Italian airports network in order to define a national roadmap for the development of airports. This document had never been realized before and it is perceived as a complex task due to the fragmentation of competencies at a legislative level.

Airports with more than 5 million passengers/year should be regarded as principal airports (the threshold is consistent with that established by the EU) while airports whose traffic output is under a target threshold (for example 1 million passengers/year) should be barred from commercial traffic (with the only exception allowed would be being actually essential to serve remote regions like islands) and be converted to freight or general aviation oriented airports. Other airports should be economically regulated in such a way that only profitable and efficient ones would be allowed to further develop.

In addition to that, a growing number of airports are being managed with a commercial-oriented point of view; that is to say that airport management (in the majority of the cases a mixed public-private ownership or a corporation of local entities) grants airlines (especially LCCs) facilities and bonuses to operate from a target airport. These bonuses to airlines are allowed by EU as long as they are not tailored to a single operator in compliance with transparency and non-discrimination criteria, to avoid phenomena of unfair competition. Bonuses are, nevertheless, a two-sided option: airlines might accept them and grant the airport a strong traffic development but this development is not to be taken for granted during time as other airports might become competitive substitutes.

It is Assaeroporti’s opinion (2011) that Italian air market needs simplification as well as firm and reliable rules and regulation. Air traffic demand at Italian airport is growing at a faster pace if compared with other major EU countries but the investments in capacity and efficiency are negligible. According to Mr. Palenzona (Assaerporti’s President), Italian air traffic market should have “*an actually independent regulatory body, a fair regulation for secondary airports that would foster competition and efficiency and, finally, funds provided to be invested in infrastructure development at existing airports*”.

In the Tables below, the sample of Italian airport taken into account for our analysis is presented. Data collected refer also to shareholding % changes between 2008 and 2010 and the evolution of the different shareholders from 2005 to 2010.

Therefore, according to the dominant share, an airport will be classified as:

1. Fully private.
2. Mixed with majority public.

3. Mixed with majority private.
4. Fully private.

The same data have been collected for many other Italian airports in both 2009 and 2010 and the result will be presented summarized by region.

Management firm	City	Airports	pax 2010	2010 shareholding			
				% public	% mixed	% private	% others
AdR	Rome	FCO - CIA	40.901.987	3,00%		95,80%	1,20%
Sea	Milan	MXP - LIN	27.244.258	99,90%			0,10%
Sacbo	Bergamo	BGY	7.677.224	71,30%		28,70%	
Save	Venice	VCE	6.868.968	29,80%	2,30%	67,90%	
Sac	Catania	CTA	6.321.753	87,50%		12,50%	
Gesac	Naples	NAP	5.584.114	30,00%		70,00%	
SAB	Bologna	BLQ	5.511.669	86,10%		7,20%	6,70%
Gesap	Palermo	PMO	4.367.342	97,80%		1,10%	1,10%

Management firm	City	Airports	pax 2010	Change 2010-2008 shareholding				O / G
				% public	% mixed	% private	% others	
AdR	Rome	FCO - CIA	40.901.987					3
Sea	Milan	MXP - LIN	27.244.258					1
Sacbo	Bergamo	BGY	7.677.224	-12,30%		12,30%		2
Save	Venice	VCE	6.868.968	3,40%	0,10%	-3,50%		3
Sac	Catania	CTA	6.321.753					2
Gesac	Naples	NAP	5.584.114					3
SAB	Bologna	BLQ	5.511.669					2
Gesap	Palermo	PMO	4.367.342	-0,70%		-0,30%	0,90%	2

Table 39 a/b: Management firm, city, IATA code, shareholding, % change versus 2008 and ownership for Italian airports taken into consideration (Source: Author)

A classification of airports considered according to passengers handled in 2010 and type of ownership leads to fig. 21. The results confirm the fact that a significant private shareholding is most common at principal airports.

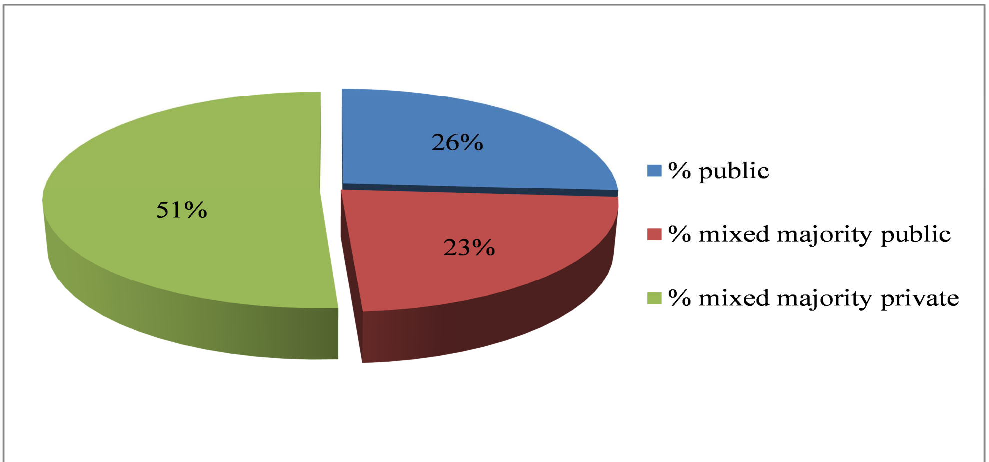


Fig. 21: % of 2010 passengers carried at Italian principal airports ranked by ownership – governance form (Source: Author)

ADR spa	Rome - Fiumicino and Ciampino					
Shareholders	2005	2006	2007	2008	2009	2010
Leonardo holding spa	51,08	51,10	51,10	51,10	51,10	51,10
MAP - Macquarie spa	44,68	44,70	44,70	44,70	44,70	44,70
Regione lazio				1,33	1,33	1,33
City of Rome				1,33	1,33	1,33
Provincial Administration of Rome	4,24	4,20	4,20	0,26	0,26	0,26
City of Fiumicino				0,08	0,08	0,08
Others				1,20	1,20	1,20

SEA spa	Milan - Linate and Malpensa					
Shareholders	2005	2006	2007	2008	2009	2010
City of Milan	84,56	84,56	84,56	84,56	84,56	84,56
Provincial Administration of Milan	14,56	14,56	14,56	14,56	14,56	14,56
Provincial Administration of Varese	0,64	0,64	0,64	0,64	0,64	0,64
City of Busto arsizio	0,06	0,06	0,06	0,06	0,06	0,06
City of Gallarate	0,04	0,04	0,04	0,04	0,04	0,04
Chamber of commerce Milan	0,03	0,03	0,03	0,03	0,03	0,03
City of Varese	0,03	0,03	0,03	0,03	0,03	0,03
Others	0,08	0,08	0,08	0,08	0,08	0,08

SACBO spa	Bergamo - Milan Orio al Serio					
Shareholders	2005	2006	2007	2008	2009	2010
SEA spa	49,98	50,00		49,98	30,98	30,98
City of Bergamo	13,84	13,80		13,84	13,84	13,84
Provincial Administration of Bergamo	13,20	13,20		13,20	13,20	13,20
Banca popolare Bergamo	10,05	10,10		10,05	17,90	17,90
Unione banche Italiane						
Credito Bergamasco				3,46	6,96	6,96
Italcementi spa				2,46	3,27	3,27
Confindustria Bergamo				0,44	0,59	0,59
Aeroclub Taramelli				0,01	0,01	0,01
Chamber of commerce Bergamo	6,56	6,60		6,56	13,25	13,25
Others	6,37	6,40		-	-	-

GESAC spa	Naples - Capodichino					
Shareholders	2005	2006	2007	2008	2009	2010
BAA Italy	65,00	65,00	65,00	65,00	65,00	65,00
City of Naples	12,50	12,50	12,50	12,50	12,50	12,50
Provincial Administration of Naples	12,50	12,50	12,50	12,50	12,50	12,50
SEA Spa	5,00	5,00	5,00	5,00	5,00	5,00
Interporto campano Spa	5,00	5,00	5,00	5,00	5,00	5,00

SAB spa	Bologna - G. Marconi					
Shareholders	2005	2006	2007	2008	2009	2010
Chamber of commerce bologna	55,39	50,50	50,50	50,55	50,55	50,55
Comune bologna	16,75	16,80	16,75	16,75	16,75	16,75
Provincial Administration of Bologna	10,00	10,00	10,00	10,00	10,00	10,00
Regione Emilia Romagna	8,80	8,80	8,80	8,80	8,80	8,80
Aeroporti holding srl	-	5,00	13,90	7,21	7,21	7,21
Others	9,06	9,00		6,69	6,69	6,69

SAVE spa	Venice - M. Polo					
Shareholders	2005	2006	2007	2008	2009	2010
Nordest avio			-	-	-	-
Provincial Administration of Venice	12,29	12,29	12,29	12,29	12,29	12,29
City of Venice	14,10	14,10	14,10	14,10	14,10	14,10
Airport of Venice Marco Polo SPA	-	-	-	-	3,34	4,44
Veneto sviluppo		-	-	-	-	-
Port Authority Venice		-	-	-	-	-
fondazione di Venice		-	2,17	2,17	2,17	2,17
marco polo holding srl / Finanziaria internazionale holding spa	36,98	38,98	38,98	38,98	38,98	41,89
City of treviso		0,73	2,09	2,09	2,09	2,09
Deutsche Bank London equities		2,31	-	-	-	2,33
CSFB prime brok	-	-	-	-	2,35	
Kairos Fund Ltd		-	2,27	2,02	2,93	
Goldman Sachs	-	-	-	-	2,11	
Chamber of commerce Venice		1,45	1,45	1,45	1,45	
Provincial Administration of Treviso		0,83	0,83	0,83	0,83	20,69
San Paolo IMI Bank		2,17	-	-	-	
APV Holding		0,10	0,10	0,10	0,10	
URVAIT service		-	-	-	-	
Others	34,63	27,05	25,74	25,97	17,26	

SAC spa	Catania - Fontanarossa					
Shareholders	2005	2006	2007	2008	2009	2010
Chamber of commerce Catania			37,50	37,50	37,50	37,50
Consorzio ASI catania			12,50	12,50	12,50	12,50
Provincial Administration of Catania			12,50	12,50	12,50	12,50
Provincial Administration of Siracusa	100,00	100,00	12,50	12,50	12,50	12,50
Chamber of commerce Siracusa			12,50	12,50	12,50	12,50
ASAC			-	-	-	-
Chamber of commerce Ragusa			12,50	12,50	12,50	12,50

GESAP spa	Palermo - P.ta Raisi					
Shareholders	2005	2006	2007	2008	2009	2010
Provincial Administration of Palermo	40,87	40,90	41,11	41,10	41,10	41,10
City of Palermo	31,33	31,30	31,38	31,30	31,30	31,30
Chamber of commerce Palermo	21,84	21,80	22,66	21,97	21,97	21,97
City of Cinisi			3,42	4,12		3,42
Ass. Ind. of Palermo				0,58		0,60
Regent srl				0,43		0,44
Ass. prov. breeders Palermo	5,96	6,00	1,45	0,12	5,63	0,06
Paolo Angius				0,13		0,02
Ass. Farmers Sicily				0,09		-
Others (10)				0,16		1,09

Table 40 a/h: Shareholding at principal Italian airports 2005-2010 (Source: ENAC, Author)

From the analysis of Table 39b, the only notable % change of shareholding took place at Bergamo Orio al Serio where SEA (the airport manager of Milan Malpensa and Linate) dismissed 20% of the Shares outstanding

(100% public shares) which were bought partly (6,69%) by another public shareholder (Bergamo's Chamber of Commerce) and partly by a few private investors (namely banks). The augmented share of a private investor is undoubtedly a positive factor, nevertheless the "negative" aspect is that the seller was another airport management entity. This highlights the Italian tendency to conform to the German situation: each entity manages one airport and participations in other airports are of a little significance. On the other hand, as it will be presented later in this chapter, in other countries the presence of multi-airport systems is significant. At principal airports, no other significant variations took place between 2008 and 2010.

Extending the outlook from 2005 to 2010, no significant % change is traceable at airports located in Rome, Milan, Catania, Palermo and Naples; by the way variations are present at Bologna and Venice: in 2006 Aeroporti Holding srl (Torino airport's management entity) bought 5% of the shares outstanding from the local Chamber of commerce and then in 2008 another 2% was acquired from minority shareholders (SAB received and still detains 4,13% of Aeroporti Holding srl shares in exchange); at Venice airport a repartition of the shares took place in order to let Marco Polo Holding srl and its partners take the majority of the shares.

From a broad point of view, it is possible to conclude that, up to 2010, there has not been a strong drift towards changes in airport management entities' shareholdings yet. Although, the commercialization and the recent decision to stop the injection of money from governmental entities to loss making airports entities is due to bring some innovation and a more intense participation of private investors in managing boards.

This is particularly true for secondary airports, that are more likely to be loss making due to their smaller traffic volumes.

SARDEGNA			
SOGAER spa	Cagliari		OWNERSHIP -
Shareholders	2009	2010	GOVERNANCE
Cdc Cagliari	94,353	94,350	2
SFIRS Spa	3,430	3,430	
Banco di Sardegna Spa	1,052	0,060	
Regione autonoma Sardegna	0,720	0,720	
Meridiana Spa	0,209	0,210	
Cdc Oristano	0,096	0,100	
Consorzio Sardegna costa sud	0,056	0,060	
Ass.Ind. Cagliari, Carbonia, Iglesias ...	0,042	0,040	
API sarda Cagliari	0,025	0,020	
Aironjet srl	0,010	1,010	
FIMA Spa	0,008	-	
Geasar Spa	Olbia		OWNERSHIP -
Shareholders	2009	2010	GOVERNANCE
Meridiana Spa	79,800	79,800	3
Cdc Sassari	10,000	10,000	
Cdc Nuoro	8,000	8,000	
Regione autonoma Sardegna	2,000	2,000	
Consorzio Costa Smeralda	0,200	0,200	
SOGEAAL spa	Alghero		OWNERSHIP -
Shareholders	2009	2010	GOVERNANCE
Regione autonoma Sardegna	25,68	80,200	1
SFIRS Spa	41,70	19,800	
Provincia di Sassari	4,07	-	
Cdc Sassari	21,70	-	
Comune di Alghero	2,71	-	
Comune di Sassari	4,14	-	
GE. AR. TO	Tortolì - Arbatax		OWNERSHIP -
Shareholders	2009	2010	GOVERNANCE
Arbatax spa	100,000	-	1
Provincia ogliastra	-	10,000	
Cdc nuoro	-	10,000	
Comune tortolì	-	10,000	
SFIRS spa	-	30,000	
Regione autonoma Sardegna	-	40,000	
SO. GE. A. OR spa	Oristano		OWNERSHIP -
Shareholders	2009	2010	GOVERNANCE
Regione autonoma Sardegna	3,290	no data	1
SFIRS Spa	0,250		
Provincia di Oristano	74,100		
Camera commercio Oristano	8,160		
Consorzio per l'industr oristanense	2,480		
Comune di Oristano	11,720		

PUGLIA			
Aeroporti di Puglia spa	Bari, Brindisi, Foggia e Taranto Grottaglie		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Regione puglia	99,414	99,410	1
Cdc taranto	0,400	0,400	
Cdc bari	0,059	0,060	
Provincia di bari	0,058	0,060	
Comune di Bari	0,040	0,040	
Comune di Brindisi	0,012	0,013	
Provincia di Foggia	0,009	0,009	
Cdc Brindisi	0,004	0,004	
Cdc Lecce	0,002	0,002	
Provincia di Brindisi	0,002	0,002	

CALABRIA			
SACAL spa	Lamezia Terme		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Comune lamezia	20,440	20,440	2
Provincia Catanzaro	18,930	18,930	
Comune Catanzaro	10,000	10,000	
Regione Calabria	10,000	10,000	
Banca carime	10,220	10,220	
Cdc catanzaro	3,070	3,070	
Provincia cosenza	3,070	3,070	
Adr spa	16,570	16,570	
Comune di V. valentia	1,520	1,520	
Confindustria Catanzaro	0,910	0,910	
Others (>10)	5,270	5,270	
SOGAS spa	Reggio calabria		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Regione calabria	no data	6,750	1
Provincia di reggio calabria		68,400	
Comune di reggio calabria		23,580	
Cdc Reggio calabria		0,440	
Provincia messina		0,410	
Comune di messina		0,410	
Others - Cdc messina		0,010	
Società aeroporto di S.anna spa	Crotone		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Regione calabria	no data	14,110	2
F.lli Romano Spa		13,320	
Banca popolare di Crotone spa		9,270	
Cdc crotone		4,540	
Ergom group		1,730	
Romano autolinee regionali spa		3,300	
Provincia di Crotone		51,000	
Comune di Crotone		1,070	
Casarossa Spa		0,640	
Others		1,020	

VENETO			
Consorzio apt Asiago spa	Asiago		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Comune asiago	26,00	no data	1
Cdc Vicenza	22,00		
Provincia Vicenza	36,00		
Comune di roana	8,00		
Comune di gallio	8,00		
Aeroporto di padova spa	Padova		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
SAVE spa	62,900	no data	3
Comune padova	0,800		
Others (>4)	26,300		
AER TRE spa	Treviso		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
SAVE spa	80,000	80,00	3
Comune di Treviso	2,630	2,63	
Veneto sviluppo spa	10,000	10,00	
Cdc treviso	4,880	4,88	
Provincia treviso	0,750	0,75	
Fondazione cassamarca	1,740	1,74	
Aeroporto G. Nicelli spa	Venezia Lido		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
SAVE spa	48,430	no data	2
Others	51,570		
Aeroporti sistema del Garda	Verona - brescia		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Cdc brescia	5,000	4,19	2
Provincia brescia	5,000	4,19	
Cdc verona	20,145	21,68	
Provincia trento	18,356	15,39	
Provincia verona	17,080	17,17	
Comune verona	6,832	6,87	
Provincia bolzano	6,631	6,66	
Banca popolare di verona	4,019	4,04	
Comune villafranca	4,010	3,86	
Fondazione cr verona vicenza belluno ancona	4,000	4,02	
Provincia vicenza	1,326	11,93	
Cdc mantova	1,137		
Provincia mantova	1,038		
Others (>19)	5,426		

LOMBARDIA			
Aeroporti sistema del Garda	Brescia		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Aeroporto Valerio Catullo - Verona	99,990	99,990	2
Provincia di Brescia	0,010	0,010	
EMILIA ROMAGNA			
SEAF spa	Forlì		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Comune forlì	48,096	48,096	1
Regione emilia romagna	25,026	25,026	
Provincia di forlì - cesena	14,452	14,452	
Cdc forlì - cesena	9,578	9,578	
Confindustria fc	0,846	0,846	
Comune cesena	2,000	2,000	
Others	0,002	0,002	
SOGEAP spa	Parma		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Unione parmense industriali	6,340	6,340	3
,ainl airport international	67,950	67,950	
Cdc parma	7,730	7,730	
Comune parma	7,730	7,730	
Cassa risparmio parma	0,830	0,830	
Provincia parma	5,550	5,550	
Autocamionale della cisa / gruppo SIAS	1,990	1,990	
Banca popolare Emilia romagna	1,000	1,000	
Others (>13)	0,880	0,880	
Aeradria spa	Rimini		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Provincia rimini	33,920	33,92	2
Comune rimini	16,650	16,65	
Cdc rimini	7,510	7,51	
Comune di riccione	6,090	6,09	
Ente autonomo fiera rimini	6,960	6,96	
Società palazzo dei congressi spa	4,000	4,00	
Confindustria rimini	2,790	2,79	
Camera di rsm	2,790	2,79	
Aia confly srl	2,770	2,77	
Comune bellaria - igea marina	2,520	2,52	
Provincia ravenna	2,210	2,21	
Comune cervia	1,440	1,44	
Comune misano	1,090	1,09	
Regione emilia romagna	7,020	7,02	
Comune di cattolica	0,030	0,03	
Others (5)	2,210	2,21	

TOSCANA			
Aeroporto di firenze spa	Firenze		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Acquisizione prima srl / apt holding srl (part.ta gruppo benetton)	33,400	33,400	3
SAGAT spa			
Gruppo monte paschi di siena	4,890	4,890	
Cdc firenze	14,430	14,430	
Comune di firenze	2,180	2,180	
Comune di prato / Cdc prato	4,090	4,090	
Fondiaria sai spa	2,050	2,050	
Cassa risparmio firenze	17,500	17,500	
So. G. im spa		12,120	
Mercato	9,330	9,340	
Others (5)			
SEAM spa	Grosseto		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Cdc grosseto	5,430	no data	2
Provincia grosseto	25,250		
Comune grosseto	25,250		
Adf aeroporto di firenze	0,386		
Cassa di risparmio di firenze	10,000		
Cassa di risparmio di prato	10,000		
Ilca srl	9,940		
Banche, associazioni e privati	6,358		
Regione toscana	7,080		
Aeroporto lucca tassignano spa	Lucca		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
reginald trading	80,000	no data	3
Comune di capannori	10,000		
Provincia lucca	10,000		
Others (5)			
SAT spa	Pisa		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Regione toscana	16,90	16,90	2
Provincia pisa	9,27	9,27	
Comune pisa	8,45	8,45	
Cdc pisa	7,87	7,87	
Cassa di Risparmio pisa-livorno-lucca	6,05	6,31	
Fondazione cassa di risparmio di Pisa	5,11	-	
Finatan SPA - Ivo Gnudi	16,14	23,15	
Others	16,63	18,30	
Provincia livorno	2,37	2,37	
Cdc Firenze	1,42	1,42	
Banca monte dei paschi di siena	3,96	3,96	
Aeroporto di firenze spa	2,00	2,00	
Others	3,83	-	
alatoscana spa	Isola d'Elba		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
SAT spa - aeroporto di pisa	30,71	no data	2
Others	3,29		
Provincia di livorno			
Regione toscana	66,00		

LIGURIA			
aeroporto di genova spa	Genova		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Autorità portuale di Genova	60,000	60,000	2
Cdc genova	25,000	25,000	
ADR aeroporti di roma spa	15,000	15,000	
AVA spa	Albenga		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Soci pubblici vari	88,31	no data	2
Soci privati vari	11,69		

UMBRIA			
SASE spa	Perugia		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Cdc perugia	no data	32,590	2
Sviluppo umbria spa		31,130	
Comune perugia		10,960	
Banca dell'umbria spa / Unicredit spa		11,380	
Confindustria Peugia		4,800	
ANCE perugia		1,790	
Comune Bastia umbra		0,600	
Banca popolare di Spoleto		1,880	
Provincia Perugia		4,270	
Others (>14)		0,600	

ABRUZZO			
SAGA spa	Pescara		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Regione abruzzo	no data	41,300	2
Caripe spa		10,730	
Comune pescara		9,750	
Cdc pescara		9,930	
Cdc chieti		9,930	
Banca Tercas		1,550	
Cdc teramo		9,180	
Cdc l'aquila		3,640	
de cecco		1,000	
provincia pescara		1,200	
Cdc l'aquila		1,790	
Others (12)			

FRIULI VENEZIA GIULIA			
Aeroporto friuli venezia giulia spa	Trieste		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Consorzio aeroporto friuli venezia giulia	51,000	-	1
Regione friuli venezia giulia	49,000	100,000	

TRENTINO ALTO ADIGE			
ABD spa	Bolzano		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Provincia di Bolzano	100,000	100,000	1

VAL D'AOSTA			
ADVA spa	Aosta		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Air Vallée holding spa	51,00	no data	3
Regione val d'aosta	49,00		

CAMPANIA			
Aeroporto di Salerno spa	Salerno Pontecagnano		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Salerno interporto	9,000	-	4
Consorzio aeroporto	91,000	100,000	

SICILIA			
AIRGEST spa	Trapani		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Provincia di Trapani	46,920	46,920	2
Gesap Spa	4,000	4,000	
Cdc Trapani	2,090	2,090	
Ditta durante	0,510	0,510	
Quercioli Dessena Cesare	7,820	7,820	
AA Valle dei templi spa	0,070	0,070	
Società infrastrutture Sicilia spa	37,590	37,590	
Others (>2)	1,000	1,000	
GAP spa	Pantelleria		
Shareholders	2009	2010	
ENAC			
	Lampedusa		
Shareholders	2009	2010	
ENAC			

PIEMONTE			
Olimpica	Cuneo		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Provincia Cuneo	30,990	27,35	2
Regione piemonte	19,830	15,51	
Fingranda spa	2,310	1,8	
Cdc cuneo	19,830	19,87	
Comune cuneo	7,230	6,32	
Comune saluzzo	1,610	1,28	
Comune alba	1,610	1,32	
Comune mondovì	1,610	1,28	
Comune fossano	1,610	1,29	
Comune brà	1,610	1,31	
Comune savigliano	2,260	1,8	
Azioni proprie	9,500	7,22	
Autostrada TO-MI spa		2,84	
Satap spa		2,76	
Cie spa		1,82	
Fininc spa		1,69	
Unicredit spa		1,52	
Others (>23)		3,02	

SAGAT spa	Torino		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Comune torino	38,000	38,00	2
Edizione holding spa	24,390	24,39	
Regione piemonte	8,000	8,00	
Sab spa - aeroporto di bologna	4,130	4,13	
Italconsult spa / tecnoinvestimenti	4,700	4,70	
Aviapartner spa	0,420	0,42	
Equiter spa	12,400	12,40	
Provincia torino	5,000	5,00	
Others (?)	2,960	2,96	

MARCHE			
AERDORICA spa	Ancona		OWNERSHIP - GOVERNANCE
Shareholders	2009	2010	
Regione marche	no data	50,180	2
Provincia Ancona		6,000	
Comune Ancona		1,270	
Cdc Ancona		4,510	
Frapi spa		2,030	
Provincia Macerata		1,010	
Comune di Falconara marittima		0,610	
Provincia di Ascoli Piceno		0,960	
fiduciaria marche		33,180	
Others (18 < 5%)		0,250	

Table 41 a/h: Shareholding and governance at Italian secondary airports 2009-2010 (Source: ENAC, Author)

From the analysis of Table 41, it is possible to derive that all airports with label 1, that is 100% public ownership, handled in 2010 less than 1 million passengers with the only exception of Alghero, Bari and Brindisi that handled 1,3 - 3,3 and 1,6 million passengers respectively.

Generally speaking the ACI, a few years ago, estimated that airports with less than 1 million passengers/year might experiment difficulties in covering their infrastructure costs and in being economically viable. The increased competition and the new degrees of complexity that have been introduced may have led to a rise of the thresholds of economic viability. The concept could be extended also to some airports with label 2 with a negligible participation of private investors, like Crotone, Brescia, Rimini, Grosseto, Albenga, Perugia, Pescara, Cuneo and Ancona.

Finally, also at secondary airports few variation of shareholdings took place between 2009 and 2010: Alghero, Tortolì, Trieste, Salerno and Cuneo are the most notable. Were the Act on Federalism (2008) extended to regional non-strategic airports as well, some changes in Italian airport system would have been possible.

The widespread majority of public ownership of airport operators along with the diminished financial capability of some public bodies due to the financial crisis may introduce deep changes in terms of ownership.

During 2010 and 2011 some important indications have been provided by Italian Airports since public bodies have been seeking private partners and investors to either buy out shares through IPOs, private bids or increase capitals, or find strategic partners with a specific knowledge in the matter.

This is the case of some small airports as Genova, Forlì, Reggio Calabria, Oristano, Lucca and Trieste. However, partial privatizations is foreseen also for medium-big sized airports' operators such as SEA (the managing company of Milan's airports) and Aeroporti di Puglia.

This recent wave of privatisation differs from the previous one since it allows private investors to invest in airports which are not economically sustainable any longer; the first wave demonstrates that the solution is feasible: the private investments made in Fiumicino and Ciampino, Naples, Venice and Bergamo have proven to be profitable during time.

It is foreseeable for Italian airports as well the worldwide trend of aggregation of airports managing companies through:

- the mutual purchasing of shares between the two companies;
- a single company managing more than one airport;
- a single investor which owns a significant amount of shares of different airport managing companies,
- a partnership between airport management companies.

Each of those options has different implications in terms of strategies and competitiveness.

The purchasing of shares is an emerging phenomenon at Italian airports and the two biggest airport managing companies (AdR and SEA) have been the first exemples: AdR owns shares in Aeroporto di Genova and in SACAL (Aeroporto di Lamezia) while SEA owns a small amount of SACBO’s (Aeroporto di Bergamo) and GESAC’s (Aeroporto di Napoli) shares.

A single airport management company owning and/or operating more than one airport might lead to the establishment of the concept of airport system. An example is BAA which owns and operates London Heathrow, London Stansted, Aberdeen, Glasgow and Southampton airports and owns market shares of other airports in the world. In Italy a similar situation is found in the airports of Verona and Brescia which are managed by the same management company.

Investing in airport managing companies is becoming a widespread trend in the market, especially for big and medium sized airports.

The investors could be basically banks, private equity funds or financial companies. In the Italian market, bank owning shares of airport management companies is quite common: Bergamo, Firenze, Lamezia, Pescara, Verona just to name few cases; private funds owned shares are still limited.

Finally, airports might find profitable to share their expertise and know-how: few examples in Europe are Panteras between Schiphol and Frankfurt and the alliance between Schiphol and AdP; however these types of alliances are not formalized in the Italian market yet.

An analysis of the Italian market through the comparison of traffic figures in the period January-November (Fig. 22) shows a growth of 1,29% in the number of movements in both 2010 and 2011, but 12 airports out of 37 suffer a decrease in the overall number of movements.

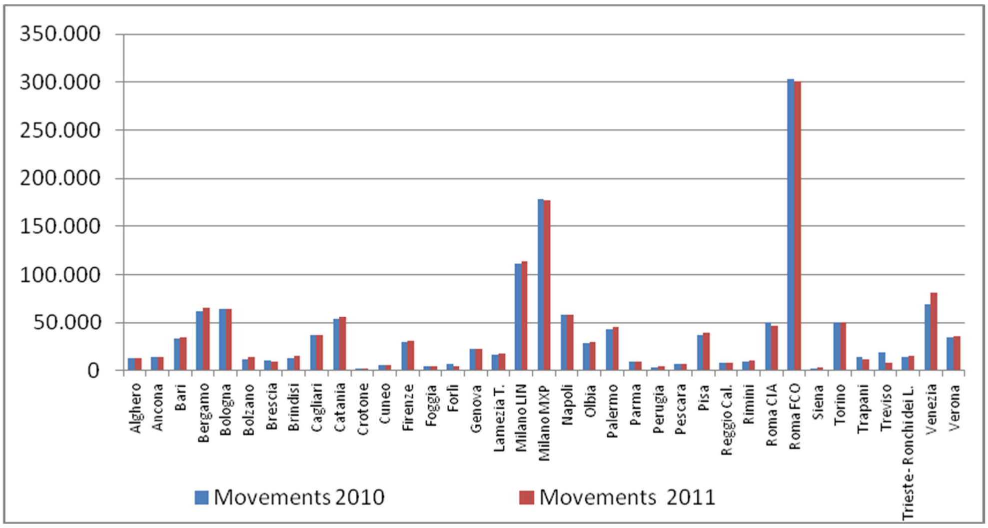


Fig. 22: Movements at Italian airports Jan-Nov 2011 (Source: Assaeroporti)

However, in the same period, the number of passenger output on a national basis has grown of 6,67%, showing a general increase in aircraft load factor; nevertheless, in the 13,5% of the airport there has been a passenger traffic decrease.

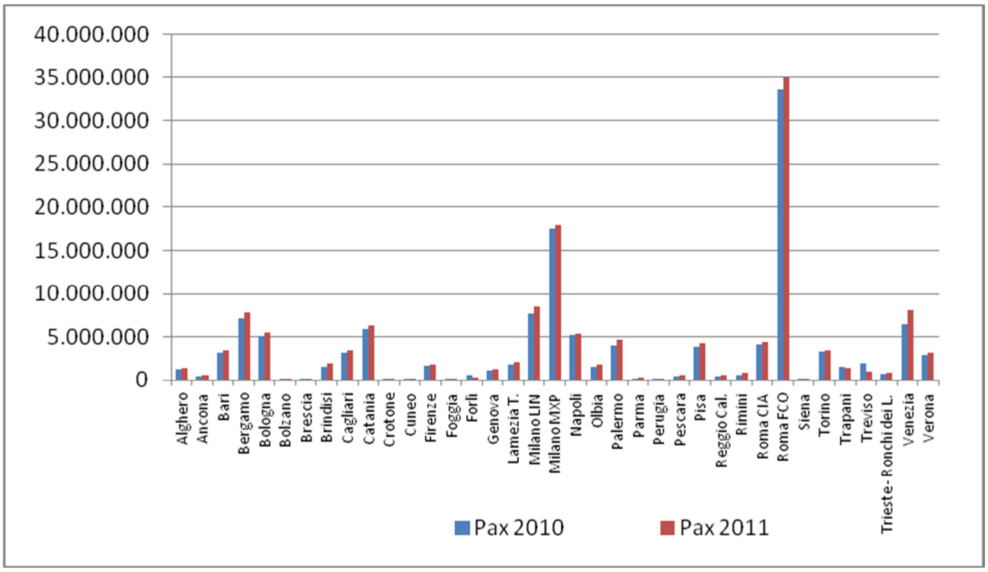


Fig. 23: Passenger output at Italian airports, Jan-Nov 2010-2011 (Source: Assaeroporti)

The analysis of monthly traffic data of the first quarter of 2011 showed a growth both in terms of passengers and movements. In the second quarter the growth of passengers was associated with stagnation in the number of flights, while the data of the third quarter highlighted a passengers' growth versus a decrease in the number of flights. Finally, November and December 2011 data showed a decrease in both passengers and movements.

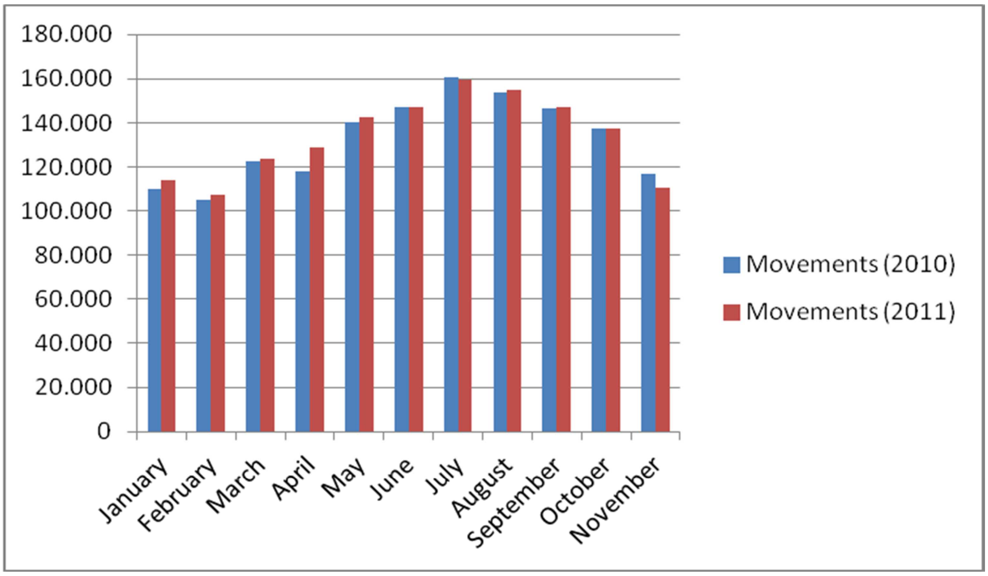


Fig. 24: Movements at Italian airports Jan-Nov 2010 versus 2011 (Source: Assaeroporti)

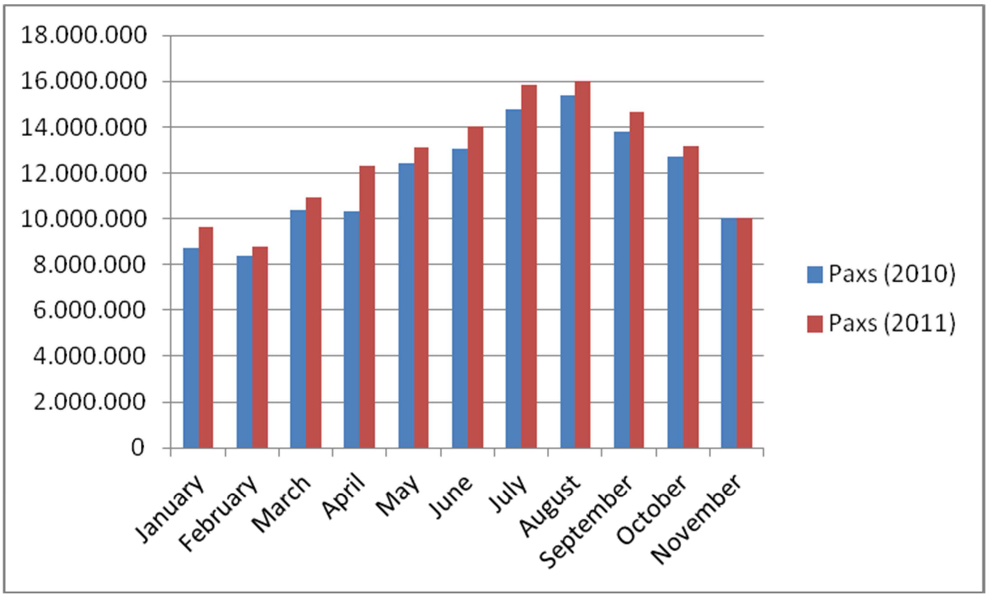


Fig. 25: Passengers at Italian airports Jan-Nov 2010 versus 2011 (Source: Assaeroporti)

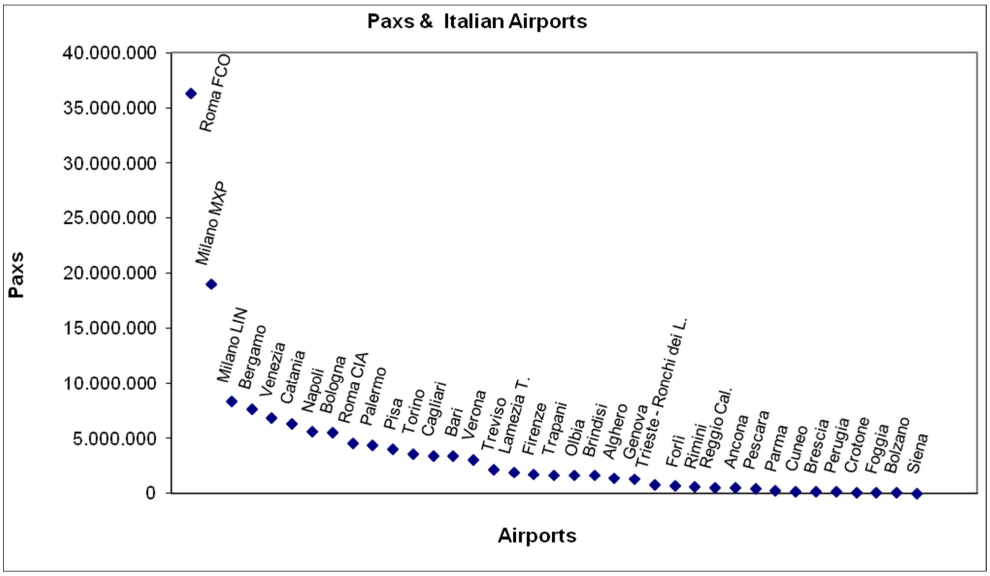


Fig. 26: Passengers at Italian airports in 2010 (Source: Assaeroporti)

Fig. 26 explains the Italian market's situation in 2010: the majority of traffic is concentrated at two airports, namely Rome Fiumicino and Milan Malpensa; then there are a few airports with traffic output between 5 and 10 million passengers, namely Milan Linate, Bergamo, Venice, Catania, Naples, Bologna and Rome Ciampino. The remaining part of the traffic is distributed among a great number of small regional airports, each one with less than 2 million passengers per year. In particular, the 38% of Italian airports handled less than 1 million passengers and the 19% handled between 1 and 2 million passengers/year.

Domestic traffic at Italian airports accounts for 43% of the total in 2010 (Fig. 27).

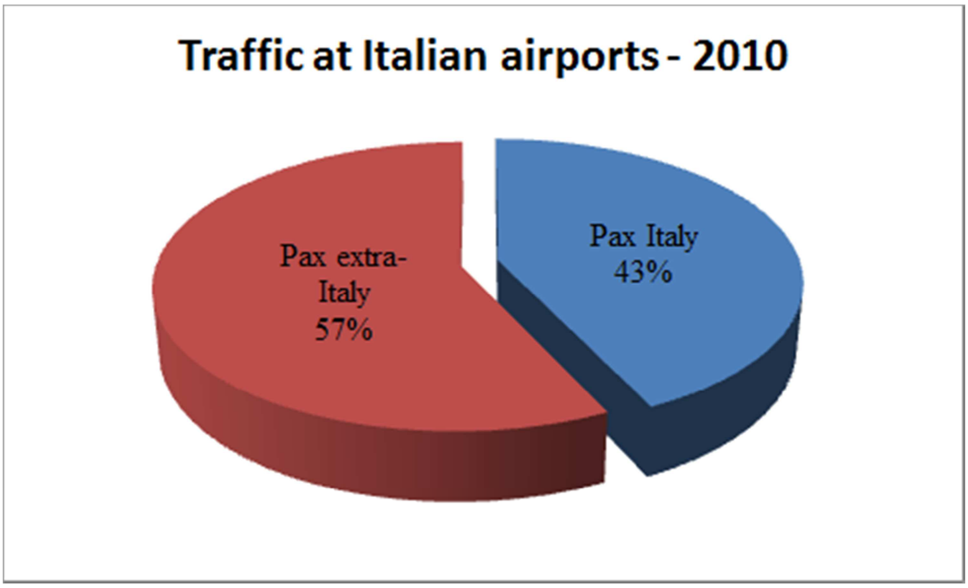


Fig. 27:Distinction between domestic and international passengers at Italian airports – 2010 (Source: ENAC)

A review of traffic data in the period 2006-2010 shows that, with reference to 2006, an additional 9 million of passengers were carried (+12,85%,with a mean annual rate of +1,3%). With reference to the flight destination, 73,2% of the flights are domestic or heading to an EU-country, followed by Asia, Africa and European extra-EU destinations, with respectively 7,3%, 7% and 6,8%. Between 2006 and 2010, the traffic between Italy and Asia grew of 35,9%, the traffic between Italy and African countries of 26,5%, between Italy and other European countries of 11,1%. Comprehensive data are available in Table 42.

	2006	2007	2008	2009	2010
North America	3.107.199	3.099.567	3.346.481	3.121.890	3.260.530
Centre America	675.572	638.083	642.178	478.730	426.260
South america	786.584	842.989	867.325	799.600	857.296
Europe - EU	52.981.758	57.140.177	57.310.030	57.032.456	58.053.605
Europe - non EU	4.082.139	4.489.282	4.975.277	4.545.244	5.371.183
Asia	4.274.813	4.618.515	4.760.073	4.800.149	5.809.435
Oceania	7.223	6.850	3.830	15	104
Africa	4.376.735	4.815.281	5.085.399	4.933.243	5.535.754
Total	70.292.023	75.650.744	76.990.593	75.711.327	79.314.167
%	-	7,62%	1,77%	-1,66%	4,76%

Table 42: Principal destinations of Italian passengers. Time series 2006-2010 (Source: ENAC)

An aspect worth to be taken seriously into account is the repartition of passengers with respect to Airline. Italian market is characterized by the absence of a strong leading national carrier (even if it experiences scarce competition from other Italian legacy carriers) combined with a little network if compared with those of other EU countries. It is therefore quite surprising that 2010 traffic data show that 5 out of top 15 carriers and 2 out of the top 3 carriers (namely Ryanair and EasyJet ranked respectively 2nd and 3rd, Alitalia being at the top) are low cost carriers. Rumors about 2011 data report that Ryanair overtook Alitalia as the biggest passengers carrier (Ryanair's market share in Italy was 12% in 2007, thus highlighting the huge growth experimented by the Irish-based LC carrier.)

Top 15 Airlines Italy 2010	
1	Alitalia - CAI
2	Ryanair
3	Easyjet
4	Meridiana
5	Air One
6	Lufthansa
7	Wind Jet
8	Air France
9	Blue Panorama
10	British Airlines
11	Air Berlin
12	Wizz Air
13	Air Italy
14	Vueling
15	Iberia

Table 43: Top 15 airlines for passengers carried in 2010 (Source: ENAC)

Were this rumors reliable or not, it is sure that competitors took advantage from the masked bankruptcy of Alitalia and the establishment of the new CAI – Alitalia in 2008. In 2006, the government tried to sell 49,9% of shares outstanding of Alitalia to partially cover the operating debts, but no reliable Italian acquirers were found. An agreement was found with Air France-KLM but flight assistants and pilots corporations together with conservative parties (the two actors had the same goal – the failure of the agreement – but actually different reasons to pursue it) brought the agreement to a failure. New elections won by the conservative parties played a role in the decision of not selling Alitalia to a competitor airline anymore; the assets which had been losing money were led to file for bankruptcy (the so-called "*Bad company*") and the debts were partially paid by the government, while profitable assets were grouped together in new Alitalia – CAI, the partially privatized national carrier. Private investors have been forced to keep their shares for a period of 5 years ending the next year; in 2013 Italian shareholders would be free to sell their shares and therefore Alitalia might even be sold to a partner airline (in coincidence with new elections). 25% of Alitalia – CAI shares are already owned by Air France-KLM.

New Alitalia – CAI is the result of the merging with AirOne, a regional Italian carrier. The new company kept Alitalia’s key slots and got AirOne’s as well, but was then compelled to reduce its network. This re-organization led to the de-hubbing of Milan Malpensa airport and consequently to the losing of a significant market share.

In 2011 some notable merging took place in Italy: Alitalia CAI merged with Wind Jet and Meridiana-Eurofly (which is the result of Meridiana’s merging with Eurofly in 2006) with Air Italy, thus strengthening their position as first and second Italian legacy carriers.

Finally, a closer look to Low Cost market in Italy is worth to be given. LCCs provide passengers flights to both domestic and international destinations, with short to medium haul routes. Therefore 2005-2010 data have been analyzed. From Table 44, it is clear that the LCCs shares at both international and total has been increasing ceaselessly, even if the pace is a little slowing down. Nevertheless the number of passengers carried on non-domestic routes by LCC doubled between 2005 and 2010, while the gran-total data is 2,5 times bigger than in 2005. With reference to domestic routes, in 2010 for the first time LCCs’s share diminished with respect to the previous year (the number of passengers carried, nevertheless, grew of 0,5 million).

		Domestic traffic		Non-domestic traffic		Total	
		Passengers	%	Passengers	%	Passengers	%
2010	Low Cost Carriers	18.469.673	30,99%	32.333.515	40,77%	50.803.188	36,57%
	Network Carriers	41.125.855	69,01%	46.980.652	59,23%	88.106.507	63,43%
2009	Low Cost Carriers	17.924.182	33,10%	28.946.987	38,23%	46.871.169	36,09%
	Network Carriers	36.224.030	66,90%	46.764.340	61,77%	82.988.370	63,91%
2008	Low Cost Carriers	14.209.250	26,02%	29.184.733	37,25%	43.393.983	32,64%
	Network Carriers	40.394.160	73,98%	49.164.259	62,75%	89.558.419	67,36%
2007	Low Cost Carriers	8.911.076	15,77%	25.959.424	32,95%	34.870.500	25,77%
	Network Carriers	47.610.428	84,23%	52.827.223	67,05%	100.437.651	74,23%
2006	Low Cost Carriers	7.055.349	13,39%	21.349.971	30,37%	28.405.320	23,10%
	Network Carriers	45.622.940	86,61%	48.942.052	69,63%	94.564.992	76,90%
2005	Low Cost Carriers	3.854.288	7,89%	16.386.652	25,55%	20.240.940	17,92%
	Network Carriers	44.989.307	92,11%	47.750.861	74,45%	92.740.168	82,08%

Table 44: Low cost and Network carriers' market share at Italian airports. Time series 2005-2010 (Source: ENAC)

2. Recent EU Traffic evolution

Passengers traffic in EU counts for the 33% of the world market. (Passengers grew of +300% with respect to EU data of the 1990s).

Passengers carried in Europe 2001 - 2010					
Year	**Pax (x 1000)**	**Δ%**	**Year**	**Pax (x 1000)**	**Δ%**
2001	944.507	-	2006	1.203.671	6,08%
2002	950.093	0,59%	2007	1.280.525	6,38%
2003	988.951	4,09%	2008	1.278.376	-0,17%
2004	1.064.227	7,61%	2009	1.202.333	-5,95%
2005	1.134.685	6,62%	2010	1.230.577	2,35%

Table 45: Passengers carried in Europe – Time series 2001-2010 (Source: ICCSAI)

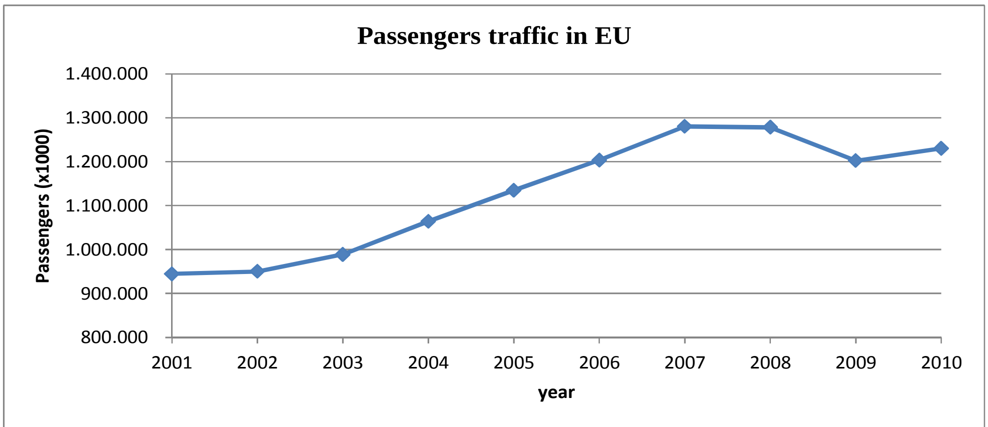


Fig. 28: Passengers carried in Europe 2001-2010 (Source: ICCSAI)

Passenger traffic in Europe is expected by Boeing to grow at 4,4% annually to 2029, rising from 1,3 billion RPKs in 2009 to 3,2 billion. Europe is still an historic hub for the aviation market, even if the crescent importance of Asia and Middle East is shifting the strategic position eastwards. According to EU Commission and EU air market's stakeholders, the two major challenges facing European airports in the next years will be capacity at airports and quality of service. With reference to the first topic, there is concern on airports capacity. However, the demand is not predicted to rise in an homogeneous way in the whole EU. Eurocontrol foresees 11,6 million IFR flights in 2017 (+22% with reference to 2009) and 16,9 million in 2030 (+77% with reference to 2009). The average growth rate forecast for air traffic movements for 2009-2017 is 2,9% per annum. Eurocontrol reports that currently 5 major EU are operating at their full capacity: Düsseldorf, Frankfurt, London Gatwick, London Heathrow and Milan Linate. Provided that the growth tendency remains steady, by 2030, other airports will get to operate at their full capacity, among those Paris CDG, Warsaw, Athens, Vienna and Barcelona. Taking into consideration the fact that air traffic and airport congestion lead to delays, it is clear that the risk of a "capacity crunch" is to be taken seriously into consideration with both new infrastructures where needed and optimization of the existing ones.

The problem of delays at airport is deeply related to the second topic: level of service, quality and efficiency. Eurocontrol estimates that 70% of all delays are caused by problems due to the turn-around depending on airlines, ground-handlers, airports or other parties. Quality is not improving together with airlines evolving needs and security challenges.

To face these challenges, the European Commission in December 2011 adopted a policy document and three legislative proposals (known as "*Airport*

Package") on the following topics: slots, ground-handling and noise restrictions.

Slots are a used to pose a cap on traffic at airports where demand for air travel exceeds the available runway and terminal capacity. Slot have been allocated to airlines under an administrative system (1993 EC Regulation) for winter and summer seasons. A minimum of 5 slots allocated at the same time on the same day of the week during a season forms a series of slots. If airlines use a series of slot 80% of the time they can retain it for the next season (the so-called "*grandfather clause*") otherwise it is returned to the pool for re-distribution. The pool system is also used to allocate new capacity. Slots from the pool are allocated by an independent co-ordinator: 50% of the pool slots go to new entrants, 50% go to other airlines on a first come first served basis. By the way, with the "grandfather clause" there is no market incentive for airlines to sell under used slots to other airlines. Thus the market is not dynamic as there is not competition nor incentives to efficiencies. In addition as air traffic has increased, at many congested airports carriers are not allowed to enter the market or indeed grow their operations. The revised slot regulation will introduce the possibility of trading slots between airlines across the EU (to tell the truth, 1993 Regulation did not provide for nor ban this practice; therefore EU countries' legislators were allowed to decide in a fragmented way). The Regulation establishes a clear regime to ensure transparency in the trading of slots. Moreover, the threshold and the defining criteria of a slot series will be tougher and airlines will be required to demonstrate that they have used their slots (the so-called "*use it or lose it*" rule). This measure is estimate to be capable of creating a +24 million passengers' capacity, of granting €5 billion to the European economy and create 62,000 jobs.

Proposals on Ground handling have already been presented in the previous chapter.

The noise-abatement strategy has four principal elements: reduction at source (quieter aircraft); land-use planning and management; noise abatement operational procedures (overflights) and operating restrictions (e.g. bans on flights during the night). These measures may reduce the available capacity at airports and so the decision-making process follows international principles on noise management established by the ICAO (the so-called "*balanced approach*", as operating restriction might harm capacity and distort competition) and by the Directive 2002/30 at EU level.

The process of noise assessments and, following, the decisions on proportionality, cost-efficiency and transparency of operating restrictions is, nevertheless, incoherent among EU countries.

The new proposals will ask the revision of the noise-compliant aircrafts' list according to development in technology. Moreover, the commission will be entitled with a scrutiny role on new noise measures in order to ensure a consistency of approach across Europe; nevertheless Member State competencies would not change.

Airport	2010	2017	2025	Capacity assumptions
Amsterdam Schiphol				Annual movement cap raised to 510.000 but no further increase
Dublin				Possibility to build a second runway
Düsseldorf				A 10% increase in capacity in 2015 would not be sufficient
Frankfurt				New runway (2011) and terminal (2015) allow increases from 83 to 126 mov/hr
London Gatwick				Optimization of existing capacity may result in 2-3 extra mov/hr
London Heathrow				No 3rd runway, or mixed mode, or relaxation of annual movement cap.
Madrid Barajas				ATC improvements forecasted from 98 to 120 mov/hr by 2020
Milan Linate				No amendment to Bersani Decree
Munich				3rd runway operational by 2017
Palma de Mallorca				Possibility to add capacity when needed
Paris CDG				Capacity increase from 114 to 120 mov/hr by 2015, but no further infrastructures
Paris Orly				No relaxation of annual slot cap
Rome Fiumicino				Improved ATC allowing 100 mov/hr but no new infrastructures
Vienna				3rd runway operational in 2020, initially allowing 80 mov/hr increasing to 90 mov/hr by 2025

Sufficient capacity
Partial demand exceeds capacity
Demand exceeds capacity

Table 46: Forecasted airport congestion at a sample of EU airport (Source: Steer Davies Gleave, 2011)

Hours per day demand exceeds capacity

Airport	2010	2012	2017	2025
Dublin	1	3	0	0
London Gatwick	14	14	14	17
London Heathrow	15*	15*	15*	15*
Madrid Barajas	6	12	6	12
Paris CDG	8	11	12	15
Palma de Mallorca	2	2	2	3
Rome Fiumicino	5	6	6	9
Vienna	5	5	9	5

Table 47: Forecasted hours/day excess capacity at a sample of EU airport (Source: Steer Davies Gleave, 2011)

According to ACI, European airport passenger throughput rose from 1,40 billion in 2009 to 1,46 billion in 2010. Europe's airports recorded 4,3% growth year-on-year, higher than that achieved by North American airports (+2,5%). However, this was some way below the worldwide average growth of 6,6% (see Fig. 29).

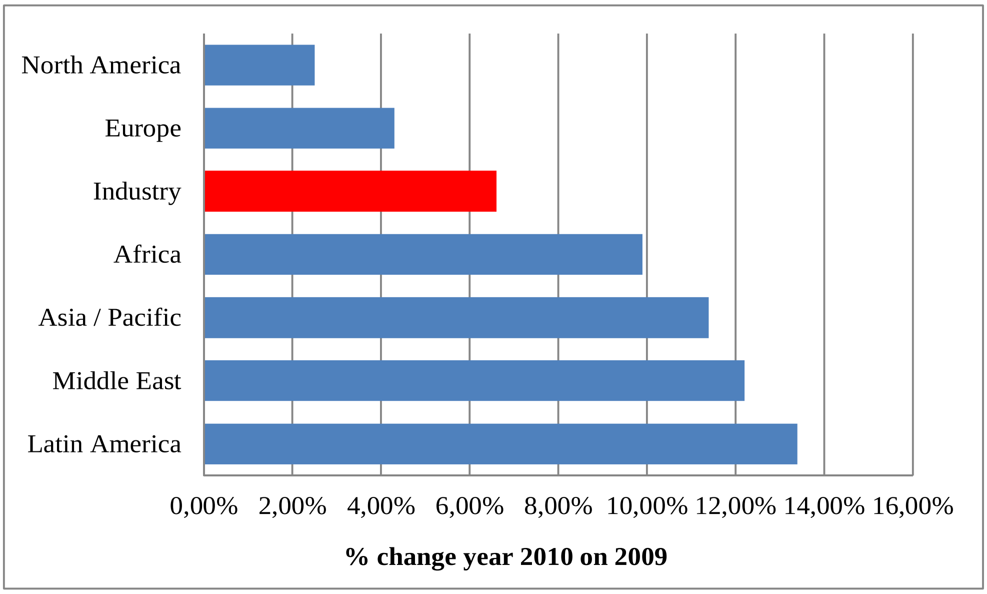


Fig. 29: % change year on year 2010 versus 2009 (Source: IATA)

European carriers saw a year-on-year passenger demand increase of +5,1% combined with a capacity increase of +2,6%. That is to say that also load factor increased with reference to 2009 (in 2010 was 79,4% , +1,9% with reference to 2009). These positive results were achieved despite the airspace closures on April and December. European airlines show a very small profit in 2010, thus not recovering the losses of 2009. Within Europe, there is considerable variety in the amount of air traffic on an individual country basis. Based on ACI airport passenger data, it is evident that Europe is dominated by certain core markets notably the UK, Spain, Germany, Italy and France, which combined accounted for approximately 75% of European Union airport passenger traffic in 2010 (see Fig. 30)

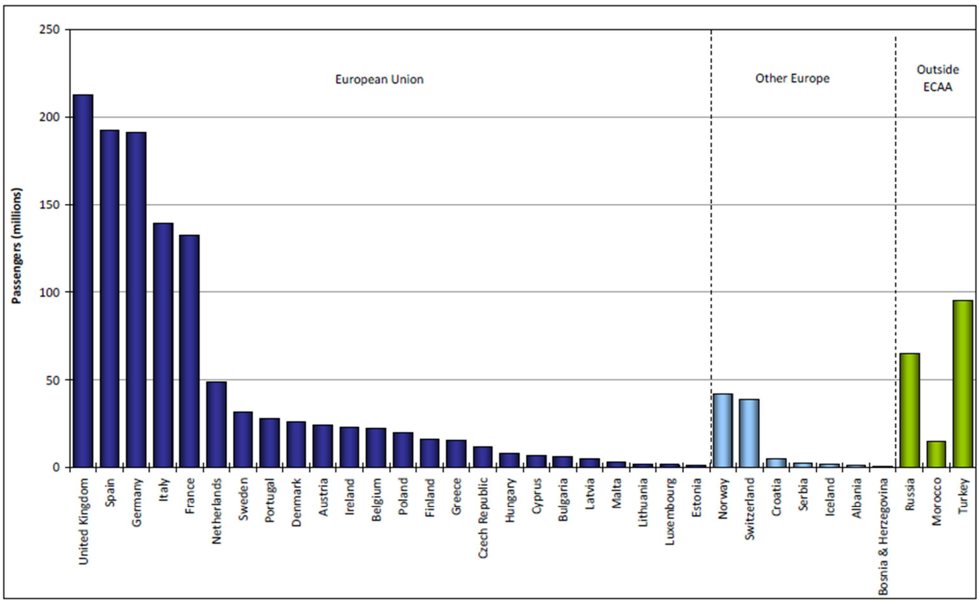


Fig. 30: European Airport Passenger Traffic by country - 2010 (Source: IATA)

Italy in 2010 registered the highest growth among the top 5 largest markets thanks to the strong growth at Rome Fiumicino (+7,5%), Milan Malpensa (+8,0%), Bergamo (+7,2) and Bologna (+14%). After the worldwide declines of 2009, the UK (largest market) was the only country in the top ten European markets to suffer a further drop in 2010 (-3,5%). The

European Union Member States recording the highest growth in 2010 included Lithuania, Latvia, Malta, Denmark, Poland and Austria. Outside of the European Union but within the European Common Aviation Area Serbia, Albania, Turkey and Russia achieved robust growth in 2010 driven in large part by tourism. The majority of others airports in Europe posted moderate growth figures with the negative exceptions of London Heathrow, London Gatwick and Palma de Mallorca. With reference to medium sized airports (over 2,5 million passengers) the largest traffic growth was registered at Brussels Charleroi (+32%) while the airports losing traffic were Belfast International and East Midlands Airport (-11%) due to increased competition and traffic reduction by their dominant carriers.

Despite the passengers growth, apart from Rome Fiumicino and Frankfurt, Europe’s major airports handled fewer air transport movements than in 2009. The principal reason are the unforeseen closures due to volcanic ash cloud and severe winter snowfalls. On the whole, airlines are responding cautiously to the upturn in traffic, preferring to increase load factors and/or using larger aircraft before adding further frequency or new routes to their networks.

Continent	Pax 2010	Freight 2010
Other Europe	33,87%	5,63%
North Africa	12,88%	22,00%
Rest of Africa	4,73%	6,79%
Far East and Australasia	11,94%	36,48%
Middle East	9,94%	16,81%
South america	3,67%	4,93%
Central America	3,49%	2,01%
North America	19,48%	25,15%

Table 48: Passengers and Freight flow from EU airports – 2010 (Source: IATA)

Airline	Nation	Service
Air Bucharest	Romania	Charter to Turkey
Belle Air Europe	Italy	Low-cost linking Italy and Albania
Eagles Airlines	Italy	Domestic based in Venice
Enter Air	Poland	Charter from Poland to Turkey, Greece, Egypt and Tunisia

Table 49a: Airlines which entered EU market in 2010 (Source: IATA)

Airline	Nation	Service
Blue wings	Germany	Charter
Hola airlines	Spain	Charter
Myair	Italy	Lowcost
Air Slovakia	Slovakia	Network
Highland airways	UK	Domestic
Air Volga	Russia	Regional
MK Airlines	UK	Cargo
Cyprus Turkish Airlines	Turkey	Network
Athens airways	Greece	Regional
Star1 Airlines	Lithuania	Lowcost
Viking Airlines	Sweden	Charter
Blue Line	France	Charter
Eurocypria Airlines	Cyprus	Charter

Table 49b: Airlines which ceased operations in 2010 (Source: IATA)

There were no major primary aviation regulatory or legislative actions implemented by the EU during 2010. The EU has continued to make significant progress through its comprehensive and horizontal agreements with non-EU states in widening the area in which the airline industry can compete freely.

The EU is vigilant over possible illegal price fixing, co-operating with other bodies both within the Community and around the world: for example

Germany's competition authority fined the air carrier Condor €1,2 million for illegally fixing prices on routes to Turkey, having colluded with Lufthansa joint venture airline SunExpress.
Actions were taken also against some governments for not being compliant with Ground Handling liberalization process.

An area of concern is the increasing divergence of attitudes by Member States towards the taxation of aviation, for example with reference to Air Passenger Duty (APD). Italian government is planning to charge passengers with an additional 2€, while on the other hand Ireland is planning to reduce its APD from €10 to €3 and both the Netherlands and Belgium decided to drop this tax altogether.
With the UK now surcharging passengers 14€ for an economy flight within Europe and 195€ for a long haul journey in premium class, there is scope for distortion of markets with passengers electing to fly (or travel by surface) from the UK or Germany to Amsterdam or Paris in order to take long-haul flights. The original purpose of APD would have been a tax on aviation to address its greenhouse gas emissions and now it is feared that, with the purpose of extending the ETS scheme to aviation, there will be a duplication of taxation.

The EU allows up to 49% of non-EU participation in EU airlines. Existing law in the United States specifically limits non-U.S. ownership of U.S. certificated airlines to smaller shareholdings of 25%. These provisions are viewed by many as exclusionary, preventing all but limited foreign investment in the U.S. domestic airline industry and preventing any real non-U.S. control over an airline's business decisions.
Airline alliances are currently the only accepted option, subject to their compliance with respective anti-trust rules.

3. Recent worldwide traffic evolution

The size of the European market was 97% of the North American market in 2010 and it remains the second largest, ahead of Asia Pacific. Europe's airports recorded over 4% growth year-on-year, higher than that achieved by North American (2,5%) but, however, below the worldwide average growth (6,6%).

The volume of global air cargo recovered significantly during 2010 (+15,3%) with the market still dominated by Asia Pacific (+18,5%), North America (+13,2%) and Europe (+15,5%). Significant increase took place also in Middle East and Latin America, although the volumes are still not comparable with those previously mentioned (see Table 50).

This was the largest increase in three decades after a strong decline in 2009.

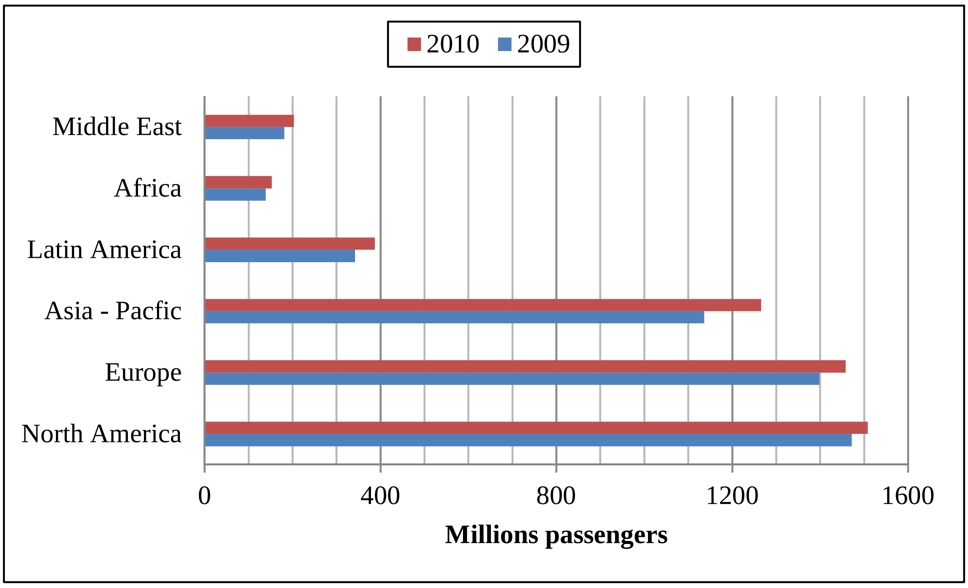


Fig. 31: Annual airport passengers by world region – 2009 versus 2010 (Source: IATA)

Region	Million Pax 2010	% change vs 2009	Million Movements 2010	% change vs 2009	Million Tons freight	% change vs 2009
Africa	152,7	9,90%	2,1	4,80%	1,7	1,90%
Asia - Pacific	1.265,6	11,40%	9,4	6,90%	31,9	18,50%
Europe	1.458,0	4,30%	15,5	0,60%	17,9	15,50%
Latin America	387,4	13,40%	4,9	7,80%	4,7	14,30%
Middle East	203,4	12,20%	1,7	8,30%	5,9	13,70%
North America	1.508,5	2,50%	19,8	-0,90%	28,7	13,20%
Total	4.975,5	6,60%	53,6	2,10%	90,7	15,30%

Table 50: Worldwide Airport traffic summary, by region - 2010 (Source: IATA)

By comparing the regional market share of total global airport passenger throughput in 2010 with 2005 and 2000, it is possible to notice that Europe's share of the global total has remained fairly constant, the North American market share has decreased by 12% since 2000. Meanwhile, Asia Pacific has increased its portion of the market by 7% since 2000, while Latin America's market share has risen 2,6% in the same period of time. In real terms, each regional market is growing, but North American and European rates are lower because they have a larger air traffic base. Fig. 32 and 33 below describe the evolution of passenger output per region in the last decade.

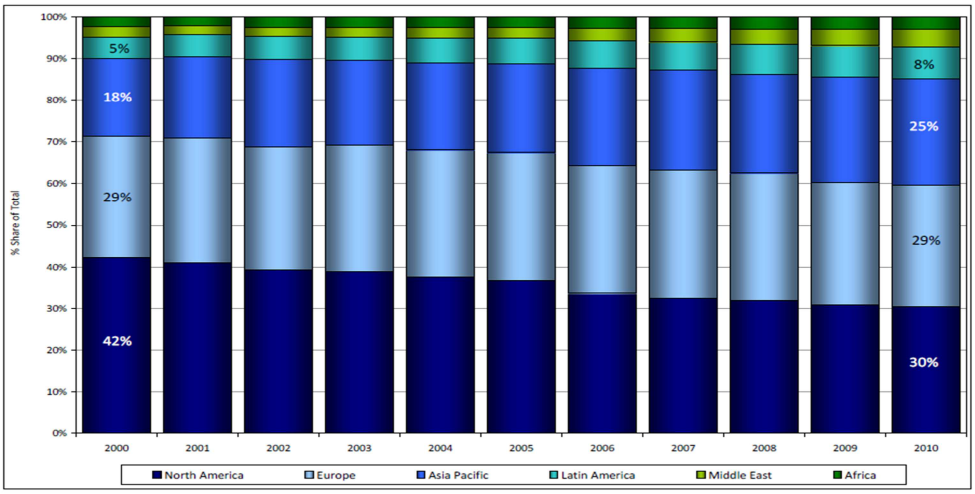


Fig. 32: Evolution of Air Passenger segmentation by country 2000-2010 (Source: ACI)

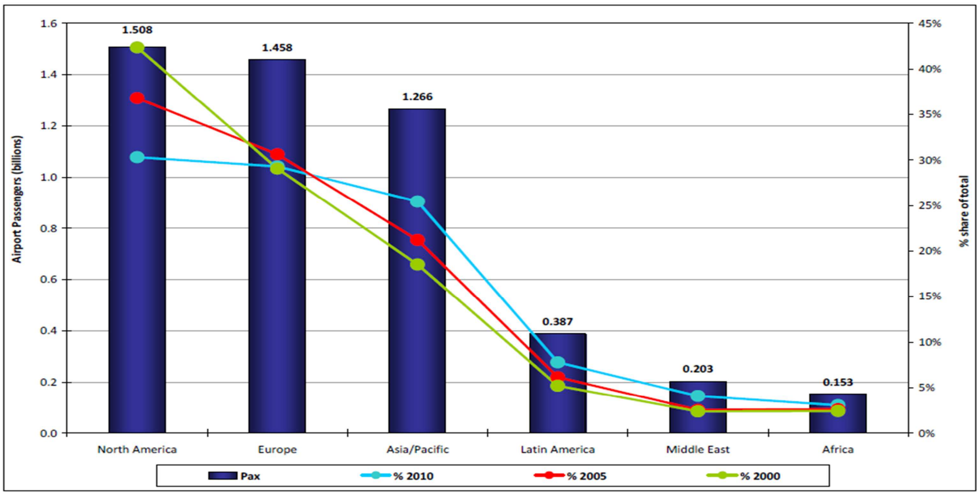


Fig. 33: Airport passengers traffic segmentation by country 2010 (Source: IATA)

Although the European air transport market remains second only to North America by volume, the year was characterized by a continuation of one particular trend – the development of emerging markets and the stagnation in mature markets. Asia Pacific air passenger demand increased by 11,4% in 2010 over 2009, while the Middle East grew by 12,2%. Airports in Latin America showed even stronger growth at 13,4% while Africa grew by 9,9%. Each of these regions far exceeded the pace of growth experienced in the advanced mature markets of Europe and North America.

According to ICAO, international airline traffic (RPKs performed on scheduled services) increased by 8,5% in 2010, led by a strong rebound in business and leisure long haul travel, particularly in emerging markets such as the BRIC (Brazil, Russia, India and China) nations where outbound tourism flourished. The largest percentage growth was registered by the airlines of the Middle East with 20,5%, followed by those of Africa (18,3%) and the Asia Pacific region. International traffic in the mature markets of North America and Europe grew by 6,6% and 7,7% respectively. Europe is still benefiting from the so called "*Low cost effect*" as LCCs are still expanding their point to point networks after the geographical enlargement of the European Union and the consequent liberalization of Easter Europe markets. Domestically, in 2010 markets grew overall by 7,1% over 2009 levels. Lower growth rates of 2,4%, 7,7% and 7,6% in North America, the Middle East and Africa respectively were offset by rates of 12,8% in the Asia Pacific region, 18,6% in Latin America and 9,9% in Europe. Asia Pacific volumes benefited from an increase of around 17% in the Chinese domestic market.

Region	Domestic	International
North America	2,4%	6,6%
Africa	7,6%	18,3%
Asia Pacific	12,8%	12,6%
Europe	9,9%	7,7%
Latin America and the Caribbean	18,6%	6,6%
Middle East	7,7%	20,5%

Table 51: ICAO members Airlines RPK growth, by region - 2010 (Source: ICAO)

The global recovery saw world GDP grow by 5,1% in 2010. This was compared to a -0,6% in 2009. The strongest economic growth worldwide in 2010 was experienced in Asia, in particular in China and India, recording growth at 9,5%; almost double the global average. This region is also forecast to experience the highest economic growth rates going forward to 2016.

The cost of jet fuel has been an increasing burden for airlines since the middle of the last decade. Today, fuel costs typically account for around 30% of an airline’s operating cost. The volatile nature of kerosene price fluctuations means that commercial aircraft operators are continually struggling to keep these operating costs under control. There is a close correlation between changes in fuel price and the subsequent change in average air fares in the European and U.S. domestic markets. After a downturn in 2009, fuel prices rose again in 2010 and are set to rise further in 2011. In 2010, the annual average price of jet fuel rose to USD 2.17 from USD 1,67 per U.S. Gallon, an increase of 30%. In 2010, the euro continued to remain strong adversely impacting the competitiveness of Eurozone tourism destinations compared to other Mediterranean resorts in Turkey and North Africa.

IATA reported that in 2010 its member airlines recorded demand for scheduled air traffic showing an 8,2% increase in passenger business, measured in terms of RPK. Demand growth outstripped a seat capacity increase of 4,4%. The average passenger load factor for the year was 78,4%, representing a 2,7% improvement on 2009.

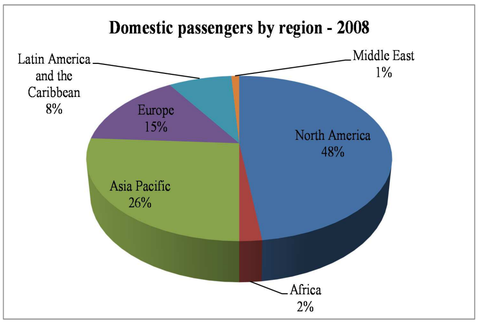


Fig. 34: Domestic and International Passenger segmentation by region - 2008 (Source: ICCSAI)

IATA forecasts that global air travel is expected to increase to 3,3 billion passengers by 2014 (+33% on 2010). Both Boeing and Airbus forecast average annual growth of about 5% between 2010 and 2029. Growth will be driven by strong economic activity in Asia which will act as a key driver to the industry's expansion, overtaking North American market.

China will be the largest contributor of new passengers, accounting 27% of the 800 million increase in passengers between 2009 and 2014. 45% of the new passengers are forecast to travel on Asia Pacific routes, while the USA will remain the largest single-country market for domestic passengers (671 million) and international passengers (215 million).

Movements Growth in the Asia Pacific region is continuing at a considerable pace. The growth at China's major airports has been rapid in recent years with Beijing Capital International Airport growing by 13% in 2010 and reaching 73,9 million passengers. However, this vigorous Chinese growth is causing airspace capacity problems in the Pearl River Delta area. South America is also experiencing rapid growth in its aviation industry which is forecast to continue throughout the decade. European hubs such as Madrid and Lisbon with close cultural links to South America can expect to see vigorous growth in the forthcoming years fuelled by further economic development in South America, particularly Brazil.

In terms of passenger volume, North American airports dominate the top 30 in the world with thirteen airports (43,3% of the sample – against 60% in 2005) recording 637 million passengers; Asia Pacific has nine airports (30% of the sample – against 12% in 2005) with 429 million passengers; EU has seven (23,3% of the sample – against 22% in 2005) airports with 342 million passengers; and the Middle East has one airport (3,4% of the sample – against 0% in 2005) with 46 million passengers (Dubai).

In terms of growth, however, seven out of the top ten are Asia Pacific airports, with four of those Chinese (including Hong Kong). The bottom ten airports comprise seven North American and 3 EU. In 2010, the world's busiest airport remained Atlanta with 89,2 million passengers (+1,5% on 2009).

Growth in the Middle East (albeit from a small base) and Asia Pacific regions is far outpacing EU and North America, reflecting the shift in focus of economic growth across the world. The Chinese airports (including Hong Kong) in the top 30 global list registered a passenger growth of 14% in 2010 over 2009; the corresponding figure for USA and EU airports is 3.1% and 3.0% respectively. Passenger throughput at North American airports has stagnated in the last five years, increasing at an average annual rate of 0,6%. EU airports have experienced similarly slow growth, recording 1,6% growth per year between 2005 and 2010. On the other hand, Asia Pacific and Middle Eastern airports achieved 6,4% and 14,1% average annual growth respectively. Regulation in both EU and North America is tighter in order to deal with topics like security, unfair competition and environmental concerns which are not being considered important at the moment elsewhere; EU and North America should continue to deliver this high quality services being focused on growth; on the other hand the rest of the world would have to find a way to match growth and sustainability.

Rank	Airport	Pax	% Change	Rank %
1	Atlanta	89.238.059	1,5%	25
2	Beijing	73.948.113	13,1%	5
3	Chicago	66.735.180	4,1%	17
4	London	65.747.173	-0,2%	29
5	Tokyo	64.208.802	3,7%	20
6	Los Angeles	59.070.127	4,5%	15
7	Paris	58.075.239	0,5%	28
8	Dallas Forth Worth	56.906.610	1,6%	24
9	Frankfurt	52.710.228	4,1%	16
10	Denver	52.209.377	4,1%	18
11	Madrid	49.784.941	3,1%	22
12	Hong Kong	49.774.874	10,6%	7
13	New York	46.514.154	1,4%	26
14	Dubai	46.313.680	15,5%	3
15	Amsterdam	45.136.967	3,7%	19
16	Jakarta	42.043.642	18,9%	2
17	Bangkok	41.253.893	5,7%	12
18	Singapore	40.923.716	13,4%	4
19	Guangzhou	40.857.345	10,6%	8
20	Houston	40.479.569	1,2%	27
21	Shanghai	40.385.996	26,5%	1
22	Las Vegas	39.757.359	-1,8%	30
23	San Francisco	39.116.764	5,1%	14
24	Phoenix	38.554.215	1,9%	23
25	Charlotte	38.254.207	10,8%	6
26	Rome	35.954.489	7,6%	10
27	Miami	35.698.025	5,3%	13
28	Sydney	35.562.255	7,8%	9
29	Orlando	34.877.899	3,5%	21
30	Munich	34.598.634	6,0%	11

Table 52: ACI Worldwide traffic report at top 30 airport (Source: ACI)

Figure 35 below illustrates the rapid growth at some East and Middle East airports from 2005 to 2010: Dubai has nearly doubled while Beijing, Guangzhou, Shanghai and Jakarta totaled a growth of more than 60%. Airports in Singapore, Hong Kong and Sydney are also in the top ten. This highlights the dominance of Asia Pacific airports in terms of growth. Conversely, five out of the six airports that have recorded declining passenger traffic levels between 2005 and 2010, 5 are located in North America.

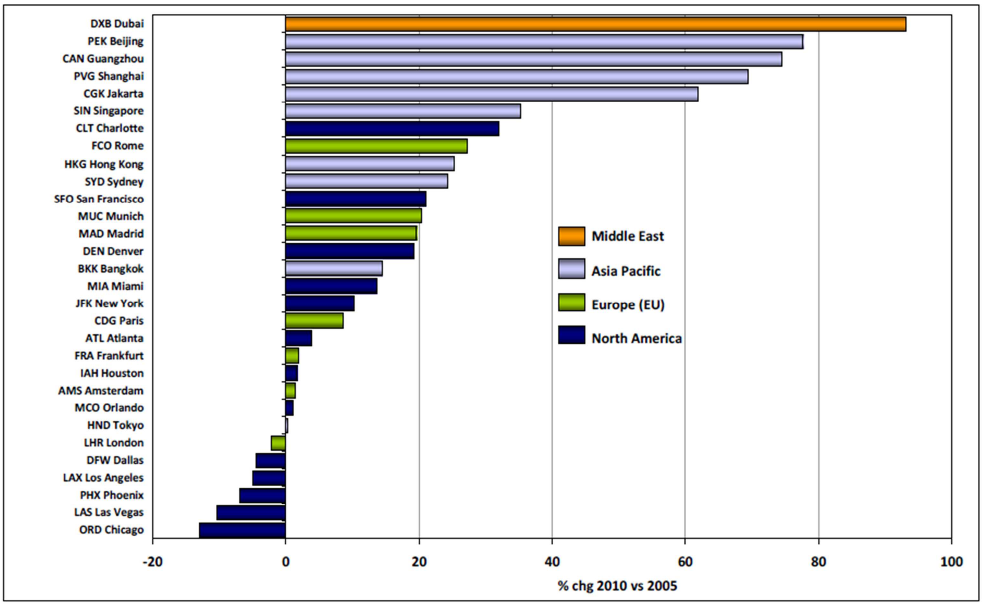


Fig. 35: Top 30 global airport – 2010 vs 2005 (Source: IATA)

The airports of Charlotte, Rome, Denver, Madrid, Munich are in the top 15 with reference to % growth between 2005 and 2010 even if they are located in countries characterized by mature – and therefore slower-growing – economies; this means that these airports have been able to take advantage from circumstances, attracting new airlines (among those LCCs) with increased capacity and aggressive marketing and pricing policies.

The IATA global traffic figures of November 2011 show a decline in passenger output while air cargo remains weak if compared to 2010 levels.

A comparison between passenger traffic demand in November and in October 2011 shows that the decline is about the 0,5% on a seasonally-adjusted basis.
Moreover, passenger load factor worldwide has fallen sharply from 78,5% in October to 76,3%, thus highlighting that the weakness in passenger demand is outpacing the airline’s ability to adjust capacity. Finally, freight market shows a 4% contraction with reference to January 2011.

4. Airlines

During 2010, average passenger load factors recovered as did average aircraft utilization and average yields per passenger kilometer. On the other hand, the cost of fuel continued to rise also in 2011 putting immense strain on airline profitability.
Airlines based in Europe were the least improving: capacity up by 2,6% and traffic by 5,1%. In comparison, Middle Eastern airlines increased their capacity by 13,2% and traffic by 17,8%.
According to IATA, the distinction between legacy carrier, regional carrier and low cost carrier is becoming thinner and thinner: there are a lot of examples worldwide of low cost carriers offering high quality services and, viceversa, legacy carriers offering a set of low fares seating. Also the last actual burden between legacy carriers and low cost carriers is predicted to be overcome in few years: AirAsia X is the first Low-cost carrier that successfully tried to introduce some long haul routes in its network. Experts from IATA and from other regulator say that the recent trend will bring airlines to move towards a common model that will be different from all the existing airline models: only the best aspects and best practices of each type of service will be kept.
Worldwide, low cost airlines now account for 23% of all advertised seat-kilometers, but the figure for Europe (35,3%) is now higher than any other

world region. Figures from the ELFAA (association of Low fare airlines in Europe) show an increase of 11,5% in passenger numbers over 2009, with its two leading members (Ryanair and easyJet) accounting for some 71% of the total ELFAA carriers' passengers.

Among the top 25 legacy carriers, Middle Eastern, Chinese and Turkish airlines increased capacity the most in percentage terms in 2010 compared to 2009. In terms of absolute growth (in ASKs) the most capacity was added by Emirates, followed by Qatar and China Southern Airlines.
Consolidation in the legacy airline sector continued in 2010 with mergers between Delta Air Lines and Northwest Airlines; and between United Airlines and Continental Airlines. The merger of Delta Airlines and Northwest Airlines was completed at the start of 2010 and created the world's largest legacy airline with the airline operating under one operating certificate, replacing American Airlines in pole position. The merger between United and Continental was approved and integration commenced in 2010, but they would operate separately until they receive a single operating certificate from the FAA. The final preparations also took place in 2010 for the merger of British Airways and Iberia with the two airlines joined together under a single parent company International Airlines Group (IAG), with the transaction completed on 24 January 2011.

Rank	Airline	2010 ASK (millions)	% change vs 2009
1	Delta Air Lines	323.740	2,50%
2	American Airlines	253.463	1,50%
3	United Airlines	192.357	-0,10%
4	Emirates Airlines	175.053	15,40%
5	Lufthansa	167.294	4,40%
6	Air France	158.289	3,10%
7	Continental Airlines	152.748	1,40%
8	British Airways	143.530	-1,60%
9	Us Airways	115.741	2,00%
10	Cathay Pacific Airways	112.253	5,40%
11	Singapore Airlines	106.599	1,30%
12	China Southern Airlines	106.269	14,70%
13	Air China	100.173	12,10%
14	Japan Airlines	96.543	-15,90%
15	Air Canada	93.764	7,50%
16	Qantas Airways	91.803	-0,50%
17	China Eastern Airlines	88.219	10,20%
18	KLM	86.539	3,00%
19	Thai Airways	78.337	6,80%
20	Korean Air	78.314	2,30%
21	Qatar Airways	70.811	25,00%
22	TAM Linhas Aereas	69.935	7,80%
23	All Nippon Airways	65.938	-1,80%
24	Iberia	61.868	3,90%
25	Turkish Airlines	59.167	14,70%

Table 53: Top 25 legacy carriers worldwide - 2010 (Source: OAG)

Emirates has moved from 6th to 4th position overtaking both Lufthansa and Air France, Air China moved from 15th to 13th position overtaking Japan Airlines and Qantas Airways; and Qatar Airways moved from 24th to 21st position overtaking TAM Linhas Aereas, All Nippon Airways and Iberia. Turkish Airlines, with its +14,70% on 2009 is due to rapidly acquire an higher position in the rank. Delta Air Lines and United Airlines data group together the result of both the airlines (Delta = Delta + Northwest; United =

United + Continental). Air France + KLM together would be ranked 3rd, British + Iberia together would be 4th, United 5th and so following).

Top 20 Airlines in the world - ASK 2010				
Rank	**Airline**	**N° airports**	**N° routes**	**ASK 2010**
1	Delta air lines	381	2104	310.797
2	American airlines	259	1126	271.964
3	Air France - KLM	280	765	228.802
4	United Airlines	216	885	212.116
5	Emirates	100	216	179.718
6	Continental Airlines	262	843	168.613
7	Lufthansa	202	731	159.256
8	Southwest Airlines	69	955	158.239
9	British airways	169	401	147.984
10	US Airways	202	884	136.189
11	Singapore Airlines	80	166	109.236
12	Cathay Pacific Airways	56	141	107.353
13	China Southern airlines	178	1197	105.758
14	Air China limited	143	599	100.419
15	Air Canada	170	706	97.792
16	Ryanair	160	2358	95.086
17	Qantas Airways	75	292	94.976
18	China Eastern airlines	163	990	88.650
19	Korean Air lines	108	277	81.580
20	JAL	80	306	80.479

Table 54: Top 20 Airlines in the world. ASK (million) 2010 data (Source: ICCSAI)

To have a more inside look at the market, a short summary of 2010 result by region is presented:

<u>Europe</u>

European-based airlines 2010 versus 2009 results (IATA):

- RPK: +5,1%
- ASK: +2,6%
- average load factors increased by +1,9% to reach 79.4%

The Association of European Airlines (AEA) legacy carriers recorded an annual RPK growth for its member airlines of 2,7%, almost half that reported by IATA, that is to say that much of the additional capacity and passenger growth on European routes came from low cost carriers (LCC). To be more specific Aegean Airlines, Air France, Finnair, British Airways, bmi, Iberia, Malev (it declared bankruptcy at the end of 2011), Czech Airlines, Croatia Airlines and Virgin Atlantic experienced overall passenger declines while significant growth was achieved by Air Baltic, Icelandair, Luxair, LOT Polish Airlines, Austrian, Ukraine International Airlines, Tarom Romanian Air Transport, Turkish Airlines and Aerosvit.

The merger of British Airways and Iberia in early 2011 means that nearly 75% of the available capacity offered annually by AEA member airlines comes from three airline groups: Air France/KLM/Alitalia 29%; Lufthansa/Austrian/Swiss/bmi/Brussels Airlines 24% and BA/Iberia 20%. Whilst the merger between BA and Iberia was completed by January 2011, in the same month the EU Commission blocked the proposed merger between Olympic and Aegean Airways announced by the two carriers in February 2010.

Top 20 Airlines in the EU - ASK 2010				
Rank	**Airline**	**N° airports**	**N° routes**	**ASK 2010**
1	Ryanair	148	2224	91.168
2	easyJet	106	879	53.349
3	Lufthansa	90	411	33.835
4	Air France	85	345	25.205
5	Air berlin	108	997	36.830
6	Iberia	80	410	22.991
7	British Airways	68	183	23.748
8	SAS	76	298	21.243
9	TAP portugal	44	128	13.944
10	KLM	39	76	8.961
11	Alitalia	52	217	17.178
12	Aer Lingus	66	222	12.762
13	Hapag Lloyd express	31	322	7.636
14	Norwegian air shuttle	78	400	16.901
15	Finnair	66	139	10.337
16	Air Europa lineas aereas	35	213	9.939
17	Spanair	31	135	8.648
18	SWISS	44	120	7.821
19	Monarch airlines	18	98	9.927
20	Condor Flugdienst	31	265	8.399

Table 55: Top 20 Airlines in Europe. ASK (million) 2010 data (Source: ICCSAI)

Top 20 Airlines in the EU - millions ASK 2010 per country											
Rank	**Airline**	**Spain**	**UK**	**Germany**	**Italy**	**France**	**Portugal**	**Norway**	**Greece**	**Sweden**	**Switzerland**
1	Ryanair	20.953	19.964	7.092	14.430	4.304	2.525	1.887	12	2.839	61
2	easyJet	9.053	20.488	2.619	6.533	5.032	2.672		1.555	95	1.197
3	Air berlin	10.342	268	19.514	1.651	185	644	67	1.198	141	1.165
4	Lufthansa	2.006	1.567	20.061	2.715	1.203	1.084	500	680	778	347
5	Air France	798	695	1.001	1.269	18.596	354	132	441	277	257
6	British Airways	1.130	13.329	1.219	2.139	964	445	253	634	499	730
7	Iberia	16.918	618	964	1.403	905	210		281	154	362
8	SAS	595	1.565	930	495	696		7.099	119	4.236	435
9	Alitalia	702	709	141	13.769	640			343		72
10	Norwegian air shuttle	2.282	686	271	391	502	118	7.763	260	1.903	78
11	TAP Portugal	341	854	649	867	1.038	7.957	156		169	609
12	Aer Lingus	1.895	2.372	583	472	438	410		33		157
13	Vueling	8.531	223	8	1.298	1.056	162		110		19
14	Finnair	685	575	505	414	604	132	99	78	211	251
15	Air Europa lineas aereas	8.733	113		230	791	62		10	1	
16	Monarch airlines	3.790	4.961				521				
17	KLM	749	760	200	630	131	222	403	238	362	201
18	Spanair	7.563	44	269	52	7				305	
19	Wizzair	351	1.497	361	691	199		218	2	298	
20	Condor Flugdienst	3.335		4.217			97		550		
Quota Ryanair+EasyJet (%)		25,7	44,9	13,1	32,1	21,0	23,8	9,2	8,5	18,6	9,0
Quota LLC (%)		57,7	65,2	58,1	44,4	29,1	38,5	49,3	30,0	39,6	37,5

Table 56: Top 20 Airlines in Europe. ASK (million) per country 2010 data (Source: ICCSAI)

Major EU airlines per passengers traffic 2010		
Airline	**Pax 2010 (x1000)**	**Load factor %**
Lufthansa group *	90.174	79,3
Ryanair	72.720	82,0
Air France - KLM **	69.770	80,7
easyJet	48.800	87,0
airberlin	34.100	76,8
British Airways	30.484	78,5
Alitalia	23.355	70,5
SAS	21.532	75,2
Iberia	19.622	82,2
Norwegian	13.029	77,0
Aeroflot	11.286	77,2
Vueling	11.036	73,2
Thomson Airways	10.996	89,9
Aer Lingus	9.709	76,1
wizz air	9.600	84,0
Lufthansa group *		
Lufthansa	58.916	79,3
Swiss	14.169	82,3
British midlands - bmi	1.304	n.a.
Austrian	10.895	76,8
Brussels airlines	4.890	n.a.
Air France - KLM **		
Air France	46.893	80,6
KLM	22.787	81,3

Table 57: Major airlines and groups in EU per passengers and Load Factor - 2010 (Source: ICCSAI)

Taking into consideration also the merging between Iberia and British, the new airline would have totaled 50 million passengers in 2010 ranking 4th. Moreover, if we consider also the likely merging between Air France-KLM and Alitalia, the group would total more than 90 million passenger (according to 2010 data), thus becoming a menace to Lufthansa group's hegemony in Europe.

North America

North America-based airlines 2010 versus 2009 results (IATA):

- RPK: +7,4%
- ASK: +3,9%
- average load factors increased by +2,6% to reach 82,2%

Within the international traffic markets it was the transpacific routes which grew the most (+12.2%), followed by Latin American routes (+8.7%) and North Atlantic routes (+2.5%).

For ATA carriers, domestic traffic (RPKs) accounted for 66,7% of the total in 2010, a reduction of 1% point compared to 2009. There has been also an improvement of passenger yields for the major U.S. carriers.

Asia Pacific

With reference to Asia/Pacific-based airlines, IATA reported the following results for 2010 on 2009:

- RPK: +9%
- ASK: +3,6%
- average load factors increased by 3,9% to reach 77,6%.

Chinese carriers have been at the heart of this recovery; moreover Chinese economy overtook Japanese becoming the second largest in the world: China Southern (+20%), Air China (+17%), Hainan Airlines (+14%).

The region continues to see strong growth in its low cost sector with AirAsia, JetStar and Virgin Blue all recording double-digit traffic increases. Tiger Airways posted a +20% in passenger numbers, thanks to the growth in domestic markets.

Japan Airlines filed for bankruptcy protection in January 2010 but continued to operate under a restructuring plan. In June, Japan Airlines and American Airlines applied to the Japanese Transport Ministry (MLITT) and were given approval for anti-trust immunity to operate as if they are a unique airline for commercial flights between North America and Asia. ANA and

United requested the same. The US Department of Transport gave final approval to both joint venture applications enabling implementation of the US - Japan ‘Open Skies’ agreement

Air India received 20 billion INR (430 million USD) form the Government to restructure its business.

Middle East

With reference to Middle East-based airlines, IATA reported the following results for 2010 on 2009:

- RPK: +17,8%
- ASK: +13,2%
- average load factors increased by 3,0% to reach 76%.

The three largest carriers in the Middle East (Emirates, Qatar and Etihad) increased their ASK by 15%, 25% and 16% respectively; all above the region’s average of 13,2%.

Latin America

With reference to South America - based airlines, IATA reported the following results for 2010 on 2009:

- RPK: +8,2%
- ASK: +2,9%
- average load factors increased by 3,8% to reach 76,7%.

The highest growth in load factors were on intra-Latin American routes (+4,2%), followed by a +3,4% on other international routes and a +2,9% on domestic routes. Domestic routes saw the highest increase ASK (+9,6%) followed by intra-Latin American ASK (up by 7,1%) and other international routes (+1,4%).

On 28 August Mexicana Airlines suspended operations after a brief period (since early August) of operating under creditor protection in both Mexico and the United States.

Africa

With reference to African airlines, IATA reported the following results for 2010 on 2009:

- RPK demand increased by 12,9%
- capacity growth (ASK) of 9,6%
- average load factors by 2,4% to reach 69,1%.

Whilst much of the capacity expansion in Africa in 2010 was by low cost carriers, Ethiopian Airlines has been expanding its long-haul network. It added 12% extra capacity in 2010 compared to 2009, more than double the growth of other legacy African carriers such as South African Airways (+4%) and Kenya Airlines (+5%).

The process of liberalization enhanced the process of concentration within airline industry worldwide and alliances have become increasingly integrated and overbearing as foreseen by Doganis in 2001.

At a global level, the process of integration has led to the creation of alliances of normal carriers operating hub and spoke network. Three major groups dominate the market: Oneworld, Skyteam and Star Alliance.

Alliances between legacy carriers is a method by which most major airlines seek to reduce costs and increase their market share since it allows the adoption of commercial practices aiming at maximizing the number of routes served avoiding the brand duplication of routes and market losses. This is expected to be the trend until there will be no interest in who owns the world’s airlines. When that happens, there is likely to be a rapid contraction in the number of major airlines and the result would be a handful of large multinational airlines, often based in territories with low taxation levels and with a significant share of their labor costs contracted out to low-wage economies.

Star Alliance is the largest alliance in terms of aircraft, passengers and revenues (USD 151 billion in revenues in 2010, 47% of total alliance revenues); SkyTeam and oneworld tied at USD 86 billion and 26,5% each.
The main trend in the last decade was that unaligned airlines would join one of the three alliances; nevertheless some major airlines like Emirates, Etihad, Qatar Airlines and Virgin Atlantic are still unattached.
Taking into account both 2010 and 2011 data, it is possible to derive that the market shares of alliance airlines did not change significantly. The highest variation is a +0,5% in LCCs market shares combined with a -0,3% in un-aligned legacy carriers' market share. This is to say that the industry seems to have reached a stable situation after the period of rapid increase in both alliances and low cost operations.

Capacity	**2010**		**2011**		**Growth**
	billion ASK	**%**	**billion ASK**	**%**	**%**
Star Alliance	129,4	25,6%	143	26,1%	10,50%
Sky Team	78,9	15,6%	86,9	15,8%	10,10%
One world	75,6	15,0%	77,8	14,2%	2,90%
Total	283,9	56,2%	307,7	56,1%	8,40%
Other legacy	142,5	28,2%	152,9	27,9%	7,30%
LLCs	78,8	15,6%	88,2	16,1%	11,90%
Gran total	505,2	100,0%	548,8	100,0%	8,60%

Table 58: Global airline alliances – ASK advertised 2010 (Source: OAG)

Star Alliance → it is the largest alliance in terms of aircraft, passengers and revenues. It gained Brazilian airline TAM in May 2010; further strengthening the alliance's presence in South America. At the end of June 2010, Greece's largest airline in terms of passengers carried also joined the alliance. In 2010 Ethiopian Airlines along with Air India were accepted into the alliance. The other three pending airlines to join Star Alliance are the Central and South American carriers Avianca, TACA and Copa Airlines.
Sky Team → China Eastern will become the second Chinese carrier in the alliance after China Southern. In 2010, Vietnam Airlines and TAROM

Romanian Air Transport were welcomed into the alliance. China Airlines, the flag carrier of Taiwan, formally announced the intention to join the alliance. Shanghai Airlines exited Star Alliance to merge with China Eastern and then joined Sky Team. Further carriers which signed agreements to join Sky Team in the next future have been Aerolineas Argentina, Garuda Indonesia, Middle East Airlines and Saudi Arabian Airlines.

<u>Oneworld</u> → Mexicana suspended its operations in August 2010 while in November S7 entered the alliance. Kingfisher Airlines of India and Air Berlin are due to enter the alliance in early 2012. Following antitrust immunity approval from both the U.S. Department of Transportation and the European Commission, the new JBA that groups together British Airways, Iberia and American Airlines to operate between the European Union (plus Switzerland and Norway) and USA, Canada and Mexico was launched in October 2010.

Mega carriers - Global Carriers Alliances		
Star Alliance	**Sky Team**	**One World**
Already Members		
Adria Airways	Aeroflot	American Airlines
Aegean Airlines	Aeromexico	British Airline
Air Canada	Air Europa	Cathay pacific
Air China	Air France	Finnair
Air New Zealand	Alitalia	Iberia
ANA	China Airlines	Japan Airlines
Asiana Airlines	China Eastern airlines	LAN
Austrian Airlines	China Southern airlines	Mexicana
Blue1	Czech airlines	Qantas
bmi	Kenya airlines	Royal Jordanian
Brussels Airlines	KLM	S7 airlines
Croatia Airlines	Korean air	
EgyptAir	TAROM	
Ethiopian Airlines	Vietnam airlines	
LOT		
Lufthansa		
Scandinavian airlines		
Singapore Airlines		
South African Airways		
Swiss international Air Lines		
TAM airlines		
TAP Portugal		
Thai Airways international		
Turkish Airlines		
United Airlines		
Us Airways		

Table 59a: Global airline alliances - Composition (Source: Websites)

Mega carriers - Global Carriers Alliances		
Star Alliance	**Sky Team**	**One World**
Future members		
Avianca	Aerolinas argentinas	Kingfisher airlines
Copa Airlines	Garuda indonesia	Air Berlin
TACA Airlines	Middle east airlines	Malaysia Airlines
Shenzen airlines	Saudi arabian airlines	
	Xiamen airlines	
Possible members		
Eva Air	Air Algerie	Air Lingus
Jet Airways	Air India	Air Astana
Air India	Air Madagascar	Etihad Airways
Air Malta	Gol Transportes aereos	Gulf air
Utair Aviaiton	Jet Airways	Jet star
Aer Lingus	Uzbekistan airways	Meridiana Fly
Air Algerie	Virgin atlantic airways	Tunisair
Air Astana	Virgin Australia	SriLankan airlines
Air Austral		TAM airlines
Caribbean airlines		TAP portugal
Etihad airlines		Us airways
Gulf air		
LAN airlines		
Luxair		
Pakistan international airlines		
Pluna		
Qatar airways		
Srilankan airlines		
Transaero airlines		
Virgin atlantic		
Virgin Australia		

Table 59b: Global airline alliances - Composition (Source: Websites)

Airline dominance in EU country (%)							
Country	**Oneworld**	**SkyTeam**	**StarAlliance**	**Other NC**	**LLC**	**Regional**	**Other**
Spain + Canarie	17,91	9,74	10,05	0,98	57,72	2,48	1,13
UK	19,06	2,67	7,82	3,77	65,15	1,26	0,27
Germany	4,86	2,02	31,23	1,62	58,10	2,10	0,08
Italy	6,95	24,64	7,45	11,38	44,45	3,22	1,91
France	6,91	45,72	8,56	4,48	29,06	3,38	1,90

Table 60: Global airline dominance at EU major countries (Source: ICCSAI)

A concise summary of trends in the low cost carrier market has been provided in an article produced for the Centre for Asia Pacific Aviation (CAPA) in February 2011: "*The key development of 2011 will be the continuation of the rapid transformation of the business models of low cost airlines worldwide: expansion in intercontinental markets, interline agreements among themselves as well as with legacy network carriers, operations with multiple types of aircraft, two-class service, multiple channels of distribution, more service to conventional airports, enhanced brands and superior communications with potential customers through social networks. These enhanced value propositions will divert more premium-fare passengers from the legacy carriers, both from the business-class cabins and the top end of the economy-class buckets (individual travelers and corporate accounts).*"

Low fares airlines are the major product of the air transport liberalization and deregulation; after fifteen years since they first appeared, it is possible to draw some conclusions on how they have contributed to change the air transport market.

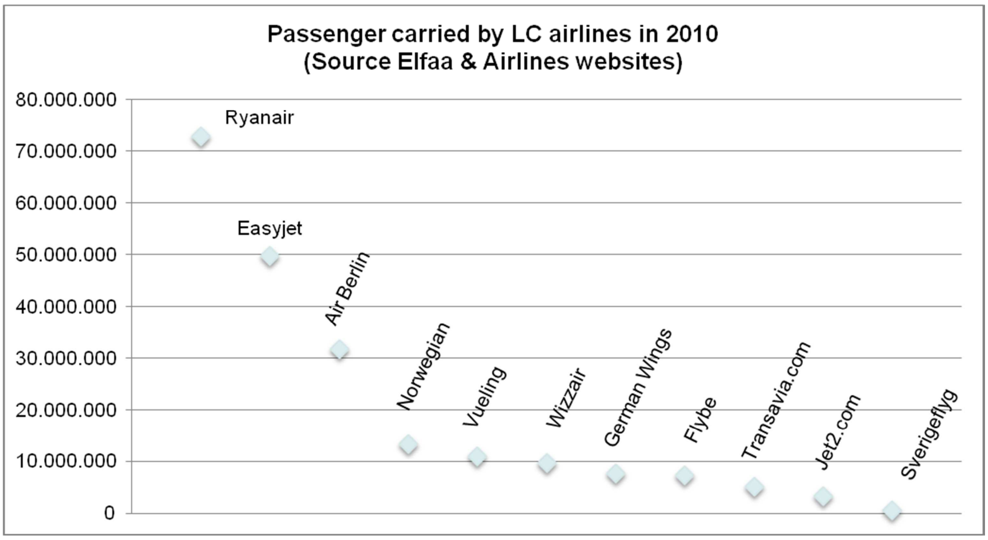


Fig. 36: Concentration of EU LC market (Source: IATA)

Three major players (Ryanair, EasyJet and Air Berlin) dominate the

European market of low fares airlines in terms of passengers carried, while other LC carriers focus their service on limited regions or on certain routes.
The worldwide market of low fares airlines, like legacy carriers' market, is strongly aggregated. It is possible to guess that LC market is even more aggregated in favour of the main players than the NCs' market.
In the first phase, low fares airlines could be considered as alternatives to full service carriers on point to point routes. However, the shift in the perception of LCCs among the passengers, the increased level of service provided and the increased use of major airports had transformed these airlines into actual competitors to legacy airlines on point to point routes.
The evolution of low fares market is also marked by their increased presence in medium sized and large airports as highlighted by the KPMG study and by Fig. 37 below.

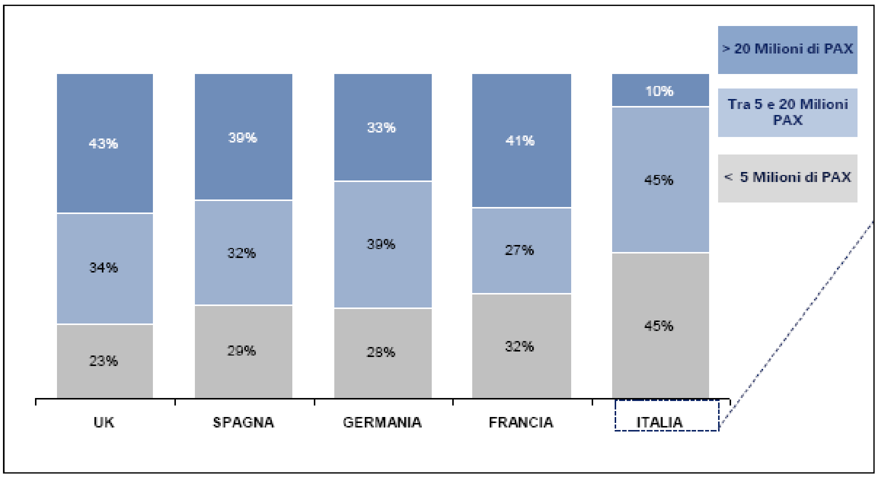


Fig. 37: Percentage of LC traffic at different sized airports in EU countries (Source: KPMG, 2011)

The merger of full service airlines and the consequent rationalization of their routes by the increased use of code share, the decrease in the demand and the higher utilization of aircraft through the increase in load factor as shown by IATA, along with the crisis of charter flights, the decrease of cargo and the concentration of low fare market around few major player, will undoubtedly change the relationship between airlines and airports. The airlines will end up having an increased market and bargaining power towards airports.

According to IATA, the distinction between legacy carrier, regional carrier and low cost carrier is becoming thinner and thinner; as time goes by probably the market segments will remain the same (business, holiday and VFR; local, short-haul and long-haul; point to point and connecting; economy and premium; time-rich and time-poor) but individual airlines will continue to select strategies which maximize their profits, based on their financial capabilities and opportunities. Many airlines will choose strategies that cross over between what are now seen as different kinds of airlines.

IATA industry outlook for 2011 state a weak profitability at 6,9 billion USD (net margin of 1,2%). IATA forecasts for 2012 are even worst: airline profitability of 3,5 billion USD and a net margin of 0.6%. The worst scenario would be the evolution of the Eurozone crisis into a full-blown banking crisis that would lead the global industry to suffer losses exceeding $8 billion USD. Moreover, regional differences have widened, reflecting the very different economic environments facing airlines in different parts of the world (S. Tyler, IATA CEO). Highlights of regional performance:

- **Europe** → it is the most challenging situation as higher passenger taxes and weak home economies have limited profitability. The region's carriers are forecasted to generate a collective profit of just 1 billion USD. Higher traffic growth rates are counterbalanced by high fuel prices and sovereign debt crisis escalation.
- **North America** → the US economy is in better condition than the European one and this, together with airlines' yields and tight capacity management, allowed an improved profitability (2 billion USD).

Nevertheless, American Airlines filed for bankruptcy in 2011 and this indicates that the region is going to face intense challenges.

- **Asia-Pacific** → the situation is uneven: Japan market still has not fully recovered from the March earthquake and tsunami, and load factors remain under pressure. By contrast airlines have improved load factors and profitability on China's expanding domestic market. Thus, the expected profitability for 2011 is the highest at 3,3 billion USD.
- **Middle East** → as the importance of fuel costs at Middle East market is relevant, the profits for 2011 would be 0,4 billion USD.
- **Latin America** → an unforeseeable loss in Brazilian load factor and intense competition brought to a small profit of 0,2 billion USD.
- **Africa** → the market is still not profitable as load factors are still low.

Recent estimations for passenger demand at global level for 2011 expect a growth of + 6,1%. Despite that positive result, cargo performance is under expectations (-0,5% in volumes and 0% in yields) and fuel prices are continuing to grow

In 2012, Europe is expected to be in recession. Global GDP growth forecasts for 2012 have been revised downwards to 2.1%. Historically the airline industry has seen profit turn into loss whenever global GDP growth falls below 2%. Passenger demand is expected to grow by 4.0%, while cargo is expected to show flat growth. As a whole, yields will be negligible provided that the fuel price doesn't grow too much (not over 100 USD x barrel), and the growth in revenues is expected to be overdrawn by that in costs (+3,7% vs +4,5%). All regions are expected to show profit deterioration from 2011.

Two scenarios have been depicted for the regional performance of 2012. The best one foresees a net margin of +0,6%, with strong differences between the regions:

- **Europe →** carriers are expected to lose 0,6 billion USD, hit by the weakness of their home market economies and further increases in passenger taxes.
- **North America →** carriers are expected to generate profits of 1,7 billion USD
- **Asia-Pacific →** carriers are expected to deliver the largest absolute profit at 2,1 billion USD. The deterioration with reference to 2011 is limited by high load factors forecasted on markets such as China that counterbalance the increases in costs due to the growing demand.
- **Middle East →** carriers are expected to post a 0,3 billion USD profit, as long-haul market conditions are strictly linked to European countries' economic condition.
- **Latin American →** carriers are expected to lose 0,1 billion USD, as Brazilian market profitability will be weak.
- **Africa →** carriers will lose another 0,1 billion USD as load factors won't be sufficiently high despite the economies and air transport markets will continue to grow.

The second scenario takes into account the possibility of the Eurozone crisis evolving into a renewed banking crisis. Based on the OECD's view, this scenario would cut global GDP growth to 0.8% and cause the industry a global loss of 8,3 billion USD. Europe would resent from this crisis more than any else (-4,4 billion USD), followed by North America (-1,8 billion USD) and Asia-Pacific (-1,1 billion USD). The Middle East and Latin America would both be expected to post 0,4 billion USD losses, while Africa would be 0,2 billion USD in the red.

IATA CEO's opinion is that "*Government policies need to recognize aviation's vital contribution to the health of the economy* and the airline industry has to be able to *deliver connectivity and keep the heart of the global economy pumping to initiating a recovery*."

According with the worst scenario, there would be no increase in passenger demand and a contraction in both cargo market and yields. Overall expenses would be expected to grow by 1,9% on 2011, but revenues would fall by -1,3% despite the likely fall of fuel price.

AEA Secretary General said that, despite the fact that "*most of the members would have posted good results over the first nine months of 2011, passenger numbers were at +8% on 2010 and the outlook for the full year were positive, 3rd and 4th quarter yields would be weak. Soaring external costs, such as fuel and taxation, continue to hamper industry profitability. For example, in 2012 fuel costs are expected to be 40% up on 2009 levels, accounting for a massive 29% of total operating expenses.*"

5. Mergers and acquisitions

A merger is a combination of at least two businesses in one entity. The existing constituents remain shareholders of the combined entity. Mergers often occur in industries in which margins continuously stay under pressure. They make financial sense if sales or cost synergies can be exploited to reach a higher combined profitability.

There are many ways of legally and technically structuring mergers. This may also include cash payments and the transfer of existing debt.

In response to the impact of the recession, several trends in the airline industry were either strengthened or confirmed in 2010. Consolidation accelerated mainly for American and European airlines while the development of new airline business models expanded. LCCs market as well is experimenting market concentration, but the phenomenon is different if compared with the legacy carrier.

Legacy carriers, in order to increase their market share, have enhanced the practice of airline alliances, because they are intent on increasing the number of passengers. Two definitive characteristics of strategic alliances are exclusive memberships and a joint marketing entity. Airline alliances should be fostered by different factors, such as increased globalisation in air transport, increasing interaction, economic incentives for airline consolidation, liberalisation and anti-trust concerns. Airline alliances take many forms and not only generate various benefits and risks to the members but also to other stakeholders such as passengers, communities and travel agencies. The alliances could result in new route options, extension of frequent flyers program and common reservation systems and creation of new market shares. On the other hand, there could be a potential tendency for reduced both competition and level of services and higher fares.

Historically alliances have been most evident in international aviation where the governments offered the airlines antitrust immunity for transoceanic alliances (for example the open skies agreements between US and European countries) that allow the partners to discuss schedules, fares and frequency of flights.

Direct acquisition can be both in the form of a 100% ownership or in the form of a major shareholding (>50%). Direct acquisition is less viable nowadays both for the huge amount of money implied and for legal restriction to foreign ownership posed by some countries (USA, Australia and EU countries impose a maximum threshold to foreign investors in their carriers). However, after the acquisition, operating fleet and crews often continue to operate with the original brand.

Many authors have studied the economic implication of airline consolidation; the findings show that total costs increase 20% slower than the total traffic generated by the merged airlines.

Other viable forms of cooperation between airlines are characterised by a more operative connotation. These forms of cooperation are the code-sharing agreements and the franchising. Code sharing is an aviation agreement between two or more airlines: on flight panels at airports the target flight reports all the callsigns of the airlines involved but only one airline actually operates the flight, on board seats are split among the airlines involved. This permits the passengers greater accessibility through allied airlines' network (also the reservation system is shared and permits bookings on connection flights operated by different allied airlines) and the airlines not to be forced to offer extra-flights on routes with scarce demand. Criticism has been levelled against code sharing by consumer organization and national departments since it is said to be confusing and not transparent to passengers.

There is franchising when a flight of airline A (franchiser) is flown by airline B (franchisee) with airline A’s level of service standards. Airlines A e B keep their independency. Franchisees may have access to logo, flight-code, products and service standards of the franchiser. Franchiser’s advantage lays in the possibility to quickly expand its network without devoting too many resources. Franchising is especially used in smaller markets, for example the domestic market to provide feeder services to a scheduled carrier’s hub. For example, British Airways has franchising agreements with Gatwick based City Flyer Express and Scottish carrier Loganair. A particular form of franchising is technically called “wet lease” and consists in franchisee’s aircraft and crew with franchisers’ liveries and uniforms. Also low cost airlines have proven willing to consolidate their market power through acquisitions, but the acquired company’s brand (often on the edge of bankruptcy) simply exits the market. For example, Easyjet purchased his rival airline GO or Ryanair took over Buzz in February 2003 and tried twice to do the same with Aer Lingus but in both the cases the acquisition has been thwarted because judged as potentially restrictive of the concurrence at Irish level. Similar episodes took place also in the US with, for example Southwest and AirTran Airways merging in 2010 (N. Gualandi, L. Mantecchini, F. Paganelli, 2010).

In order to co-operate in an alliance (e.g., to code-share or involve in closer forms of co-operation) an airline must receive immunity or an antitrust exemption, from Department of Transport.

Airlines generally are positively oriented to alliances because they are able to offer to each member significant advantages: marketing costs savings, improved competitiveness and improved quality of service among others. These advantages are non-negligible also in light of these carriers' inability to merge. On the other hand, someone might judge alliances or joint ventures between airlines as anti-competitive. In their view, these joint ventures can act as a monopoly operator on certain routes and can use market power to preclude new competition, raise fares, and engage in other anti-competitive practices, particularly where there are slot constraints at one or both ends of a route.

In the following lines, we provide some example of alliance in the different regions of the world:

North America →

British Airways, Iberia and American Airlines reached a JBA to operate between the European Union (plus Switzerland and Norway) and USA, Canada and Mexico. Airlines were granted antitrust immunity approval from both the U.S. Department of Transportation and the European Commission. This agreement includes revenue sharing, combined selling, schedules coordination and other benefits such as frequent flyer consistency and integration, alignment of baggage policies and improved connection timings.

United merged with Continental (2011) and the previous year Delta and Northwest did the same. Moreover, the new Delta Air Lines signed an expanded codeshare agreement on flights between the US and Australia with Virgin Australia Group (2011). Under the agreement, Delta will add its DL code to all flights between Los Angeles (LAX) and Sydney (SYD), Melbourne and Brisbane, operated by V Australia (VA), Virgin Australia's (DJ) long-haul international carrier. V Australia will add its DJ code to DL's service between LAX and SYD.

In 2011, US Airways Express concluded a franchising agreement with SkyWest Airlines: SkyWest will operate 6X-daily Express flights from US Airways' hub in Phoenix. SkyWest is the result of the 2010 merging between Atlantic Southeast Airlines and ExpressJet Airlines.

In October 2011 Delta Air Lines (DL) and US Airways (US) decided a slot swap between New York LaGuardia (LGA) and Washington National (DCA) airport. DOT approved the deal, clearly recognizing the slot transaction as a public interest option because of the service benefits and efficiencies that would result in both airports New York and Washington. Under the deal, DL will acquire 132 slot pairs at LGA from US and US will get 42 slot pairs from DL at DCA.

Latin America →

Group TACA and Avianca finalized their merger agreement to create the joint holding company Avianca-TACA Ltd. The merged airline's fleet totaled 129 aircraft and in total 13 carriers from 10 Latin American countries became part of one airline holding company.

In April, Caribbean Airlines took over Air Jamaica after a number of months of negotiation between the two island carriers.

Also in August 2011, Chile-based LAN and Brazil-based TAM announced they had forged a non-binding memorandum of understanding outlining their intentions to combine their holdings. The deal is subject to both companies completing a binding definitive merger agreement and securing approval from their shareholders and relevant regulatory authorities.

In early 2011 LAN acquired 100% of the shares of Colombia's second largest carrier Aires. Finally, GOL and Aerolineas Argentinas have signed an MOU to begin a codeshare agreement.

Europe→

In Europe there are three big groups that operate more than 70% of the flights. These group are the result of merging and alliances. Air France-KLM's shareholders are the French government (18%) and private investors. Lufhtansa group has been built through the acquisitions of Swiss Airlines, Austrian Airlines, Germanwings, Brussels Airlines and British Midlands. British Airways is due to merge with Iberia in a new entity named International Airlines Group. In Italy some merging have taken place recently: Alitalia and Airone (2008), Alitalia and Windjet (2011) and Meridiana and Air Italy (2011). Moreover, 25% of shares of Alitalia have been sold to Air France – KLM

Looking at EU LCC market, Air Berlin signed a codeshare agreement with S7 to operate flights between Germany and Russia (some of the airports involved are Tegel, Munich, Stuttgard, Dusseldorf, Moscow Domodedovo, Irkutsk, Samara, Kazan, Rostov and Yekaterinburg);

Asia Pacific→

Shanghai Airlines merged with China Eastern Airlines in January 2010, though the two airlines' capacity remains reported separately. Malaysia Airlines Group (MAS) has launched a network rationalization program with its subsidiary, Firefly, which will now serve only short-haul turboprop routes while returning 2 Boeing 737-400 and six 737-800s to MAS.

The Australian Consumer and Competition Commission (ACCC) has issued draft approval for the Joint Business Agreement (JBA) between Qantas and American Airlines for Pacific routes between the US and Australia/New Zealand and the networks that support those routes (2010). ACCC approved also the proposed alliance between Singapore Airlines (SIA) and Virgin Australia (VA). Under the alliance, the airlines will cooperate on all aspects of their Australia-Singapore services and any international and domestic connecting routes, including joint pricing and scheduling, as well as joint marketing and sales. Finally, All Nippon Airways (ANA) officially applied to Japan's Legal Affairs Bureau to establish its planned joint venture LCC with AirAsia to be called AirAsia Japan.

Eric Amel, formerly the chief economist for both Delta Air Lines and Continental Airlines, provided a breakdown of US airlines' domestic market share post-consolidation compared to 2007 (before the Delta/Northwest, United/Continental and Southwest/AirTran mergers).

Pre-consolidation (2007): Southwest (19,8%) + AirTran (4,2%), Delta (11,5%) + Northwest (7,3%), United (10,9%) + Continental (7,2%), US Airways (10,8%), American (13,2%), JetBlue (4,2%), Alaska (3,1%) and others (7,9%). The actual situation today is: Southwest (25,9%), Delta (18,9%), United (15,6%), American (11,5%), US Airways (10,6%), JetBlue (5,1%), Alaska (3.4%), Frontier (2,6%), Hawaiian (1.5%), Spirit (1,4%) and others (3,5%).

Even after consolidation, no airline controls more than a quarter of the domestic market and only three carriers have a market share of 15% or more. In 2007, the top 10 carriers controlled 92,5% of the domestic market; now they control 96,5%. The top five US carriers went from controlling 66,2% pre-consolidation to 82,5% post-consolidation.

The same phenomena may take place between airports: the resulting companies are known as corporatization or corporate governance programs, they are created in order to attract investors and avoid cost duplication. A recent example is the 2011 MOU between Basic Element Group, (which owns several airports in South Russia), Changi Airports International (CAI) and LLC Sberbank Investments to form a joint venture (JV) to invest in and develop airports in Russia. Basic Element will hold 50% plus one share, CAI will hold 30% and Sberbank will hold 20%, minus one share. The creation of the JV is targeted to be completed in the second quarter of 2012.

It is subject to due diligence and final negotiations between the parties and approval by the regulatory authorities. Basic Element runs five airports in the South region: Krasnodar, Sochi, Gelendzhik, Anapa and Yeisk.

6. Vertical integration between Airport and Airlines

Airports are strongly depend on airlines' decision to operate services; for example low-cost airlines have forced airport revenues down thanks to their bargaining position during the negotiation with airport managers. It has become clear that benefits may be achieved if airports and airlines work closely together as "*...if customers don't have a good perception of the situation, it will obviously impact on the image of both partners...*" (J. Spinetta, CEO Air France, 2005).

Large airports are in a better negotiating position than smaller airports, as a bigger size indicates a larger catchment area. The same happens for large airlines that can almost dictate the conditions towards regional airports. The majority of relationships involves hub airports and its hub carrier, but alternative combinations are also reliable (for example, hub carrier and regional airport). In the aviation context there are various forms of specific investments on both sides: airports may adapt their infrastructure to carriers' needs and, on the other hand, airlines can consider their airport choice when making strategic decisions. The longer the duration of the relationship, the more likely it is that each party will show each other commitment through long-term contracts, shared performance measure indexes and trust. In fact, there are benefits for both airports and airlines from entering into long-term relationships: airports can obtain financial support and secure business volume, on the other and airlines can secure key airport facilities on favorable terms; this provides incentives for the airport and the dominant carrier to strike exclusive deals.

Vertical relationship between airport and airline may happen in these scenarios: privatization of hub airport (Lufthansa now holds 9% of shares in Frankfurt airport, thus being able to influence strategic and investment's decisions and to have control on airport's cost development policy), terminal expansion at hub airport (terminal 2 at Munich airport was built and operated by a joint company of Lufthansa and Munich airport; LH wanted a feasible terminal layout to support his double-hub and spoke operations and T2 was also intended to become a premium facility for Star alliance members' passengers) or terminal expansion at a base airport (the low cost carrier commits itself to grant the airport a certain amount of passengers versus lease or rearrangement of airport's structures).

The weak point about vertical integration consists in the potential rise to anticompetitive practices aimed at displacing competing airlines such as diminution of quality of service, potential discrimination, increasing charges, cross-subsidies between airport and airline. This could happen if the airport operator is allowed to control somehow at least one airline. Therefore international experience suggests that airport concessions should impose vertical separation between the airport and the airline.

Airport management should appreciate both the volatility of low-cost market and the rapid growth expectations before formulating airport-airline agreements: long term agreements and investments in infrastructure to accommodate low-cost airlines must be assessed regarding the degree of risk that services may be withdrawn, that is to say "*market volatility*" (Bingelli & Pompeo, 2002). Airport management should be also aware of the necessity of equity issues between traditional and low cost carriers as the social and economic status of a region may be harmed if scheduled services are withdrawn.

Traffic is much more volatile both at secondary airports and in a deregulated environment than under strict regulation that prevents airlines from rapidly changing their routes, fares or frequency of service. The phenomena known as vertical integration between airport and airline consists in deductions on airport fees, commercial alliances and financial aids to project and build new structures, in order to pursue the mutual will to attract passengers. Such relationship may also take place between state and airline, when the former pays the latter the operating costs, for example, to operate air connections to areas not easily attainable else-how or to operate from under-congested airports to reduce the congestion level at main hubs. (N. Gualandi, L. Mantecchini, F. Paganelli, 2010)

IATA's Director General and CEO, T. Tyler said in his speeches that: "*Airports and airlines share a common interest in making aviation safer, more secure, user-friendly, operationally efficient and environmentally responsible.*" He highlighted six areas where airports and airlines can enhance cooperation to innovate and deliver value: safety, security, improving the customer experience, infrastructure investments, environment and charges.

- Safety: runway safety, ground safety and ground damage are the areas of concern. IATA and ACI will promote together the IATA Ground Operations Manual (IGOM) to globally harmonize ground operations
- Security: risk-based approach with the aim of allowing passengers to move through security without stopping, unpacking or removing outerwear.
- Improving the Customer Experience: to improve efficiency and passenger convenience through e-ticketing, common use self-service (CUSS) kiosks and bar coded boarding passes.
- Environment: airports and airlines are united with air navigation service providers and manufacturers to tackle aviation's carbon emissions.
- Infrastructure Investments: building infrastructure to handle growth is a challenge best handled in close cooperation between airports and airlines. This includes working together in the airport master planning

drawing, to ensure that investments are being made that match the needs of airlines. This is the case of London Heathrow Airport, where an ongoing dialogue between the airport operator and the airlines is helping, among other things, to promote capacity expansion, to optimize existing capacity, to take advantage of developing technology, to mitigate noise and emissions, to enhance surface access and to improve operational resilience.

Another example of strategic cooperation agreements between airport and airline is the one signed between China Southern Airlines (CZ) and Dalian Airport (DLC) in order to let the first enhance its position in the northeastern China and compete with Air China (CA) and the second to get more traffic (domestic routes as well as international).

Airport and airline might, for example, find an agreement on a certain kind of service to be provided like a target turn-around time. The result could be obtained through a terminal or an airside renovation. A 25' turn-around time and contact stand is for example part of what Ryanair often requests the airports before starting operations.

- Cost-Efficiency: cost efficient, affordable airports with charges compliant with ICAO principles are of a big importance. Airlines and airports are under similar pressure.

7. Multi airport systems

Whatever the form of ownership and control that the state has selected, the management of airports can be done either on an individual airport basis, on an airport system basis, on an airport network basis or on a combination of these. An airport system is composed of two or more airports serving the same major metropolitan area and operated under a single ownership and control structure. An airport network is a group of airports within a state operated under a single ownership and control structure; it can include all airports serving the territory of the state or only some of these airports. Cross ownership of airports in different states or managements contracts obtained in different states by an international airport management company can also lead to a form of cooperation sometimes referred to as airport network or as airport alliances, but these forms of international cooperation are of a different nature than a network at a national level.

There are arguments in favor of operating and managing a group of airports within an airport network, a form of organization that has become more and more common at a national level. Smaller airports may derive some benefit within a common ownership which could include cross-subsidization. Other arguments point to the advantages for a state having a national air transport system in achieving its national development objectives; the advantages in terms of economies of scale and synergies; the easier access of all airports to capital markets and the better management of capacity and use of resources throughout the network. In summary, an airport network can be a valuable method of collectively managing airports which, taken individually, would not be viable.

Argument against cross-subsidization are based on the fact that charges have to be cost-related, that users should not be charged for facilities they don’t use and that only those facilities used for international air services should be included in the cost basis for charges. In that sense, cross-subsidization between international airport and domestic airports is questionable, although it is recognized that in some states it may be the only way to maintain airports that serve, for example, landlocked regions. Opponents to the network approach also point out that if subsidies are to be provided for national planning purposes, these should rather come from the state than from users of other airports.

Another aspect is related to the operation and management of airports at an international or multinational level, including alliances between airports or airport groups. This is made possible by the operation and management of airports in different states by globalized airport companies. The main advantage of such a form of organization lies in the potential economies of scale, while the drawbacks may be found in a possible diversion of revenue and cross-subsidies between airports in different states (a form of cooperation that may be acceptable to some developing states).

One conclusion that may be drawn from this controversial issue is that an equilibrium should be sought between the interests of airports and users and that in case where cross-subsidization within a national network is applied, that full transparency is necessary. In the final analysis, it is for state to decide on what is in their best interest, taking the above advantages and disadvantages and their particular circumstances into account. In this respect consideration should be given to the possibility for states or charging authorities to recover less than their full costs is recognized as well as the possibility of cross-subsidization through revenues from commercial activities. With regard to international operation and management of airports, this form of organization should be exerted with caution and could be considered as acceptable as long as it bring lower charges through economies of scale (ICAO, 2006).

A competition issue is worth attention when it comes of privatizing airports: should airports have to be taken as a group or separately? This is particularly true when the group is made of large, profitable airports and a number of smaller, loss making airports. This was the case with the Australian airports and also in a number of South American countries prior to privatization. If the airport group is sold as a single entity a higher sale price may be achieved because of the lack of perceived competition. However, if the group contains loss making airports this may make the airports group less attractive to investors. If only the profitable airports are privatized one option would be to use the concession fees to subsidize the smaller airports (Graham, 2008).

Airlines in general tend to be suspicious of airport groups, because they fear to be charged for un-requested services in order to finance the development of another airport which they do not even use (IATA, 2000). In practice in Australia, the government decided on individual privatizations for the major international airports but with packages of some of the smaller ones. Restrictions were imposed to stop the same operator from having overall control at a number of airports. In South America, all 33 Argentinian airports were covered under the same concession agreements, while in Mexico the airports have been divided into four different groups with a mixture of small and large airports in each group. In the United Kingdom, BAA, which is an airport group of seven airports, was privatized in 1987 after much debate as a single entity, but this has remained a controversial issue ever since.

Nevertheless, in our opinion, airport alliances and multi airport system are a positive issue as they foster the elimination of cost duplication and permit to share expertise and know-how. Moreover and most important, airports need to have a contractual power towards airlines as well: as airlines are grouping together and at some airports only one dominant carrier exists, airlines are acquiring a strong contractual power to get lower charges and they might even influence the airports' development. Airport alliances is seen as a good counterstrategy to negotiate with airlines on a fair field. Finally, this trend is also typical in liberalized countries by ground handling operators. (N. Gualandi, L. Mantecchini, F. Paganelli, 2011)

BAA-Ferrovial owns 65% at Naples airport and is in charge of its management and was the airport manager of Chilean Cerro Moreno Antofagasta airport from 2000 to 2010. This is to highlight the fact that BAA-Ferrovial, after the merging, is starting considering the idea of selling its non-strategic assets to cover its debt. Therefore, assets in Bristol, Budapest, Sydney, Glasgow Prestwick (the secondary airport of

Glasgow), Indianapolis as well as in secondary Australian airports have been sold and also the divestiture of Naples airport is foreseen for the next future. Retail management at Baltimore-Washington International Airport, Boston Logan International Airport and Pittsburgh International Airport is held by BAA-Ferrovial. BAA-Ferrovial's shares at Australian airports have been bought by Map Airport, partner of Macquarie Airport. MAp airports is shareholder of Bruxelles, Copenaghen e Tokyo Haneda (Macquaire, sito web).

Another important player in British Airport scenario as well as worldwide is *Manchester Airport Group* (MAG). MAG is the biggest british-owned airport management group and its shares are 100% public. MAG manages Manchester, East Midlands, Bournemouth and Humberside airports. The 100% public shareholding has not proven to be a drawback to expansion towards other market.

Group *Fraport*'s shareholding is composed by the regional government of Hesse, the municipality of Frankfurt and other secondary investors both from public and private sector. In this case too, Fraport is an international managing group which expanded its interests in a panel of several airports worldwide: Hanover, Burgos, Varna, Delhi, Antalya, Il Cairo, Lima and Xian. Fraport group has recently declared its interest in buying Edinburgh airport from BAA-Ferrovial.
Financial results for 2010 show that: Profits were +78% on 2009 and revenue +9%

AENA too is 100% publically owned by the Spanish government, but through Aena Internacional, it takes part in the management of the infrastructure of 27 airports, distributed around the geography of Latin

America (Mexico, Colombia, Cuba and Bolivia), the European Union (United Kingdom and Sweden) and the United States:

- Guadalajara, Tijuana, Puerto Vallarta, Los Cabos, La Paz, Manzanillo, Hermosillo, Bajío, Morelia, Aguascalientes, Mexicali and Los Mochis through its 17,4% shares in Grupo Aeroportuario del Pacífico (GAP);
- Cartagena de Indias city Airport, through its 38% of the shares in Sociedad Aeroportuaria de la Costa S.A (SACSA)
- Barranquilla Airport through its 40% of the shares in Aeropuertos del Caribe S.A (ACSA);
- Cali airport through its 33,3% of the shares in Aerocali Society S.A
- Finally AENA International takes part in operation and management of London Luton, Belfast and Cardiff airports in the UK; Orlando Sanford in USA; La Paz, Santa Cruz and Cochabamba in Bolivia and Skavsta airports in Sweden through its participation in TBI plc,. It also has different operation and management contracts in USA.

AENA is the State airport group owner and operator of 47 Spanish airports, overseeing 2,1 million air transport movements and 193 million passengers in 2010. Consolidated revenue remained steady in 2010 over 2009, consolidated EBITDA increased 57% in 2010 over 2009.

Aéroport de Paris Group owns equity stakes in airport operating companies outside France, some of which are held directly by Aéroports de Paris and the others by ADPM. These stakes are accompanied by management, consultancy or operating contracts held by Aéroports de Paris, ADPM or the company in which the stake is held. The Group’s international holdings are listed below:

Mexico. Since 2000 Aéroports de Paris has held a 25.5% stake in the Mexican company Servicios de Tecnología Aeroportuaria, S.A. de C.V. (SETA), through which it has interests in Grupo Aeroportuario del Centro Norte, (GACN) which is the holding company for 13 airports in the north and center of Mexico, including Monterrey International Airport. Aéroports de Paris enjoys joint decision-making power for major decisions regarding the management of SETA, and, via SETA's role in GACN, exercises indirect management over GACN.

China. In February 2000, ADPM took a 9.99% stake, for 119,9 million euros, in Beijing Capital International Airport (BCIA). The acquisition of this stake was accompanied in 2000 by the signature of a consultancy contract for the support of BCIA, particularly in areas relating to the transformation of the airports to a hub model and the development of non-aviation revenues.

Belgium. Since 1999, ADPM has owned a 25.6% stake in the Société de Développement et de Promotion de l'Aéroport de Liège-Bierset SA (SAB), which manages the Liège-Bierset airport in Belgium.

Guinea. ADPM signed a technical assistance contract with SOGEAC (Société de Gestion et d'Exploitation de l'Aéroport de Conakry), which operates the international airport at Conakry - Gbessia. ADPM has owned a 29% stake in SOGEAC since 1994.

Japan. In February 2006, ADPM, alongside Mitsui and ADP Ingénierie ("ADPi") formed a consortium to bid for the concession to manage the new international terminal at Tokyo Haneda airport in Japan.

Inside France, AdP manages the following airports : Paris-Charles de Gaulle, Paris-Orly, Paris - Le Bourget, Marsa Alam International and Queen Alia International Airport (Amman)

AdP has recently won the bid to build and lease for 30 years a new terminal building at Zagreb – Croatia.

There are notable cases of 100% public management groups that own/manage their country's airports as public infrastructures but, at the same time, are involved in the management of foreign countries airports with a commercial outlook: after AENA, AdP and Fraport in Europe, *Vancouver Airport Authority* is worth to be mentioned: it owns/operates Cranbrook, Fort st John, Hamilton, Kamloops Moncton in Canada, Sangster airport in Jamaica, Lynedn Pindling airport at Nassau-Bahamas, Arturo Merino Benitez Airport in Santiago (Chile), Larnaka and Paphos in Cyprus and has 65% of the shares at both Liverpool and Sheffield Airport in the UK

Italian management groups have no shares in foreign management group and this is in our opinion a strong drawback also for foreign investments at Italian airports. The only notable cases of a single management entity that owns the concession to operate more than one airports are AdR (Rome Fiumicino and Ciampino), SEA (Milan Linate and Malpensa), SAVE (Venice Tessera, Venice Lido plus majority shareholding at secondary regional airports of Padova and Treviso), Aeroporti del Garda Spa (which manages Verona and Brescia airports, but the two airports are too close and therefore Brescia is actually un-used) and Aeroporti di Puglia (Bari, Brindisi, Taranto and Foggia).

Amsterdam Schiphol Group is the owner and operator of Amsterdam Schiphol Airport and the airports at Rotterdam, The Hague, Eindhoven and Lelystad. The group also has airport interests in the United States, Australia, Italy, Indonesia, Aruba and Sweden as well as an 8% stake in Aéroports de Paris. Passenger numbers at Amsterdam Schiphol grew by 3,8%. Results published for 2010 show: net revenue +2,3% and operating profit +58,6%

Københavns Lufthavne owns Copenhagen Kastrup Airport and Roskilde Airport in Denmark. In addition the group has a 49% stake in Newcastle Airport (UK) and 10% of Aeropuertos del Sureste, a group of nine airports in Mexico. Total revenues +11% on 2009 and net profit +48%.

The Port Authority of New York & New Jersey is responsible for all airports and seaports and link tunnels in the New York City area including the five airports of John F Kennedy, Newark Liberty, La Guardia, Newburgh Stewart and Teterboro. Gross operating revenues +2,3% on 2009 and incomes -57,9% on 2009.

The *Airports of Thailand group* comprises the major airports in Thailand including Bangkok Suvarnabhumi, Bangkok Don Muang, Chiang Mai, Phuket, Hat Yai and Chiang Rai. Revenue +12%, full year profits +97% on 2009

The *MAp Airports Group* owns 74% of Sydney Airport, 39% of Brussels Airport, 30,8% of Copenhagen Airport and 1% of Bristol Airport. Full year financial results for 2010 show +6,3% in total revenue.

GMR is a major infrastructure group that manages and operates New Delhi International Airport and Sabiha Gökçen Airport in Istanbul. The group also has a significant interest in the expansion work at Malé Airport in the Maldives.

TAV Airports Holding has significant airport interests in Turkey and surrounding countries, including the operation of Istanbul Atatürk, Ankara Esenboga, Monastir, Enfidha and both Skopje and Ohrid Airports in Macedonia.

Both Hochtief and TAV appear to be looking for some other shareholders to inject private capital due to the financial crisis that hit Europe during last years. However, no investors showed.

In the context of serving passengers and cargo, a multi-airport system is successful to the extent that airlines and passengers use all the airports to a significant degree. Successful multi-airport systems must be more likely to exist in metropolitan areas with a high level of airline and passenger traffic because the greater the traffic, the more likely the multi-airport system is viable. A second airport has to be attractive: passengers and airlines will not use a second airport when they can get better service elsewhere. Originating passengers consider the time it takes both to get to the airport and to wait for a flight so airports with minimal air services are unattractive, while airlines try to optimize the use of their assets. The airlines allocate flights to routes by means of large-scale optimization programs which are able to account not only for the value of individual flights but for the multiplier effect of concentrating flights in a market. Airlines thus try to concentrate their flights to dominate markets, or at least prevent competitive airlines from doing so. An additional flight in a major market reinforces the value of the other flights in that market. When airlines consider the possibility of allocating flights to secondary airports, they thus have to consider not only whether they can achieve competitive load factors in the secondary market, but whether there is sufficient additional traffic that will compensate for the loss in the airline's market share in the major market. This is a stable result of the competitive game between airlines.

The second busiest airport in a multi-airport system now typically has far less of the traffic than the busiest airport. If the difference is not significant, it means that there are political or technical constraints that hinder the maximum exploitation of the first airport or that the traffic is so large that it saturates several major airports.

An issue to be aware of at secondary airports is the market volatility, that is the airline possibility to go operate elsewhere. The natural uncertainties in traffic are amplified at secondary airports, because the traffic is small. The volatility of traffic at secondary airports is further increased because these are often dominated by a single or two carriers.

It is then requested that a strategic vision is implemented by airport management: to secure a site and to provide it with an access path for a second airport insures that future developments will be possible. Then building facilities incrementally, according to demonstrated need. The con is the loss of economies of scale and the resulting higher costs per unit of capacity, while the pro is the potential savings that result from not having to pay for capacity that turns out to be un-necessary.

Finally, because the type of traffic is variable at second airports, the configuration and the nature of the facilities ought also to be flexible. These criteria were presented by R. de Neufville in 1995 but in our opinion they are still actual nowadays since a lot of reports and studies analyzed to draw useful information for the next chapter often comply and regret about the economic and transport-related un-necessity of some airport infrastructures in several countries taken into consideration.

Chapter 4:

Methods of assessing airport competition at target countries

This last chapter is based on the assessment of airports performances. The existing indexes and indicators will be presented from the point of view of both airlines and airport management entities. Then a quick review of the theoretical basis needed to define the indicators taken into consideration for assessing the competition scenario will be given. As anticipated in chapter two, three main methods will be used: Gini index, Normalized Herfindahl-Hirschman index and games theory.

The indicators derived are the passengers' concentration in the vicinity of each country's main airport, the Hub capability at European airport or airport system and the Dominance index.

1. Means of measuring performance and productivity

Performance and productivity measures are important financial management tools for airport managers, regulators and users. Airports typically use considerable resources in daily operations. Performance shortfalls can result in significant additional costs to users and society as a whole. The objective of measuring performance and productivity is therefore to improve efficiency and cost-effectiveness.

Performance measures can be applied to all aspects of an airport, not only it its operations but also to safety, security and commercial practices. Performance measures are helpful in establishing organizational goals, identifying areas needing attention, preparing operational and financial plans and improving accountability. The primary purpose obviously is the assessment and improvement of performance over time within an airport organization.

Airports should choose areas of measurement that focus on improving what is important: for example, increasing aircraft movements, reducing congestion and delay.

To analyze the data collected in a proper ways, there are two viable methods: if the period of time taken into consideration is too short to establish a time-series analysis, the comparison with other airports' data could be useful; otherwise, time-series analysis are a suitable method to assess the evolution of the performance of the targeted item during time. Comparison of performance between airports is a difficult and likely misleading field: indeed, data might be not comparable as definition criteria, method of collection, size of the sample and accounting practices may differ. The most important requirements needed should be: uniqueness (of the analyst in order to use the same methodology) and a thoroughly deep knowledge of the industry in order to make the analysis consistent with the airports' peculiarities (operational, structural and organizational structures). This way, comparison might reveal performance drivers and core indicators suitable to describe the system in a complete and realistic way. It is useful to carefully establish a level field of comparison by means of performance indicators and to compare the single units rather than the airports as a whole.

The first step would be the definition of measurable goals to rely on during the analysis and the assessment of what is to be considered as a success and what a failure. Then outcome objectives and the results to obtain in order to achieve the goal are to be decided. The measure method should permit the analysts to easily collect data at a reasonable cost. Data should be general and easy to be processed in order to enable analysis over periods of time. On the basis of benchmarks, expectations and trade-off a baseline for the individuation of the current level of performance has to be established; then, to achieve the goal, initiatives, efforts and resources are needed. To trade-off among goals and resource allocation in case of incompatibilities between goals is necessary in order not to waste pointlessly resources (staff, money and infrastructure). Finally if the result had been positive, the method should be analyzed in order to define its strength points and to assess its suitability in other areas. Failures as well have to be carefully analyzed in order to determine which the causes were and what to do to improve.

A list of quantitative measures has been established to assess qualitative indicators of performance. These measures rely on the resources present at an airport (employee, runways, terminal, bridges…) and on the airport output (passengers, movements, revenues…). This way, indicators like pax/aircraft movements, pax/employees, aircraft movements/runway, pax/bridges and pax/terminal area are used to determine whether the airport operates at its full capacity. Moreover, from the economic point of view, indicators like labor cost/operating cost, labor cost/pax, operating cost/pax or operating cost/aircraft movement, total revenue/pax, aeronautical revenues/aircraft movement and aeronautical revenue/total revenue might be derived. More and more Departments of Transport are requesting their airport or their airport operators as well as airlines to disclose financial data to foster transparency and efficiency.

While the number of passengers handled, aircraft movements and tonnage of cargo handled are the principal quantitative measures of output, users and the airport managers are also concerned about other outcomes that reflect the quality and efficiency of services provided:

Safety → runways accidents are a primary safety concern for airports. They are rare, therefore is usually provided a risk assessment for example runway incursions creating a collision or a hazard between a vehicle/person/object and a landing/taking off aircraft. Typical indicators are total number of incursion/period and rate of incursion/operation

Delay→ all partners at an airport are interested in reducing delays. In order to do this, measures that identify the main causes are necessary; weather delays are beyond airport operator’s control therefore the analysis is focused on the activities within the competencies of the airport operator: taxi times, absolute number of delay, total delay/day, number delays/hour, length of delay/operation

Productivity and cost efficiency → number of pax/employee, aircraft movements/employee, tons of cargo/employee. Cost efficiency measures are similar but indicate the amount of money necessary to obtain a target output (cost/pax, cost/aircraft movements, Cost/tons of cargo handled). They are calculated on the basis of informations on the total amount of pax and cargo handled and may be prepared in total or for its individual facilities. Comparing ratios between facilities may help identify best practises, while comparing results over time indicates whether performance is improving or deteriorating.

2. Airport - airline agreements

As it has been previously analyzed, the agreement between airport and airline is seen by the airlines as an alternative to formal economic regulation.

The basic form of an airport-airline agreement is the "Airport conditions of use", which is a compulsory document that airport must provide the airlines and passengers which describes the services provided at the airport. Obviously, the services provided are the same which are going to be charged to users under the provision of aeronautical fees. Nevertheless this document is not sufficient as it does not identify the rights and obligations of both parties, contains no indications on level of service and no information regarding a process to follow in case of disputes between the user and the airports. The only major country which has the rights and obligations clearly defined and incorporated into a legally binding contract is the United States. These use and lease agreements concentrate on the fees and rentals to be paid, the method by which these are calculated and the conditions of use of these facilities. Service standards are not usually incorporated into these agreements.

However, there have been some cases of a more formalized airline – airport relationship emerging. For example, the low cost airlines, such as Ryanair and EasyJet, have sought more long-term deals at airports which they have chosen as operative bases; in this documents both fees and service levels are considered (for example the airport or the ground handling provider commits itself to guarantee the airline a short turn-around time or the usage 7/24 of a certain facility, for example dedicated common check-in desks). Elsewhere some airports have voluntarily agreed charge levels directly with their airline customers rather than asking for the intervention of a regulator.

For example at Copenhagen, the airport operator established a 3-year agreement with Danish airlines and IATA (which stood for foreign airlines) concerning airport charges. The document established that between 2003 and 2005, an increase of 2,75% on charges would have been applied on an annual basis. The agreement was a success and was than renewed for 2006-2008 but this time the annual surcharge was modulated: +3% in 2006 and +1% in both 2007 and 2008. On the other hand, airlines were granted incentives for passenger growth, for the use of large aircraft and a reduction of the security charge (Copenhagen Airport, 2005). It was finally established that government intervention (on the basis of a dual till price cap regulation) would have been deemed necessary in case the airport and airlines were not able to reach an agreement.

Likewise in Australia, the switch from price regulation to price monitoring, has encouraged both airports and airlines to reach 5 year agreements to regulate charges and services. Even in the United Kingdom, where a more heavy-handed price cap regulation exists, during the price cap's review period for years 2008–2013, airports and airlines were encouraged for the first time to enter into a much more direct dialogue (called "constructive agreement") aiming at reaching an agreement on investment levels, service quality and data disclosure.

The airport–airline agreement at Frankfurt airport in 2002 went further than all these others. It was a 5-year agreement with Lufthansa, the German Airline Association and BARIG (the board of airline representatives in Germany standing for airlines flying to Germany). It was a risk-sharing model which linked airport charges to traffic growth. As a reference, the 2001 ratio of airports charges to the number of departing passengers was used as a reference. If the passenger forecast figures were reached, the reference ratio would be increased by about 2% annually. If the passenger traffic grew faster than expected, then the airlines would receive 33% of the additional revenue while Fraport would get 66% as a compensation for extra congestion. Conversely, the airlines would bear 33% of the risk associated if the traffic fell below the levels.

In case of disagreement, public law foresaw that the State of Hesse would have imposed a dual till ROR regulation.

A Special Review Board with representatives from the airlines, Fraport and local government was established to have four meetings/year during which discussions on issues and swap information would take place.

The deal also secured the financing of a 76 million € for noise protection program. Under the agreement, the airlines renounced to take legal action against the level of charges whilst Fraport made commitments not to cut costs by reducing service standards and to undertake investment projects which were planned (Fraport, 2002; Klenk, 2004). We can call this kind of agreement as a Revenue sharing agreement.

There were finally several cases in which the request to the airport was made by LCCs: in order to face growing demand, LCCs asked to be provided with dedicated facilities as purpose built terminals (also known as Low-cost Terminal) or converted infrastructures (as it happened for Marseille and Budapest to address their LCCs requests). These terminals would be simple and functional, being designed for point-to-point rather than transfer passengers, with no frills such as airline lounges, air bridges in order to realize the lowest possible construction and operating costs. Commercial facilities would be provided but not in such an extensive way than in legacy carriers' terminals as LCCs passengers' only need would be food and beverages. (Graham, 2009)

3. Theoretical aspects of concentration indexes

To derive a measure of concentration the two major indexes are the Herfindahl-Hirschman Index and the Gini index. The former resents of variations at the sample extremities, while the latter is more sensitive to variations in the whole sample, with special reference to the intermediate values. Gini index is used to establish comparison between samples with a different number of elements.

Given the variable X whose elements are ranked in a crescent order:

$$\chi_1 \leq \chi_2 \leq ... \leq \chi_n \tag{2}$$

or in mathematical form:

$$\chi_{i-1} \leq \chi_i \;\; \forall i = 1,..., n. \tag{3}$$

then if:

$$C_i = \sum_{j=1}^{i} \chi_j \quad \forall i = 1,...n \tag{4}$$

and the mean value is:

$$\mu = \frac{1}{n}\sum_{i=1}^{n} \chi_i = \frac{C_n}{n} \tag{5}$$

The Gini coefficient is derived as:

$$G = \frac{\sum_{i=1}^{n-1}(P_i - Q_i)}{\sum_{i=1}^{n-1} P_i} \qquad \backslash \tag{6}$$

Being P_i the measure on the X-axis and Q_i the measure on the Y-axis:

$$P_i = \frac{i}{n} \qquad \forall i = 1,\ldots,n \tag{7}$$

$$Q_i = \frac{C_i}{C_n} \qquad \forall i = 1,\ldots,n \tag{8}$$

G values vary in [0;1] and the higher is G, the higher is the market concentration. If there is no concentration, then the numerator N = 0 and therefore G = 0; if there is maximum concentration, then $Q_i = 0$ for each i and then G = 1.

A graphic explanation of the Gini coefficient might be given taking into consideration a right and isosceles triangle with both catheti measuring 1 unit. Namely the Gini coefficient measures the distance between the Lorentz curve and the triangle's hypotenuse, which represents the case of market equity: each item *n* has a market share equal to N/*n*. The Lorenz curve's extremes are always (0;0) and (1;1). The Lorenz curve is a convex curve and lies always under the equity curve, as $q_i \le p_i \quad \forall i = 1,\ldots n$.

Given that:

$$P_i = \sum_{i=1}^{n-1} \frac{i}{n} = \frac{n-1}{2} \tag{9}$$

It follows that:

$$G = \frac{\sum_{i=1}^{n-1}(P_i - Q_i)}{\sum_{i=1}^{n-1} P_i} = \frac{\sum_{i=1}^{n-1} P_i}{\sum_{i=1}^{n-1} P_i} - \frac{\sum_{i=1}^{n-1} Q_i}{\sum_{i=1}^{n-1} P_i} = 1 - 2\frac{\sum_{i=1}^{n-1} Q_i}{n-1} \tag{10}$$

That is the formulation of the Gini Index as it express the ratio between the area between the equity curve and the Lorenz curve and the triangle's area and. If we have two Lorenz curves A,B and the Lorenz curve A is entirely comprised between the equity curve and Lorenz curve B then Concentration A < Concentration B. If the Lorenz curve at its beginning is very close to X-axis it means that there are a lot of operators that share a little quota of the market and few operators that share the remaining relevant quota of the market; on the other hand if the Lorenz curve is very close to Y-axis it means that there are a lot of operators that share a relevant quota of the market and few operators that share the remaining quota.

The Herfindahl index (also known as Herfindahl–Hirschman Index, or HHI) is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. It is defined as the sum of the squares of the market shares of the 50 largest firms (or summed over all the firms if there are fewer than 50) within the industry, where the market shares are expressed as fractions. The result is proportional to the average market share, weighted by market share. As such, it can range from 0 to 1, moving from a huge number of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power, whereas decreases indicate the opposite. The major benefit of the Herfindahl index in relationship to such measures as the concentration ratio is that it gives more weight to larger firms.

To make an example, we take into consideration two cases in which the six largest firms produce 90% of the goods in a market; in Case 1, all six firms produce 15% each, while in Case 2 there is one firm that produces 80% while the five others produce 2% each. We assume that the remaining 10% of output is divided among 10 equally sized producers. As HHI gives information about the market concentration, the result is expected to be different even if in both Case 1 and 2 the total production of the six firm considered is the same (90%). Indeed, in the first case there is open competition, while in the second case there is a substantial monopoly. Given the mathematic formulation of HHI, which squares each contribution before the sum, an additional weight is given to firm with larger market share.

$$HHI = \sum_{i=1}^{N} s_i^2 \tag{11}$$

where N is the number of the firms involved in the market

$$Case\ 1: HHI = 6 \times 0{,}15^2 + 10 \times 0{,}01^2 = 0{,}136 = 13{,}6\% \tag{12}$$

$$Case\ 2: HHI = 0{,}80^2 + 5 \times 0{,}02^2 + 10 \times 0{,}01^2 = 0{,}643 = 64{,}3\% \tag{13}$$

Economists consider that a market has a high concentration if the HHI is above a target threshold. USA's economists make use of a threshold of 25%, while European economists are used to relying more on HHI variation with the entry/exit of a competitor in/from the market (for instance, concern is raised if there is a 2,5% change when the index already shows a concentration of 10%. Back to the Case 1 of the example, if a firm which already owns 15% market share buys a competitor firm whose share was 15%, HHI goes up from 0,136 to 0,181)

$$Case\ 1bis: HHI = 0{,}3^2 + 4 \times 0{,}15^2 + 10 \times 0{,}01^2 = 0{,}181 = 18{,}1\% \tag{14}$$

This new scenario would be relevant for merger law in both the US (being HHI over 0,18) and in the EU (because there has been a change of 0,045, which is bigger than 0,025). HHI ranges from 1/N to 1, where N is the number of firms in the market. Equivalently, if % are used as whole numbers (15% counts as 15 and not as 0,15) the index can range up to 100^2=10000

According to the DOJ-FTC 2010 Horizontal Merger Guidelines, the agencies will regard a market in which the post-merger HHI is below 1500 (15%) as "un-concentrated," between 1500 and 2500 (15% - 25%) as "moderately concentrated," and above 2500 (25%) as "highly concentrated." A merger potentially raises "significant competitive concerns" if it produces an increase in the HHI of more than 100 points (1%) in a moderately concentrated market or between 100 and 200 points (1% - 2%) in a highly concentrated market. A merger is presumed "likely to enhance market power" if it produces an increase in the HHI of more than 200 points (2%) in a highly concentrated market. Therefore, a small index indicates a competitive industry with no dominant players. If all firms have an equal share the reciprocal of the index shows the number of firms in the industry. When firms have unequal shares, the reciprocal of the index indicates the "equivalent" number of firms in the industry. There is also a normalized Herfindahl index. Whereas the Herfindahl index ranges from 1/N to 1, the normalized Herfindahl index ranges from 0 to 1. It is computed as:

$$H^* = \frac{\left(H - \frac{1}{N}\right)}{1 - \frac{1}{N}} \qquad (15)$$

where again, N is the number of firms in the market, and H is the usual Herfindahl Index, as above.
In our case, the Normalized Herfindahl index H^*will be used to describe the market and there will be no problems of market identification as HHI's detractors usually claim: in fact, the market chosen will be an airport and the firms involved will be the airlines which operate to/from the target airport.

4. Theoretical aspects of the Games Theory

The Games Theory is a branch of math sciences applied to decision processes in case of competition. The aim is the finding of a competitive/cooperative solution. The outcome is dependent on the players' choices. The competitors are supposed to be capable of a logical reasoning, to be rational and oriented to the maximization of their utility. A typical problem of games theory is called game. Each game is played by at least 2 competitors or players. Each player has a strategy, that is to say an action plan with the moves for each possible evolution of the game. The outcome of the game depends on the players' strategy and it is not sole.
It is possible to distinguish between cooperative games (Von Neumann's game) if players are allowed to come to an understanding which is profitable for both and competitive games (Nash) when the strategy and the game rely only on each player's decision without consultation with the competitor. Players may have a complete knowledge of the rules and of each competitor's utility or not. A player's knowledge might also be perfect or not, whether the target player knows the foregoing series of moves.

Finally, games are simultaneous if the players make their decisions simultaneously or consecutive (as it happens in the game of chess).

The prisoner's dilemma is a canonical example of a game analyzed in game theory that shows why two individuals might not cooperate, even if it appears that it is in their best interest to do so. A classic example of the prisoner's dilemma (PD) is presented as follows: "*Two men are arrested, but the police do not possess enough information for a conviction. Following the separation of the two men, the police offer both a similar deal: if one testifies against his partner (defects/betrays), and the other remains silent (cooperates/assists), the betrayer goes free and the cooperator receives the full ten-year sentence. If both remain silent, both are sentenced to 1 year in jail for a minor charge. If each betrays the other, each receives a 5 years sentence. Each prisoner must choose either to betray or remain silent; the decision of each is kept quiet. What should they do?*"

If each player is only interested in lessening his time in jail, the game becomes a non-zero sum game where the two players may either assist or betray the other. The logical decision leads each player to betray the other, even though their individual reward would be greater if they cooperated. In the regular version of this game, collaboration is dominated by betrayal, and as a result, the only possible outcome of the game is for both prisoners to betray the other. Regardless of what the other prisoner chooses, A will always gain a greater payoff by betraying B. In the extended form game, the game is played over and over, and consequently, both prisoners continuously have an opportunity to penalize the other for the previous decision. If the number of times the game will be played is known, the finite aspect of the game means that by backward induction, the two prisoners will betray each other repeatedly.

The label "prisoner's dilemma" may be applied to situations not strictly matching the formal criteria of the classic game; for instance, a situation in which two entities could gain important benefits from cooperating or suffer from the failure but find it difficult or expensive (not necessarily impossible) to coordinate their activities in order to achieve cooperation might well be represented with a Prisoner's dilemma - like game

The normal game is shown below:

$$\begin{array}{ccc} \backslash & B\ cooperates & B\ betrays \\ A\ cooperates & (1,1) & (10,0) \\ A\ betrays & (0,10) & (5,5) \end{array} \tag{16}$$

As it is possible to see from the matrix, both A and B, unaware of the mate's decision, will get a higher pay-off by betraying the other. For example, Prisoner A will be freed if he betrays the mate and will stay 1 year in prison if he cooperates with the mate (that is to say, keeps silent) provided that B cooperates, while he will stay 10 years in prison if B betrays him or share with B a 5 years sentence. Therefore, given that A's utility is to shorten his staying in prison, A will choose to betray B. Since the game is symmetric, B has the same pay-offs than A, therefore B will betray as well. Since both A and B rationally decide to betray (to confess the crime), each receives a lower reward than if both were to stay quiet. This is an output that leads players to a worse result than that achievable with cooperation (indeed, the strategy is "A wants to stay in prison as less as possible" not "A wants B and him to stay in prison as less as possible").

If we generalize the (16), we obtain (17):

$$\begin{array}{ccc} \backslash & B\ cooperates & B\ betrays \\ A\ cooperates & (a,a) & (c,b) \\ A\ betrays & (b,c) & (d,d) \end{array} \tag{17}$$

The game is a prisoner's dilemma if – in utility terms (that is to say, years of prison) - it is true that:

$$b > a > d > c \tag{18}$$

That is to say, for both A and B:

$$0 > 1 > 5 > 10 \qquad (19)$$

a>d implies that the "Cooperation" is socially preferred to the "Betrayal" outcome (as, in utility terms, 1+1>5+5), while b>a and d>c imply that the "Betrayal" outcome is the one which will actually result. It is not necessary for a Prisoner's Dilemma to be strictly symmetric, it is sufficient that the choices which are individually optimal (and strongly dominant) result in an equilibrium which is socially inferior.

If two players play prisoners' dilemma more than once in succession and they remember previous actions of their opponent and change their strategy accordingly, the game is called “Iterated Prisoners' dilemma”. In addition to the general form above, the iterative version also requires that 2a > b+c, to prevent alternating cooperation and defection giving a greater reward than mutual cooperation. The iterated prisoners' dilemma game is fundamental to certain theories of human cooperation and trust. On the assumption that the game can model transactions between two people requiring trust, cooperative behavior in populations may be modeled by a multi-player, iterated, version of the game. It has, consequently, fascinated many researchers over the years. If the game is played exactly N times and both players know this, then the only possible Nash equilibrium is to always defect because if player A betrays on the last turn, player B will not have a chance to punish the player A on the next turn. Therefore, both A and B will defect on the last turn. Thus, the player might as well defect on the second-to-last turn, since the opponent will defect on the last no matter what is done, and so on. The same applies if the game length is unknown but has a known upper limit.

Unlike the standard prisoners' dilemma, in the iterated prisoners' dilemma the defection strategy is counter-intuitive and fails badly to predict the behavior of human players but within standard economic theory it is the only correct answer. For cooperation to emerge between game theoretic rational players, the total number of rounds N must be random or at least unknown to the players. In this case “always betray” may no longer be a strictly dominant strategy.

Interest in the iterated prisoners' dilemma (IPD) was kindled by Robert Axelrod in his book The Evolution of Cooperation (1984). In it he reports on a tournament he organized of the N step prisoners' dilemma (with N fixed) in which participants have to choose their mutual strategy again and again, and have memory of their previous encounters. Axelrod discovered that when these encounters were repeated over a long period of time with many players, each with different strategies, greedy strategies tended to do very poorly in the long run while more altruistic strategies did better, as judged purely by self-interest. He used this to show a possible mechanism for the evolution of altruistic behavior from mechanisms that are initially purely selfish, by natural selection (R. Axelrod, 1984). The best deterministic strategy was found to be “Tit for tat” by A. Rapoport. The strategy is simply to cooperate on the first iteration then A does what B did on the previous move. Depending on the situation, a slightly better strategy can be "Tit for tat with forgiveness" that is to say that if B betrays, on the next move A might sometimes choose to cooperate anyway. This allowed for occasional recovery from getting trapped in a cycle of defections (A. Rapoport, A.M. Chammah, 1965). Axelrod then stated several conditions necessary for a strategy to be successful: the strategy must be nice that is to say that it will not defect before its opponent does (an optimistic behavior) but not be a blind optimist; must then be forgiving to stop long runs of revenge and counter-revenge and “Non-envious” that is to say that a player must not strive for scoring more point than the opponent. The optimal (points-maximizing) strategy for the one-time PD game is simply defection. However, in the iterated-PD game the optimal strategy depends upon the strategies of likely opponents and how they will react to defection and cooperation. If in a population there is only 1 player that applies the “Tit for that” strategy, the optimal strategy is to betray every time. If there is a certain % of betrayers while the rest apply “Tit for tat” strategy, then the optimal strategy for an individual depends on the percentage and on the length of the game. The Prisoner's dilemma is therefore of interest to the social sciences such as economics, politics and sociology, as well as to the biological sciences such as ethology and evolutionary biology. Many natural processes have been abstracted into models in which living beings are engaged in endless games of prisoner's dilemma. This wide applicability of the PD gives the game its substantial importance.

5. Case study

In this paragraph, country taken into consideration will be analyzed one by one on the basis of the theory used to derive concentration index. The information extracted from the data collected will be presented and briefly commented. Then, 2 applications of games theory and in particular of the Prisoner’s dilemma will be presented with reference to competition between airports and to possible agreements between airport and airlines.

5.1 – Concentration Index analysis

Rank	Movements	IATA CODE	2005	2006	2007	2008	2009	2010	% on 2010
1	Sydney	SYD	258.923	264.401	275.226	271.029	278.262	290.501	29%
2	Melbourne	MEL	175.435	176.112	186.431	189.011	192.641	206.798	50%
3	Brisbane	BNE	141.785	144.359	150.895	157.675	156.928	168.342	67%
4	Perth	PER	57.972	61.659	68.985	78.623	81.671	87.863	76%
5	Adelaide	ADL	70.829	72.508	74.772	74.654	73.340	76.110	83%
6	Gold Coast	OOL	27.471	27.279	31.691	32.083	35.297	37.737	87%
7	Cairns	CNS	46.547	44.952	43.488	39.511	38.562	42.611	91%
8	Canberra	CBR	38.182	38.257	41.177	45.191	44.201	43.280	96%
9	Hobart	HBA	14.335	13.497	14.488	15.027	14.927	16.064	97%
10	Darwin	DRW	16.416	17.981	19.270	22.733	25.962	27.238	100%
TOT GROUP			847.895	861.005	906.423	925.537	941.791	996.544	
TOT COUNTRY			1.215.212	1.209.914	1.256.952	1.264.112	1.292.885	1.375.232	

Rank	Passengers	IATA CODE	2005	2006	2007	2008	2009	2010	% on 2010
1	Sydney	SYD	28.996.263	31.016.186	32.345.887	32.700.964	34.461.403	35.958.289	30%
2	Melbourne	MEL	21.040.864	22.156.871	23.943.342	24.448.325	25.917.992	27.962.834	54%
3	Brisbane	BNE	16.015.923	17.379.809	18.297.730	18.720.295	18.896.956	19.974.746	71%
4	Perth	PER	7.005.254	7.977.091	8.952.069	9.359.248	9.992.588	10.889.528	80%
5	Adelaide	ADL	5.766.504	6.181.390	6.619.267	6.784.166	7.015.509	7.278.766	86%
6	Gold Coast	OOL	3.515.021	3.777.856	4.323.355	4.618.200	5.186.147	5.486.072	91%
7	Cairns	CNS	3.731.178	3.782.183	3.777.154	3.653.544	3.550.240	3.859.339	94%
8	Canberra	CBR	2.550.129	2.687.336	2.853.480	3.061.859	3.258.396	3.240.848	97%
9	Hobart	HBA	1.605.978	1.629.417	1.758.241	1.869.262	1.855.871	1.903.165	99%
10	Darwin	DRW	1.219.378	1.403.685	1.562.216	1.538.938	1.569.007	1.679.899	100%
TOT GROUP			91.446.492	97.991.824	104.432.741	106.754.801	111.704.109	118.233.486	
TOT COUNTRY			103.997.499	103.997.499	120.120.667	122.014.912	127.204.110	135.040.270	

Table 61: Australian traffic data

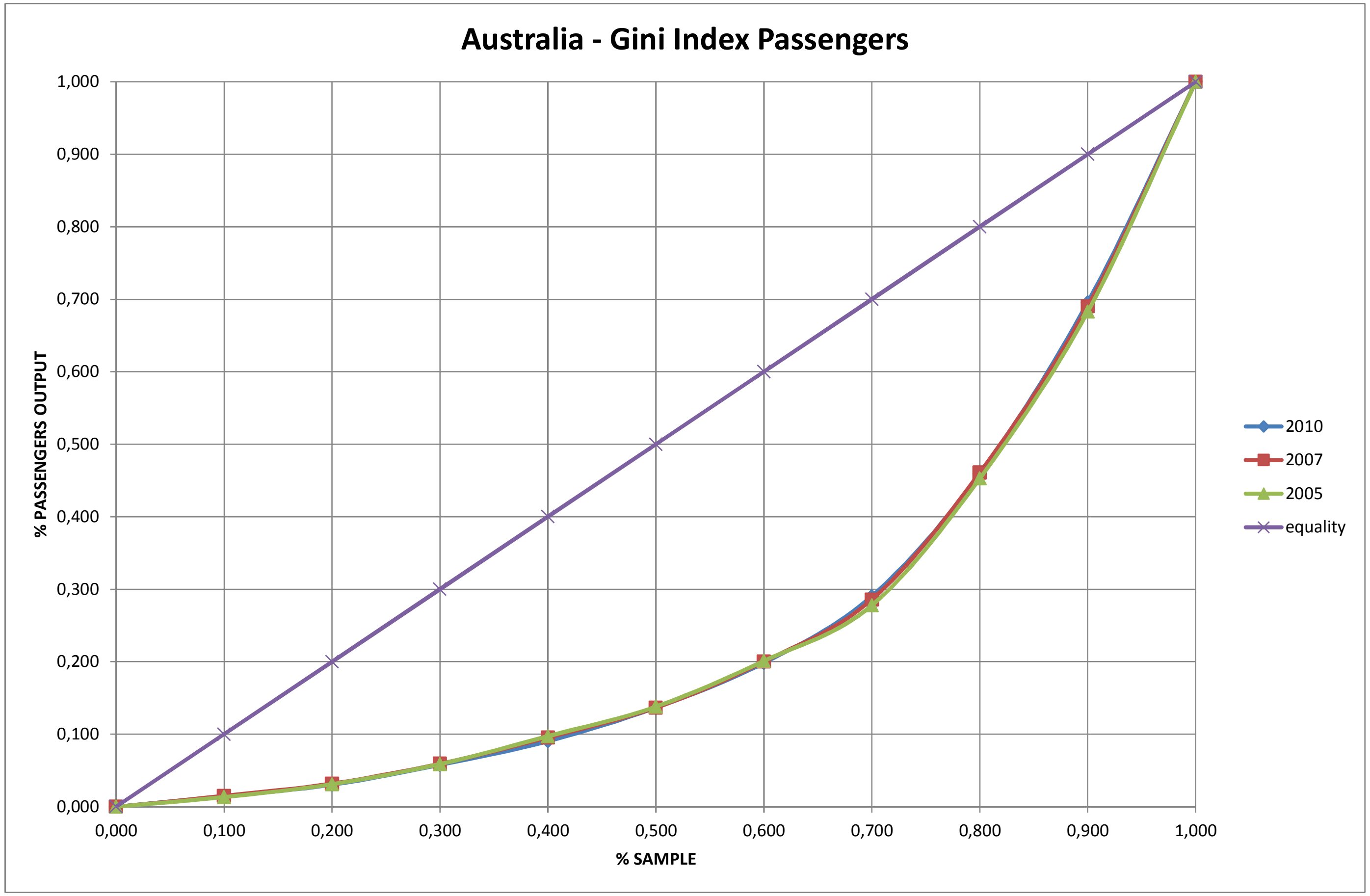


Fig. 38: Lorenz curve Australia Passengers

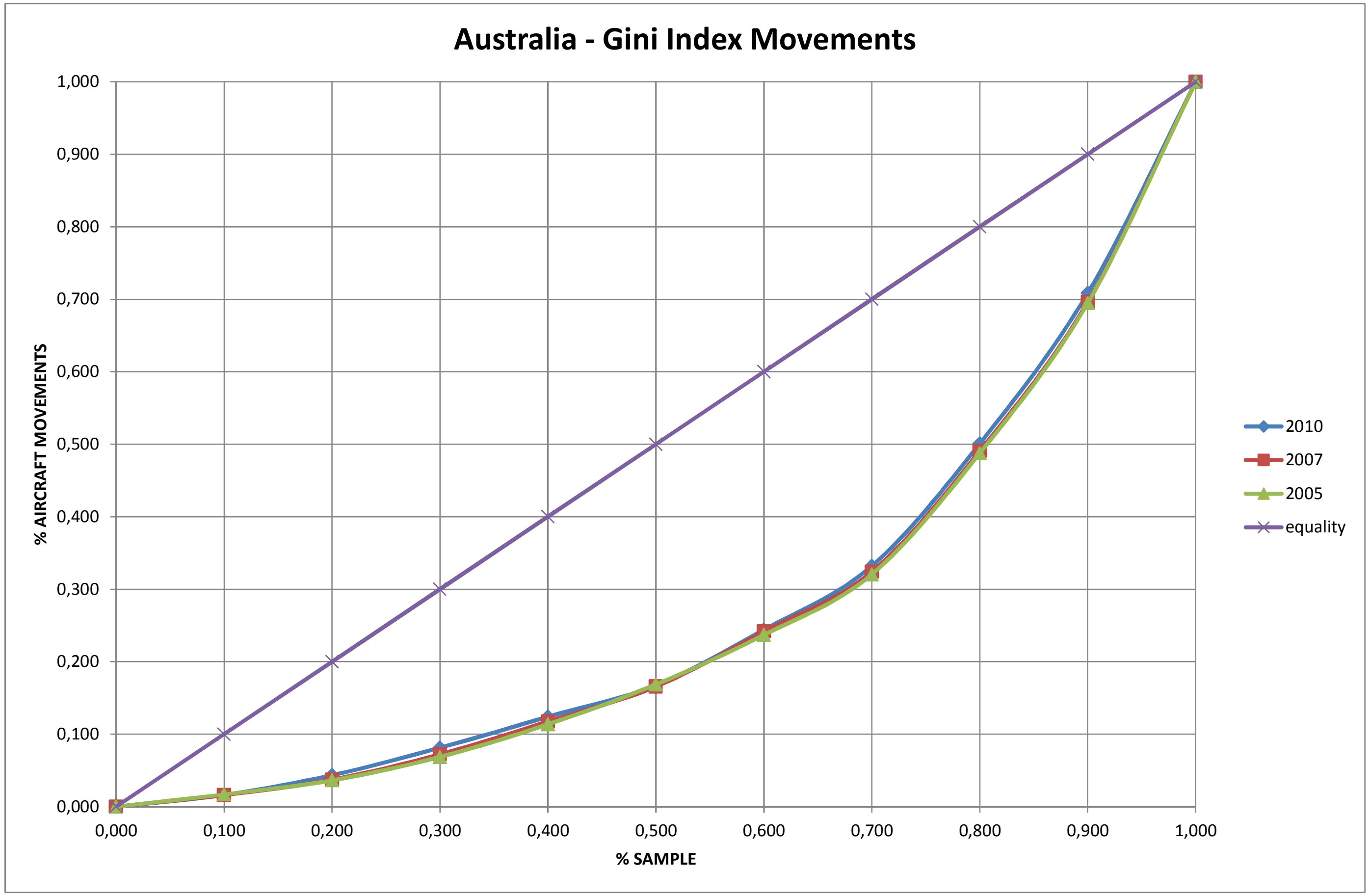


Fig. 39: Lorenz curve Australia Movements

2010	2009	2008	2007	2006	2005	equality		MOVEMENTS
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,016	0,016	0,016	0,016	0,016	0,017	0,100	10%	
0,043	0,043	0,041	0,037	0,037	0,036	0,200	20%	
0,081	0,081	0,075	0,072	0,068	0,069	0,300	30%	
0,124	0,122	0,118	0,118	0,113	0,114	0,400	40%	
0,168	0,169	0,167	0,166	0,165	0,169	0,500	50%	
0,244	0,247	0,248	0,242	0,236	0,237	0,600	60%	
0,332	0,333	0,333	0,324	0,321	0,321	0,700	70%	
0,501	0,500	0,503	0,491	0,488	0,488	0,800	80%	
0,708	0,705	0,707	0,696	0,693	0,695	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,456	0,457	0,458	0,468	0,473	0,471	-3,14%	GINI	

2010	2009	2008	2007	2006	2005	equality		PASSENGERS
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,014	0,014	0,014	0,015	0,014	0,013	0,100	10%	
0,030	0,031	0,032	0,032	0,031	0,031	0,200	20%	
0,058	0,060	0,061	0,059	0,058	0,059	0,300	30%	
0,090	0,092	0,095	0,095	0,097	0,097	0,400	40%	
0,137	0,138	0,138	0,137	0,136	0,138	0,500	50%	
0,198	0,201	0,202	0,200	0,199	0,201	0,600	60%	
0,290	0,290	0,289	0,286	0,280	0,278	0,700	70%	
0,459	0,459	0,465	0,461	0,457	0,453	0,800	80%	
0,696	0,691	0,694	0,690	0,683	0,683	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,505	0,505	0,502	0,505	0,509	0,509	-0,81%	GINI	

Table 62: Gini Index for Australia – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 10% on the X-asis regardless of its output as the sample is composed by ten airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 62 and the % variation refers to 2010 on 2005.

From Table 61, fig. 38 (with reference to passengers) and fig. 39 (with reference to aircraft movements) it is possible to understand that Sydney airport accounts in both cases for approximately 30% of the total traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 87% of the Australian airports traffic output and 70% of the traffic movements. In terms of movements, the 50% of the sample is handled by Sydney and Melbourne and the same figure holds true also with reference to passengers output (54% handled by Sydney + Melbourne). In terms of movements, airports from Sydney to Cairns (rank 1 to 7) account for 90%; in term of passengers the same output is handled from airports ranked from1 to 6. That is to say that passengers are more concentrated than movements at major airports. The Gini index in terms of passengers is almost stable (0,509 in 2005 and 0,505 in 2010), that is to say that the traffic repartition between airports has not changed; this is explicable with the high distances between airports and the scarce road connections typical of Australia. In terms of movements, the Gini index shows a variation of -3,14% of 2010 on 2005 that is to say that the smaller airports of the sample gained traffic shares from 2005 to 2010, thus diminishing the concentration. In fact from fig. 39, the blue line for 2010 is clearly over the red and the green one for X-axis values between 0,2 and 0,4. Geographically speaking, almost the 70% of the nation passengers' traffic is concentrated in an area centered in Sydney with a mean radius of approximately 700 km (airports of Sydney, Melbourne, Brisbane, Gold coast and Canberra). Top five airports don't show phenomena of airline concentration as there is a significant number of airlines and no one has a dominant market share (in the majority of the cases there are at least 2 competing airlines with market share over 20%). Where there are few competitors, the HHI index grows highlighting substantial concentration

(Gold Coast, Canberra, and Hobarth): in these cases, the dominant airline detains more than 40% of the daily movements (at Gold Coast, the dominant airline detains 53,7% of the movements) and the top 5 airlines control more than 95% of the traffic.

In terms of airlines' presence at airports, Low Cost carriers Jetstar and Pacific Blue contribute to reach the 80% of the daily movements in 9 out of 10 airports while legacy carrier Qantas in 8 out of 10 airports (Table 64). Moreover, taking into consideration the top 5 carriers of each airport, the same three carriers are present in 9 cases out of 10, together with the freight carrier Australian Air Express (Table 65). As the Dominance Index is given by:

$$DI = \frac{total\ points \times frequency}{n° \ of\ airports\ in\ the\ sample} \qquad (20)$$

the carriers which have a significant number of movements at the majority of airports take the highest score. That is the reason why legacy carrier Qantas, thanks to its feeder flights plus hub traffic gets the top DI, followed by point to point low cost carriers Pacific Blue (which detains a higher share of domestic low cost Australian market) and Jetstar. Given the importance of freight traffic in Australia, it is no surprise that also a freight carrier gets a high DI. Other relevant carriers are in the majority of the cases Regional carrier with a lower frequency service, therefore they have lower DI.

HHI INDEX				un-concentrated		moderate		high concentrated	
SYDNEY		MELBOURNE		BRISBANE		PERTH		ADELAIDE	
HHI norm	0,152	HHI norm	0,169	HHI norm	0,132	HHI norm	0,107	HHI norm	0,128
N° carriers	41	N° carriers	28	N° carriers	27	N° carriers	21	N° carriers	11
1/N	0,024	1/N	0,036	1/N	0,037	1/N	0,048	1/N	0,091
HHI	0,172	HHI	0,199	HHI	0,164	HHI	0,150	HHI	0,207
1st carrier	31,45%	1st carrier	29,83%	1st carrier	25,08%	1st carrier	28,38%	1st carrier	33,50%
1st-2nd carrier	51,78%	1st-2nd carrier	57,77%	1st-2nd carrier	45,60%	1st-2nd carrier	44,55%	1st-2nd carrier	56,16%
1st-2nd-3rd carrier	63,73%	1st-2nd-3rd carrier	72,37%	1st-2nd-3rd carrier	63,36%	1st-2nd-3rd carrier	59,08%	1st-2nd-3rd carrier	72,91%
top5	81,66%	top5	85,09%	top5	84,85%	top5	76,57%	top5	88,67%
top10	89,62%	top10	92,94%	top10	92,67%	top10	91,09%	top10	99,01%
GOLD COAST		CAIRNS		CANBERRA		HOBARTH		DARWIN	
HHI norm	0,275	HHI norm	0,066	HHI norm	0,134	HHI norm	0,140	HHI norm	0,049
N° carriers	4	N° carriers	11	N° carriers	6	N° carriers	4	N° carriers	9
1/N	0,250	1/N	0,091	1/N	0,167	1/N	0,250	1/N	0,111
HHI	0,456	HHI	0,151	HHI	0,279	HHI	0,355	HHI	0,155
1st carrier	53,70%	1st carrier	24,03%	1st carrier	40,30%	1st carrier	40,91%	1st carrier	21,82%
1st-2nd carrier	94,44%	1st-2nd carrier	42,86%	1st-2nd carrier	64,18%	1st-2nd carrier	81,82%	1st-2nd carrier	40,91%
1st-2nd-3rd carrier	98,15%	1st-2nd-3rd carrier	56,49%	1st-2nd-3rd carrier	86,57%	1st-2nd-3rd carrier	95,45%	1st-2nd-3rd carrier	57,27%
top5	100,00%	top5	79,87%	top5	98,51%	top5	100,00%	top5	81,82%
top10	100,00%	top10	98,70%	top10	100,00%	top10	100,00%	top10	100,00%

Table 63: Airlines' concentration at Australian major airports

	2010	2009	2008	2007	2006	2005
PAX GROUP	118.233.486	111.704.109	106.754.801	104.432.741	97.991.824	91.446.492
% ON PAX COUNTRY	87,55%	87,81%	87,49%	86,94%	87,43%	87,93%
% 2010 on 2005	29,29%					
PAX < 1000 KM	92.622.789	87.720.894	83.549.643	81.763.794	77.018.058	72.118.200
% ON PAX COUNTRY	68,59%	68,96%	68,47%	68,07%	68,72%	69,35%
% 2010 on 2005	28,43%					
pax/kmq GROUP	13	12	11	11	10	10
pax/kmq < 1000 km	62	59	56	55	51	48
MEAN RADIUS	1726					
MEAN RADIUS < 1000 KM	690					

AIRLINE	SYD	MEL	BNE	PER	ADL	OOL	CNS	CBR	HBA	DRW	N°	SERVICE
Airnorth Regional										X	1	RC
Australian Air Express	X	X	X	X			X	X		X	7	FC
Jetstar Airways	X	X	X	X	X	X	X		X	X	9	LC
Northern Air Cargo				X						X	2	FC
Pacific Blue Airlines / Virgin Blue	X	X	X	X	X	X	X	X	X		9	LC
Qantas Airways	X	X	X	X	X		X	X		X	8	NC
Regional Express	X	X			X						3	RC
Skytrans							X				1	RC - CH
Skywest Airlines				X							1	RC
Sunstate Airlines			X				X				2	RC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 64: Australian traffic composition

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
Qantas Airways	72	9	64,80
Pacific Blue Airlines	70	9	63,00
Jetstar Airways	52	9	46,80
Australian Air Express	50	9	45,00
Regional Express	26	6	15,60
Northern Air Cargo	6	2	1,20
Airnorth Regional	8	1	0,80
Tiger Airways Australia	6	1	0,60
Air New Zealand	4	1	0,40
Brindabella Airlines	2	1	0,20

Table 65: Dominance Index at Australian airports

Rank	Movements	IATA CODE	2005	2006	2007	2008	2009	2010	% on 2010
1	São Paulo-Guarulhos International	GRU	154.339	154.948	187.960	194.184	209.636	250.493	17%
2	Congonhas-São Paulo	CGH	228.110	230.995	205.564	186.694	193.308	204.943	31%
3	Brasília International	BSB	130.885	126.427	126.853	141.477	162.349	176.326	43%
4	Rio de Janeiro-Galeão International	GIG	97.332	100.895	119.892	130.597	119.287	122.945	51%
5	Santos Dumont	SDU	66.335	64.603	65.689	71.527	97.075	126.515	60%
6	Deputado Luís Eduardo Magalhães International	SSA	78.271	91.414	90.989	95.804	102.211	114.946	68%
7	Tancredo Neves International	CNF	36.842	45.437	55.491	59.544	70.122	84.851	73%
8	Salgado Filho International	POA	55.767	59.463	68.827	72.445	79.104	90.625	79%
9	Guararapes-Gilberto Freyre International	REC	54.843	57.812	59.871	64.625	66.415	77.322	85%
10	Afonso Pena International	CWB	58.050	56.934	62.563	69.076	80.017	88.217	91%
11	Viracopos International	VCP	25.716	25.107	29.226	32.399	55.261	74.472	96%
12	Pinto Martins International	FOR	42.537	46.567	47.226	47.703	49.962	62.570	100%
	TOT GROUP		1.029.027	1.060.602	1.120.151	1.166.075	1.284.747	1.474.225	
	TOT COUNTRY		1.841.225	1.918.538	2.042.033	2.128.824	2.290.950	2.648.449	

Rank	Passengers	IATA CODE	2005	2006	2007	2008	2009	2010	% on 2010
1	São Paulo-Guarulhos International	GRU	15.834.797	15.759.181	18.795.596	20.400.304	21.727.649	26.849.185	22%
2	Congonhas-São Paulo	CGH	17.147.628	18.459.191	15.265.433	13.672.301	13.699.657	15.499.462	35%
3	Brasília International	BSB	9.426.569	9.699.911	11.119.872	10.443.393	12.213.825	14.347.061	47%
4	Rio de Janeiro-Galeão International	GIG	8.657.139	8.856.527	10.352.616	10.717.120	11.828.656	12.337.944	57%
5	Santos Dumont	SDU	3.562.297	3.533.177	3.214.415	3.628.766	5.099.643	7.822.848	64%
6	Deputado Luís Eduardo Magalhães International	SSA	4.554.572	5.425.747	5.932.461	6.042.307	7.052.720	7.696.307	70%
7	Tancredo Neves International	CNF	2.893.299	3.727.501	4.340.129	5.189.528	5.617.171	7.261.064	76%
8	Salgado Filho International	POA	3.521.204	3.846.508	4.444.748	4.931.464	5.607.703	6.676.216	82%
9	Guararapes-Gilberto Freyre International	REC	3.604.652	3.953.845	4.188.081	4.679.457	5.250.565	5.958.982	87%
10	Afonso Pena International	CWB	3.393.079	3.532.879	3.907.275	4.281.354	4.853.733	5.774.615	91%
11	Viracopos International	VCP	816.599	826.246	1.006.059	1.083.878	3.364.404	5.430.066	96%
12	Pinto Martins International	FOR	2.774.240	3.282.979	3.614.439	3.465.791	4.211.651	5.072.721	100%
	TOT GROUP		76.186.075	80.903.692	86.181.124	88.535.663	100.527.377	120.726.471	
	TOT COUNTRY		96.078.832	102.185.376	110.569.767	113.263.537	128.135.616	155.363.964	

Table 66: Brazilian traffic data

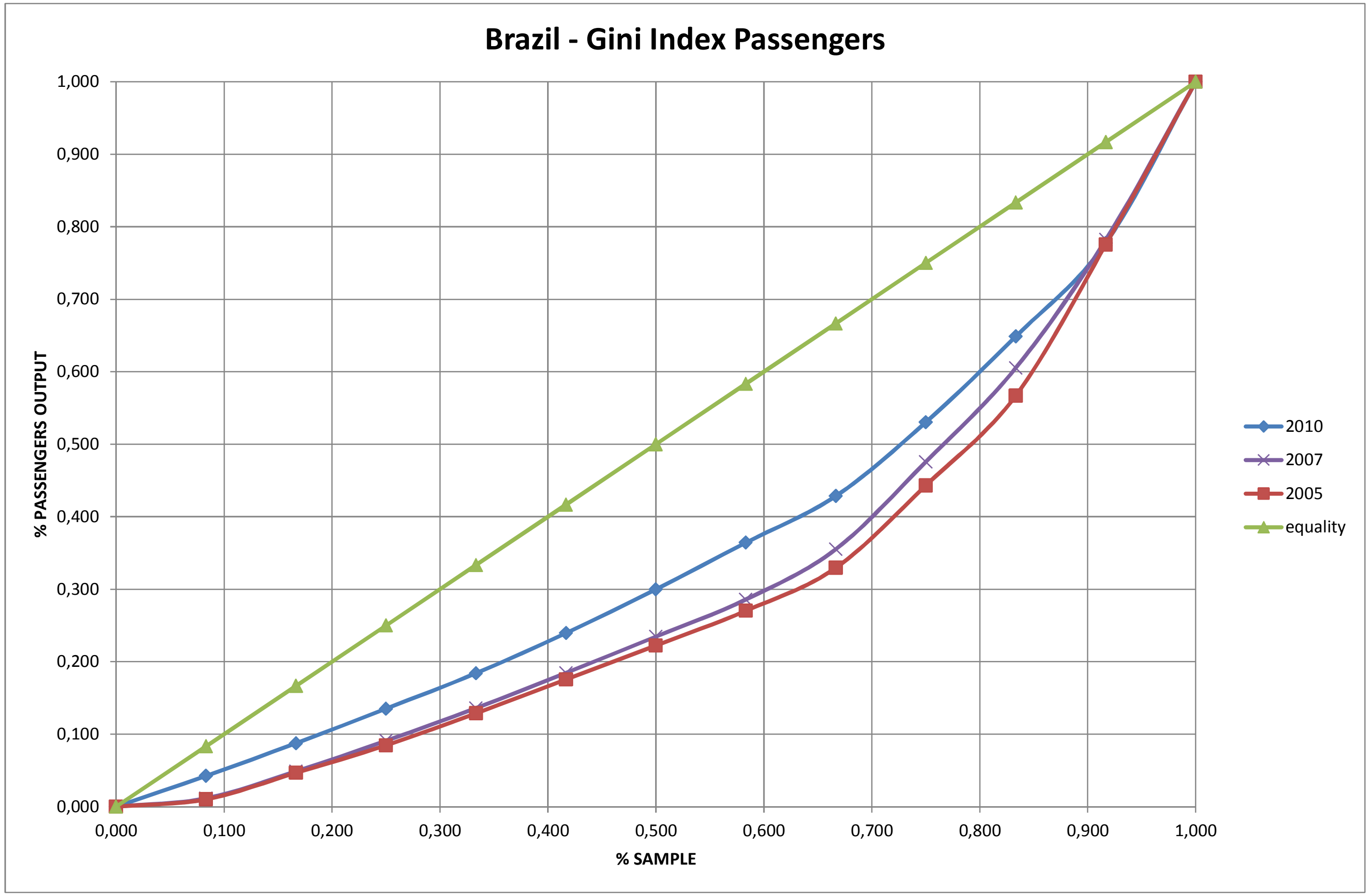


Fig. 40: Lorenz curve Brazil Passengers

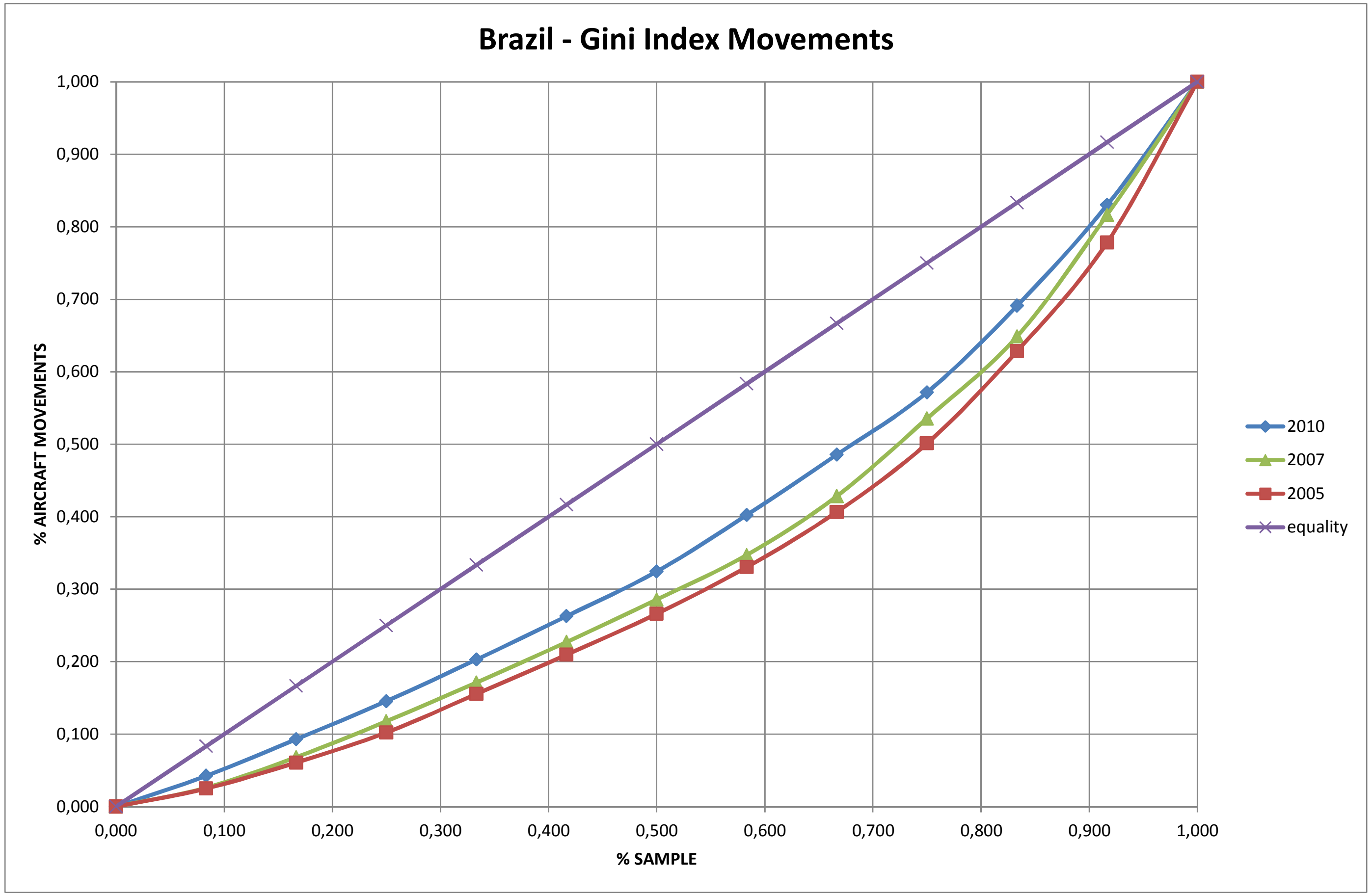


Fig. 41: Lorenz curve Brazil Movements

2.010	2.009	2.008	2.007	2.006	2.005	equality		PASSENGERS
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,042	0,033	0,013	0,012	0,010	0,010	0,083	8%	
0,088	0,075	0,052	0,049	0,050	0,047	0,167	17%	
0,135	0,124	0,093	0,091	0,095	0,085	0,250	25%	
0,184	0,175	0,142	0,136	0,139	0,129	0,333	33%	
0,239	0,227	0,194	0,185	0,184	0,176	0,417	42%	
0,300	0,283	0,250	0,235	0,232	0,222	0,500	50%	
0,364	0,339	0,309	0,286	0,281	0,270	0,583	58%	
0,429	0,409	0,377	0,355	0,348	0,330	0,667	67%	
0,530	0,526	0,494	0,476	0,458	0,443	0,750	75%	
0,649	0,647	0,616	0,605	0,578	0,567	0,833	83%	
0,777	0,783	0,770	0,782	0,772	0,775	0,917	92%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,294	0,313	0,365	0,382	0,392	0,408	-27,97%	GINI	

2010	2009	2008	2007	2006	2005	equality		MOVEMENTS
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,042	0,039	0,028	0,026	0,024	0,025	0,083	8%	
0,093	0,082	0,069	0,068	0,067	0,061	0,167	17%	
0,145	0,134	0,120	0,118	0,110	0,102	0,250	25%	
0,203	0,188	0,175	0,171	0,164	0,155	0,333	33%	
0,263	0,250	0,234	0,227	0,219	0,210	0,417	42%	
0,324	0,312	0,296	0,286	0,275	0,266	0,500	50%	
0,402	0,388	0,358	0,347	0,336	0,331	0,583	58%	
0,486	0,467	0,440	0,428	0,422	0,407	0,667	67%	
0,571	0,560	0,552	0,535	0,517	0,501	0,750	75%	
0,691	0,686	0,673	0,649	0,636	0,628	0,833	83%	
0,830	0,837	0,833	0,816	0,782	0,778	0,917	92%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,241	0,260	0,287	0,305	0,325	0,339	-28,86%	GINI	

Table 67: Gini Index for Brazil – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 8,33% on the X-axis regardless of its output as the sample is composed by twelve airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 67 and the % variation refers to 2010 on 2005.

From Table 66, fig. 40 (with reference to passengers) and fig. 41 (with reference to aircraft movements) it is possible to understand that Sao Paolo Guarulhos airport accounts for approximately 17% of the total movements and for 22% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 78% of the Brazilian airports traffic output and 55% of the traffic movements. That is to say that in Brazil there are a lot of secondary airports (with traffic output lower than 5 million passengers/year) that, by the way, handle 45% of the aircraft movements. In terms of movements, the 50% of the sample is handled by Sao Paolo, Brasilia and the major airport of Rio de Janeiro (both Sao Paolo and Rio de Janeiro are served by two airports) and the same figure holds true also with reference to passengers output (57% handled by Sao Paolo + Brasilia + major Rio's airports). In terms of both movements and passengers, airports from Sao Paolo to Curitiba - Afonso Pena (rank 1 to 10) account for 90% of the total traffic. At top 4 airports passengers are more concentrated than movements, while from the 5th to the 10th ranked airport aircraft movements are more concentrated than passengers, suggesting a lower load factor or the usage of smaller aircrafts by airlines. In this country there is a strong variation of the Gini index over time in terms of both passengers and aircraft movements. That is to say that the air traffic market in this country is not yet mature; moreover, as it is logical, the market is expanding as the Gini index shows a reduction of approximately 28% in both passengers and movements time series. The only approximately constant data is the number of passengers carried at the first airport of the country. Although, this is another Brazilian system's peculiarity: by a government decision (through Infraero), the role of principal airport switched from Sao Paolo Congonhas to Sao Paolo Guarulhos in 2008 as the former airport had reached its full capacity and it wouldn’t have been able to cope with the crescent demand (the fact that the major airport is not the one serving the capital city is another peculiarity that Brazil shares with Australia, Canada, Germany, USA and Turkey). The strong reduction of the Gini index in both cases shows that the smaller airports of the sample gained significant traffic shares, thus diminishing the concentration. In fact from fig. 40 and fig. 41, the blue line for 2010 is clearly over the others and closer to the equality line. Geographically speaking, almost the 52% of the nation passengers traffic is concentrated in an area centered in Sao Paolo with a mean radius of approximately 340 km (two airports of Sao Paolo, two airports of Rio de Janeiro, Belo Horizonte, Campinas and Fortaleza airports). Six out of the 12 airports considered show phenomena of airline concentration as there are few airlines competing for the market or at the airport there are two competing airlines that together handle by far the majority of the traffic (at least 70%). The airport of Campinas is actually dominated by a single airline which, alone, stands for the 84% of the daily movements. In the other 6 airports the level of airline concentration is moderate. However, in all airports taken into consideration, the top 5 airlines taken together handle more than the 85% of the daily traffic in terms of movements; therefore it is possible to guess that in Brazil there is scope for airline competition as well.

In terms of airlines’ presence at airports, the two major legacy carriers TAM Linhas Aereas and Gol Air Transport contribute to reach the 80% of the daily movements in 11 out of 12 airports while low cost carrier Azul Brazilian contributes in 8 out of 12 airports (Table 69). Moreover, with regard to the top5 airlines of each airports, the same three carriers are present in, respectively, 12 11 and 9 cases out of 12, together with the other LC carrier Webjet with a frequency of 10 out of 12 (Table 70). As the Dominance Index is given by formula (20), the carriers which have a significant number of movements at the majority of airports take the highest score. That is why legacy carrier TAM Linhas Aereas and Gol Air

Transport, thanks to their feeder flights plus hub traffic get the top DI with respectively 100 and 93,5 points (on 120 available). The two Low cost carriers Webjet and Azul Brazilian are ranked 3rd and 4th with respectively 36,67 and 36,00 point. Other relevant carriers are Regional carrier with a lower frequency service, therefore they have lower DI.

HHI INDEX				un-concentrated		moderated		high-concentrated	
SAO PAULO GUARULHOS		SAO PAULO CONGONHAS		BRASILIA		R. DE JAN. - GALEAO		R. DE JAN. - SANTOS DUMONT	
HHI norm	0,173	HHI norm	0,186	HHI norm	0,253	HHI norm	0,228	HHI norm	0,084
N° carriers	37	N° carriers	3	N° carriers	11	N° carriers	25	N° carriers	7
1/N	0,027	1/N	0,333	1/N	0,091	1/N	0,040	1/N	0,143
HHI	0,195	HHI	0,457	HHI	0,321	HHI	0,259	HHI	0,214
1st carrier	33,22%	1st carrier	48,76%	1st carrier	39,49%	1st carrier	36,06%	1st carrier	32,29%
1st-2nd carrier	60,02%	1st-2nd carrier	95,41%	1st-2nd carrier	78,78%	1st-2nd carrier	70,35%	1st-2nd carrier	59,77%
1st-2nd-3rd carrier	66,11%	1st-2nd-3rd carrier	100,00%	1st-2nd-3rd carrier	86,44%	1st-2nd-3rd carrier	78,10%	1st-2nd-3rd carrier	70,25%
top5	77,30%	top5	100,00%	top5	95,87%	top5	86,50%	top5	88,95%
top10	87,04%	top10	100,00%	top10	99,61%	top10	91,81%	top10	100,00%
SALVATOR DE BAHIA		BELO HORIZONTE		PORTO ALEGRE		RECIFE		CURITIBA	
HHI norm	0,128	HHI norm	0,119	HHI norm	0,141	HHI norm	0,144	HHI norm	0,129
N° carriers	10	N° carriers	10	N° carriers	11	N° carriers	8	N° carriers	10
1/N	0,100	1/N	0,100	1/N	0,091	1/N	0,125	1/N	0,100
HHI	0,216	HHI	0,207	HHI	0,219	HHI	0,251	HHI	0,217
1st carrier	35,46%	1st carrier	32,60%	1st carrier	33,61%	1st carrier	36,76%	1st carrier	32,28%
1st-2nd carrier	59,22%	1st-2nd carrier	49,59%	1st-2nd carrier	59,24%	1st-2nd carrier	67,03%	1st-2nd carrier	59,06%
1st-2nd-3rd carrier	69,50%	1st-2nd-3rd carrier	66,58%	1st-2nd-3rd carrier	74,79%	1st-2nd-3rd carrier	76,76%	1st-2nd-3rd carrier	71,65%
top5	87,59%	top5	95,07%	top5	89,08%	top5	90,81%	top5	93,31%
top10	100,00%	top10	100,00%	top10	99,16%	top10	100,00%	top10	100,00%
CAMPINAS		FORTALEZA							
HHI norm	0,688	HHI norm	0,238						
N° carriers	13	N° carriers	8						
1/N	0,077	1/N	0,125						
HHI	0,712	HHI	0,333						
1st carrier	84,04%	1st carrier	40,13%						
1st-2nd carrier	90,66%	1st-2nd carrier	79,62%						
1st-2nd-3rd carrier	93,07%	1st-2nd-3rd carrier	91,72%						
top5	96,08%	top5	96,82%						
top10	99,10%	top10	100,00%						

Table 68: Airlines' concentration at Brazilian major airports

	2010	2009	2008	2007	2006	2005
PAX GROUP	120.726.471	100.527.377	88.535.663	86.181.124	80.903.692	76.186.075
% ON PAX COUNTRY	77,71%	78,45%	78,17%	77,94%	79,17%	79,30%
% 2010 ON 2005	58,46%					
PAX < 1000 km	80.975.184	66.190.913	58.973.251	56.881.523	54.694.702	52.304.838
% ON PAX COUNTRY	52,12%	51,66%	52,07%	51,44%	53,52%	54,44%
% 2010 ON 2005	54,81%					
pax/kmq GROUP	34	29	25	24	23	22
pax/kmq < 1000 km	221	181	161	156	150	143
MEAN RADIUS	1058					
MEAN RADIUS < 1000 km	341					

AIRLINE	GRU	CGH	BSB	GIG	SDU	SSA	CNF	POA	REC	CWB	VCP	FOR	N°	SERVICE
Azul Brazilian				X	X	X	X	X	X		X	X	8	LC
Gol Air Transport	X	X	X	X	X	X	X	X	X	X		X	11	NC
OceanAir	X		X						X				3	RC
Passaredo Linhas Aereas	X												1	RC
TAM Linhas Aereas	X	X	X	X	X	X	X	X	X	X		X	11	NC
Trip Linhas Aereas	X				X	X	X			X			5	RC
WebJet	X			X	X	X		X		X			6	LC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 69: Brazilian traffic composition

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
TAM Linhas Aereas	100	12	100,00
Gol Air Transport	102	11	93,50
WebJet	44	10	36,67
Azul Brazilian	48	9	36,00
Trip Linhas Aereas	30	7	17,50
OceanAir	20	5	8,33
PLUNA	4	1	0,33
Aerotransportes Mas de Carga	2	1	0,17
American Airlines	2	1	0,17
Passaredo Linhas Aereas	2	1	0,17

Table 70: Dominance Index at Brazilian airports

Rank	Movements	IATA CODE	2006	2007	2008	2009	2010	% on 2010
1	Toronto Pearson International	YYZ	362.750	367.753	376.731	366.999	378.453	29%
2	Vancouver International	YVR	223.481	236.997	246.897	225.480	221.903	46%
3	Calgary International	YYC	150.790	160.720	163.127	162.280	161.833	59%
4	Montréal-Pierre Elliott Trudeau International	YUL	158.275	169.138	169.818	167.396	173.552	72%
5	Victoria International	YEG	30.738	31.975	32.853	32.291	31.713	75%
6	Ottawa Macdonald-Cartier International	YOW	65.040	72.632	79.227	81.028	86.106	81%
7	Winnipeg James Armstrong Richardson International	YHZ	70.966	72.251	71.200	71.010	71.018	87%
8	Edmonton International	YWG	82.590	91.238	94.615	93.688	91.693	94%
9	Halifax Stanfield International	YYJ	53.027	56.932	57.376	58.640	61.720	98%
10	Kelowna International	YLW	20.296	20.671	20.224	20.285	20.485	100%
TOT GROUP			1.217.953	1.280.307	1.312.068	1.279.097	1.298.476	
TOT COUNTRY			2.117.009	2.224.598	2.289.311	2.237.336	2.267.970	

Rank	Passengers	IATA CODE	2006	2007	2008	2009	2010	% on 2010
1	Toronto Pearson International	YYZ	29.688.029	29.759.849	30.531.483	29.325.663	30.910.795	34%
2	Vancouver International	YVR	1.625.477	17.024.850	17.108.871	15.660.003	16.254.016	51%
3	Calgary International	YYC	11.186.340	11.935.499	12.210.006	11.639.069	11.774.776	64%
4	Montréal-Pierre Elliott Trudeau International	YUL	11.476.528	12.320.568	12.163.987	11.874.886	12.700.175	78%
5	Edmonton International	YEG	5.302.239	5.835.075	6.230.818	5.972.018	5.981.206	85%
6	Ottawa Macdonald-Cartier International	YOW	3.688.499	3.964.240	4.156.884	4.112.216	4.390.951	89%
7	Halifax Stanfield International	YHZ	3.330.941	3.346.616	3.463.249	3.363.324	3.509.473	93%
8	Winnipeg James Armstrong Richardson International	YWG	3.574.679	3.555.070	3.452.307	3.372.817	3.385.250	97%
9	Victoria International	YYJ	1.343.819	1.438.738	1.501.189	1.490.559	1.464.420	99%
10	Kelowna International	YLW	1.267.518	1.327.258	1.359.619	1.338.946	1.365.113	100%
TOT GROUP			72.484.069	90.507.763	92.178.413	88.149.501	91.736.175	
TOT COUNTRY			101.677.328	106.433.442	109.025.968	104.765.822	109.324.591	

Table 71: Canadian traffic data

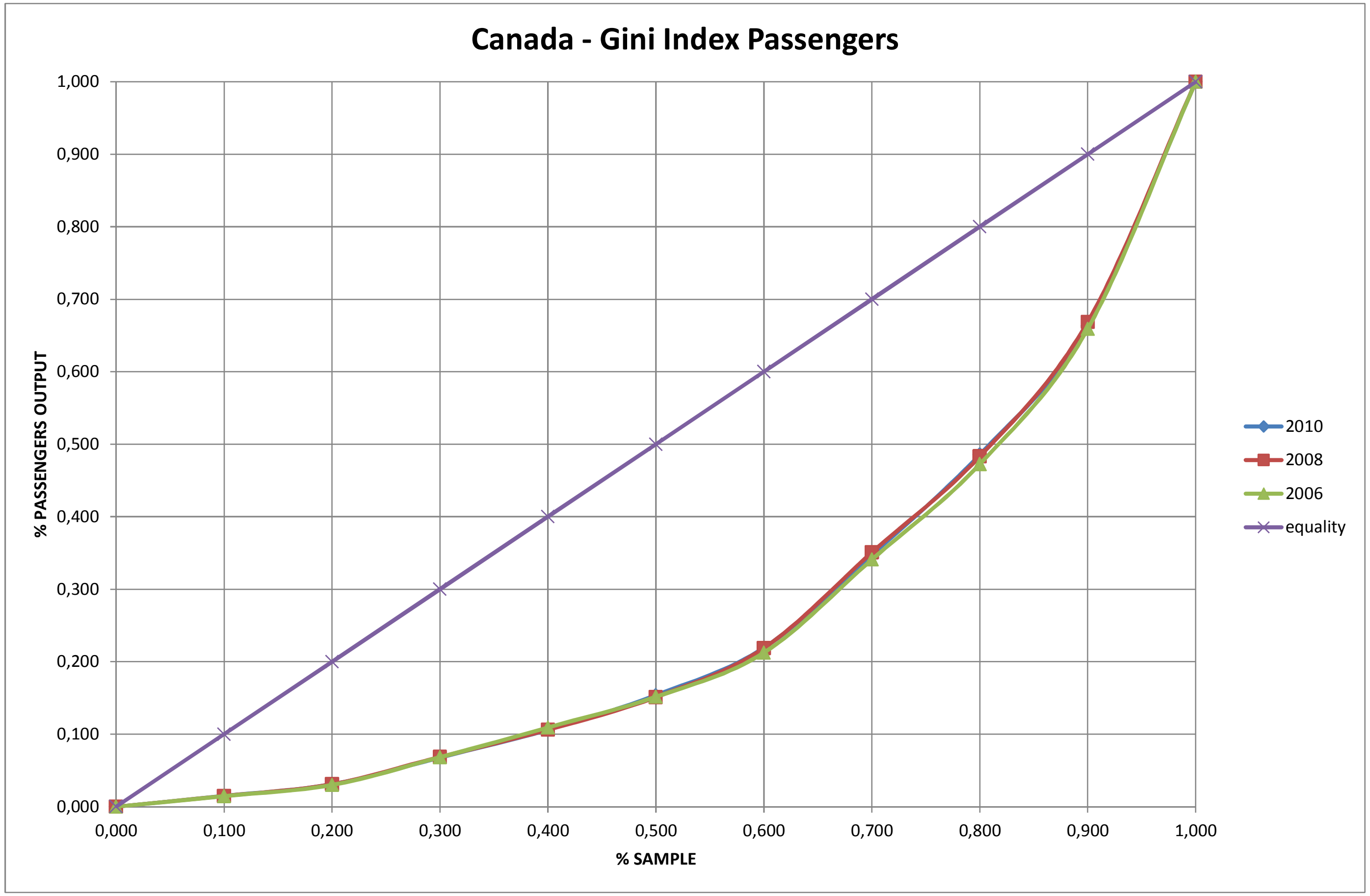


Fig. 42: Lorenz curve Canada Passengers

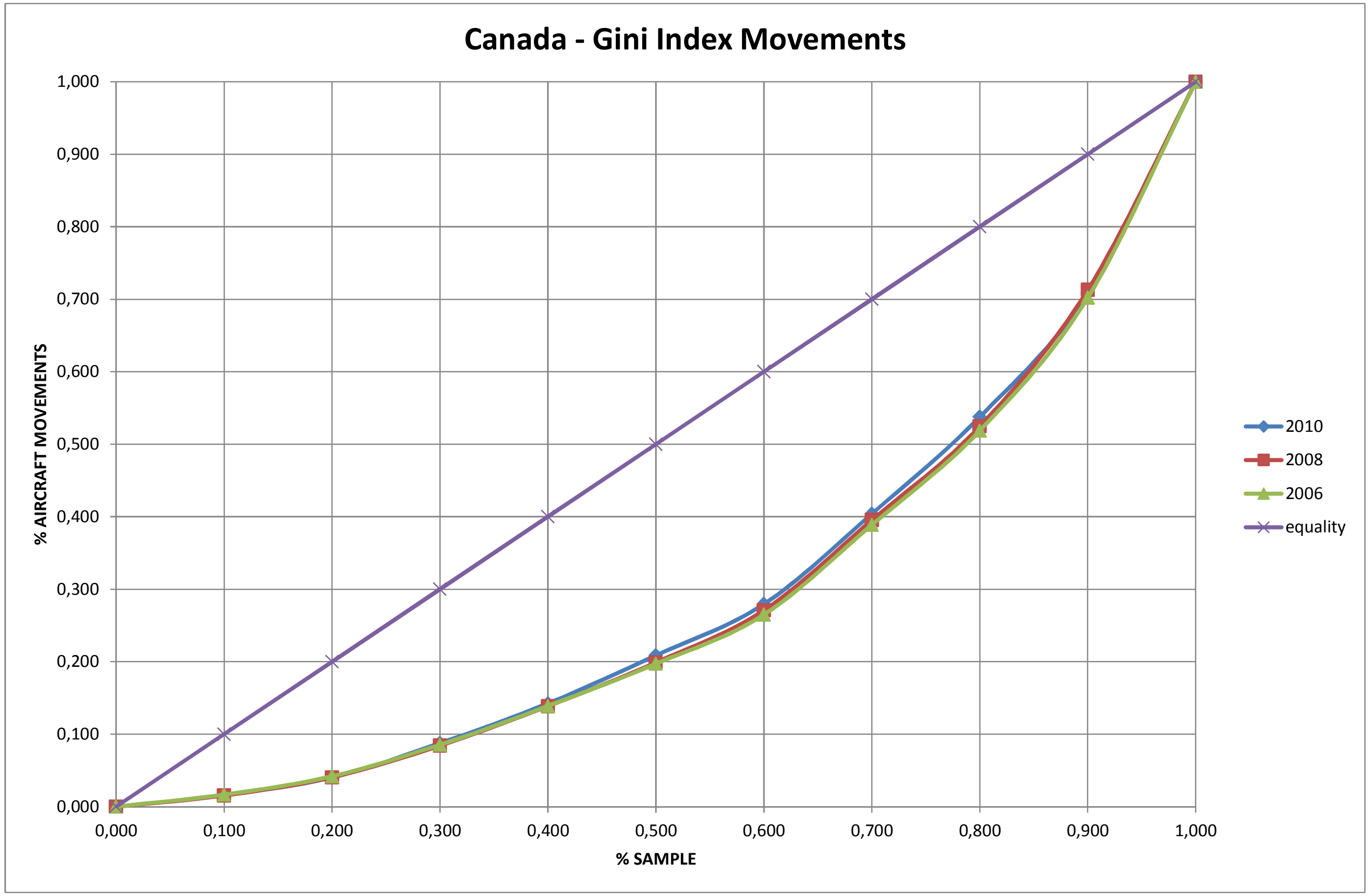


Fig. 43: Lorenz curve Canada Movements

2.010	2.009	2.008	2.007	2.006	equality		PASSENGERS
0,000	0,000	0,000	0,000	0,000	0,000	0%	P
0,015	0,015	0,015	0,015	0,015	0,100	10%	A
0,031	0,032	0,031	0,031	0,030	0,200	20%	S
0,068	0,070	0,068	0,068	0,068	0,300	30%	S
0,106	0,108	0,106	0,107	0,109	0,400	40%	E
0,154	0,155	0,151	0,151	0,152	0,500	50%	N
0,219	0,223	0,219	0,215	0,212	0,600	60%	G
0,347	0,355	0,351	0,347	0,341	0,700	70%	E
0,486	0,490	0,483	0,483	0,473	0,800	80%	R
0,663	0,667	0,669	0,671	0,659	0,900	90%	S
1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,482	0,477	0,481	0,483	0,488	-1,23%	GINI	

2.010	2.009	2.008	2.007	2.006	equality		MOVEMENTS
0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,016	0,016	0,015	0,016	0,017	0,100	10%	M
0,040	0,041	0,040	0,041	0,042	0,200	20%	O
0,088	0,087	0,084	0,086	0,085	0,300	30%	V
0,142	0,142	0,138	0,142	0,139	0,400	40%	E
0,209	0,206	0,199	0,199	0,197	0,500	50%	M
0,279	0,279	0,271	0,270	0,265	0,600	60%	E
0,404	0,406	0,395	0,396	0,389	0,700	70%	N
0,538	0,537	0,525	0,528	0,519	0,800	80%	T
0,709	0,713	0,713	0,713	0,702	0,900	90%	S
1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,415	0,415	0,424	0,422	0,429	-3,26%	GINI	

Table 72: Gini Index for Canada – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 10% on the X-axis regardless of its output as the sample is composed by ten airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 72 and the % variation refers to 2010 on 2006.

From Table 71, fig. 42 (with reference to passengers) and fig. 43 (with reference to aircraft movements) it is possible to understand that Toronto airport accounts for approximately 29% of the total movements and for 34% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 84% of the Canadian airports traffic output and 57% of the traffic movements. That is to say that in Brazil there are a lot of secondary airports (with traffic output lower than 5 million passengers/year) that handle 43% of the aircraft movements but only 16% of the passengers. In terms of movements, the 59% of the sample is handled by Toronto, Vancouver and Calgary airports, while Toronto and Vancouver handle 51% of the passengers. In terms of movements, airports from Toronto to Edmonton (rank 1 to 8) account for 94% of the total traffic, while as for passengers airports from Toronto to Halifax (rank 1 to 7) account for 93% of the total traffic. At top 6 airports, passengers are by far more concentrated than movements suggesting a higher load factor or the usage of bigger aircrafts by airlines. In this country there is a significant variation of the Gini index over time in terms of movements (-3,26% of 2010 on 2006) while the loss in terms of passengers is less relevant (-1,23% of 2010 on 2006). The variation in terms of passengers took place between 2006 and 2008 at big-sized airports (see fig. 42 for X-axis value ranging from 0,6 to 0,9 – that is to say 2nd,3rd and 4th ranked airport - where the red Lorenz curve for 2008 is clearly above the green one for 2006, while the 2010 Lorenz curve is partially overlapped), while the variation in terms of movements took place in particular between 2008 and 2010 at medium to big-sized airports (see fig. 43 for X-axis value ranging from 0,4 to 0,9 – that is to say airports ranked from 2nd to 6th - where the blue Lorenz curve for 2010 is clearly above the red one for 2008). Thus, the market is expanding and the concentration diminishes. The number of passengers carried and the movements handled at the first airport of the country is, on the other hand, almost steady. The reduction of the Gini index in both cases shows that the airports other than the first have been gaining significant traffic shares, thus diminishing the concentration. Geographically speaking, almost the 43% of the nation passengers' traffic is concentrated in an area centered in Toronto with a mean radius of approximately 480 km (Toronto, Montreal and Ottawa airports). Five out of the 10 airports considered don't show phenomena of airline concentration as, among the airlines competing for the market, no one has a dominant market share (in the majority of the cases there are at least 2 competing airlines with market share over 20%). Where the first airline with reference to daily movements gathers approximately 30% of the traffic, the HHI index grows highlighting moderate airline concentration (Toronto, Calgary, Halifax, Victoria). In addition to this, if the number of competing airlines is less than ten, then there is high concentration of airline: as the only example, at Kelowna airport there are 8 competing airlines and the dominant airline detains the 40% of the traffic. At un-concentrated airport, the top 3 airlines gather less than 60% of the movements, at moderately concentrated airports they gather from 60% to 70% of the traffic and at concentrated airport the traffic share handled is higher than 80% (and top5's share over 90%).

In terms of airlines' presence at airports, the low cost carrier Westjet and Jazz Aviation (which provides regional feeder service to the legacy carrier Air Canada) contribute to reach the 80% of the daily movements in 10 out of 10 airports while legacy carrier Air Canada contributes in 8 out of 10 airports (Table 74b). Moreover, with reference to the top 5 carriers of each airport, the same three carriers are present in, respectively, 10 10 and 9 cases out of 10 (Table 75). As the Dominance Index is given by formula (20), the carriers which have a significant number of movements at the majority of airports take the highest score. That is why regional carrier Jazz

Aviation, with its feeder traffic on behalf of legacy carrier Air Canada, gets the top DI with 82 point on 100 available. The second highest DI is appointed to low cost carrier Westjet with 66 points (the difference lies in the fact that a regional feeder service needs an higher frequency to link the spokes with the hub and transport passengers at a convenient time) and the third to Air Canada with 55,80 points. The rest of notable carriers taken in consideration provide a short haul – low frequency service as regional or charter carrier and therefore get far lower DI values.

HHI INDEX				un-concentrated		moderated		high-concentrated	
TORONTO		VANCOUVER		CALGARY		MONTREAL		EDMONTON	
HHI norm	0,179	HHI norm	0,105	HHI norm	0,139	HHI norm	0,102	HHI norm	0,110
N° carriers	42	N° carriers	39	N° carriers	27	N° carriers	36	N° carriers	24
1/N	0,024	1/N	0,026	1/N	0,037	1/N	0,028	1/N	0,042
HHI	0,199	HHI	0,128	HHI	0,170	HHI	0,127	HHI	0,147
1st carrier	36,56%	1st carrier	22,66%	1st carrier	29,70%	1st carrier	24,87%	1st carrier	25,88%
1st-2nd carrier	56,89%	1st-2nd carrier	42,45%	1st-2nd carrier	52,58%	1st-2nd carrier	46,58%	1st-2nd carrier	47,06%
1st-2nd-3rd carrier	70,28%	1st-2nd-3rd carrier	57,70%	1st-2nd-3rd carrier	66,61%	1st-2nd-3rd carrier	53,59%	1st-2nd-3rd carrier	60,00%
top5	77,59%	top5	70,09%	top5	77,12%	top5	64,45%	top5	75,88%
top10	87,84%	top10	83,69%	top10	89,85%	top10	78,28%	top10	89,71%
OTTAWA		HALIFAX		WINNIPEG		VICTORIA		KELOWNA	
HHI norm	0,091	HHI norm	0,111	HHI norm	0,072	HHI norm	0,138	HHI norm	0,163
N° carriers	20	N° carriers	17	N° carriers	20	N° carriers	9	N° carriers	8
1/N	0,050	1/N	0,059	1/N	0,050	1/N	0,111	1/N	0,125
HHI	0,136	HHI	0,163	HHI	0,118	HHI	0,234	HHI	0,268
1st carrier	22,30%	1st carrier	27,43%	1st carrier	22,34%	1st carrier	41,58%	1st carrier	39,39%
1st-2nd carrier	39,37%	1st-2nd carrier	46,86%	1st-2nd carrier	36,63%	1st-2nd carrier	56,44%	1st-2nd carrier	69,70%
1st-2nd-3rd carrier	54,36%	1st-2nd-3rd carrier	64,00%	1st-2nd-3rd carrier	50,18%	1st-2nd-3rd carrier	69,31%	1st-2nd-3rd carrier	80,30%
top5	77,70%	top5	82,29%	top5	68,50%	top5	87,13%	top5	92,42%
top10	93,73%	top10	93,71%	top10	92,67%	top10	100,00%	top10	100,00%

Table 73: Airlines' concentration at Canadian major airports

	2010	2009	2008	2007	2006
PAX GROUP	91.736.175	88.149.501	92.178.413	90.507.763	87.112.069
% ON PAX GROUP	83,91%	84,14%	84,55%	85,04%	84,14%
% 2010 on 2005	5,31%				
PAX < 1000 km	48.001.091	45.312.765	46.852.354	46.044.657	44.853.056
% ON PAX GROUP	43,91%	43,25%	42,97%	43,26%	44,11%
% 2010 on 2005	7,02%				
pax/kmq GROUP	4,32	4,15	4,34	4,26	4,10
pax/kmq < 1000 km	66,73	63,00	65,14	64,01	62,36
raggio medio	2600				
raggio medio < 1000	479				

Table 74a: Canadian traffic composition

AIRLINE	YYZ	YVR	YYC	YUL	YEG	YOW	YHZ	YWG	YYJ	YLW	N°	SERVICE
Air BC/Air Canada express	X		X								2	RC
Air Canada	X	X	X	X	X	X	X	X			8	NC
Air Georgian							X				1	RC - CH
American Eagle Airlines	X			X							2	RC
Bearskin Airlines				X		X		X			3	RC
Calm Air International								X			1	RC
Central Mountain Air		X			X						2	RC
ExpressJet Airlines				X		X		X			3	RC
Harbour Air		X									1	RC - CH
Horizon Air/Alaska Airlines Commuter		X							X	X	3	RC
Jazz Aviation	X	X	X	X	X	X	X	X	X	X	10	RC
Kelowna Flightcraft Air Charter								X			1	CH
Morningstar Air									X		1	FC
North Caribou Flying Service Ltd.			X		X						2	CH
Northwest Airlink/Express Airlines	X			X							2	RC
Pacific Coastal Airlines		X							X		2	RC - CH
Perimeter Airlines								X			1	RC - CH
Porter Airlines				X		X	X				3	RC
Provincial Airlines				X							1	RC
Sky Regional Airlines				X							1	RC
Skywest Airlines			X								1	RC
Sunwest Home Aviation			X		X						2	CH
Sunwing Airlines				X							1	CH
West Coast Air		X									1	RC - CH
Westjet	X	X	X	X	X	X	X	X	X	X	10	LC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 74b: Canadian traffic composition

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
Jazz Aviation	82	10	82,00
Westjet	66	10	66,00
Air Canada	62	9	55,80
Porter Airlines	18	3	5,40
North Caribou Flying Service Ltd.	10	3	3,00
Horizon Air	10	2	2,00
Pacific Coastal Airlines	10	2	2,00
Perimeter Airlines	10	1	1,00
Air Georgian	6	1	0,60
Air BC/Air Canada express	4	1	0,40
Bearskin Airlines	4	1	0,40
Calm Air International	4	1	0,40
Sunwest Home Aviation	4	1	0,40
American Eagle Airlines	2	1	0,20
Central Mountain Air	2	1	0,20
Morningstar Air	2	1	0,20
Sky Regional Airlines	2	1	0,20
West Coast Air	2	1	0,20

Table 75: Dominance Index at Canadian airports

Rank	Airport	COD IATA	Passengers	% on 2010	Movements	% on 2010
1	Beijing Capital International	PEK	73.948.114	13%	517.585	11%
2	Hong Kong		49.774.874	22%	306.534	18%
3	Guangzhou Baiyun International	CAN	40.975.673	29%	329.214	25%
4	Shanghai Pudong International	PVG	40.578.621	37%	332.126	33%
5	Shanghai Hongqiao International	SHA	31.298.812	42%	218.985	37%
6	Shenzhen Bao'an International	SZX	26.713.610	47%	216.897	42%
7	Chengdu Shuangliu International	CTU	25.805.815	51%	205.537	47%
8	Taiwan		25.114.413	56%	156.036	50%
9	Kunming Wujiaba International	KMG	20.192.243	60%	181.466	54%
10	Xi'an Xianyang International	XIY	18.010.405	63%	164.430	58%
11	Hangzhou Xiaoshan International	HGH	17.068.585	66%	146.289	61%
12	Chongqing Jiangbei International	CKG	15.802.334	69%	145.705	64%
13	Xiamen Gaoqi International	XMN	13.206.217	71%	116.659	67%
14	Changsha Huanghua International	CSX	12.621.333	73%	115.635	69%
15	Nanjing Lukou International	NKG	12.530.515	75%	116.087	72%
16	Wuhan Tianhe International	WUH	11.646.789	78%	112.521	74%
17	Qingdao Liuting International	TAO	11.101.176	80%	103.975	77%

Table 76a: Chinese traffic data

Rank	Airport	COD IATA	Passengers	% on 2010	Movements	% on 2010
18	Dalian Zhoushuizi International	DLC	10.703.640	81%	91.628	79%
19	Sanya Phoenix International	SYX	9.293.959	83%	70.575	80%
20	Ürümqi Diwopu International	URC	9.148.329	85%	86.491	82%
21	Haikou Meilan International	HAK	8.773.771	86%	73.824	84%
22	Zhengzhou Xinzheng International	CGO	8.707.873	88%	84.180	86%
23	Shenyang Taoxian International	SHE	8.619.897	89%	70.786	87%
24	Tianjin Binhai International	TSN	7.277.106	91%	85.034	89%
25	Harbin Taiping International	HRB	7.259.498	92%	61.002	90%
26	Jinan Yaoqiang International	TNA	6.898.936	93%	69.145	92%
27	Fuzhou Changle International	FOC	6.476.773	94%	62.108	93%
28	Guiyang Longdongbao International	KWE	6.271.701	95%	61.231	95%
29	Nanning Wuxu International	NNG	5.632.933	96%	52.396	96%
30	Wenzhou Yongqiang International	WNZ	5.326.802	97%	49.854	97%
31	Guilin Liangjiang International	KWL	5.259.260	98%	48.103	98%
32	Taiyuan Wusu International	TYN	5.252.783	99%	57.525	99%
33	Macau international		4.078.836	100%	37.148	100%

Table 76b: Chinese traffic data

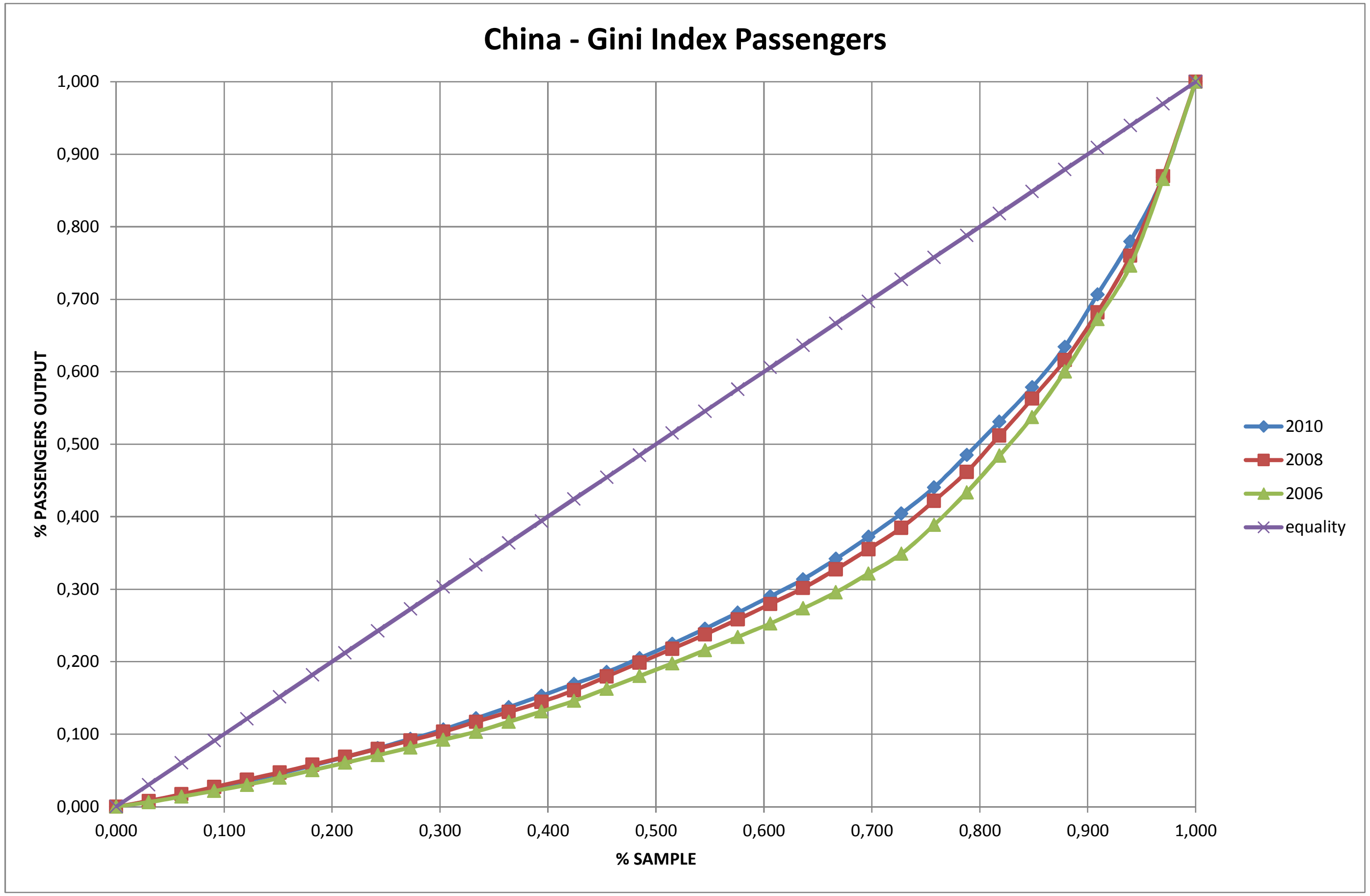


Fig. 44: Lorenz curve China Passengers

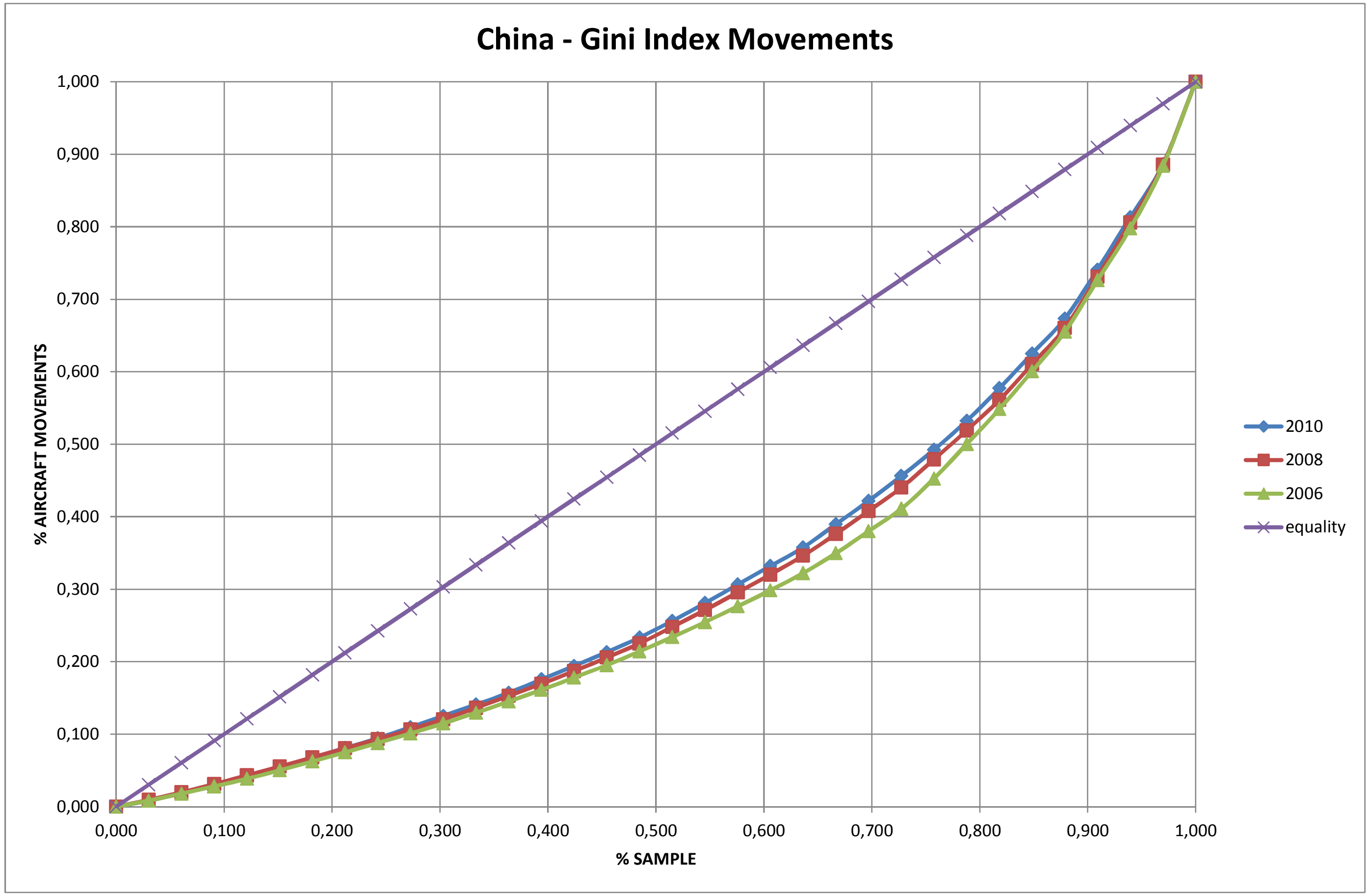


Fig. 45: Lorenz curve China Movements

2010	2009	2008	2007	2006	equality		PASSENGERS
0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,007	0,009	0,008	0,007	0,006	0,030	3%	
0,017	0,018	0,017	0,016	0,014	0,061	6%	
0,026	0,027	0,027	0,024	0,022	0,091	9%	
0,035	0,037	0,037	0,034	0,030	0,121	12%	
0,046	0,048	0,047	0,044	0,040	0,152	15%	
0,057	0,059	0,058	0,054	0,050	0,182	18%	
0,068	0,071	0,069	0,065	0,060	0,212	21%	
0,081	0,082	0,080	0,076	0,071	0,242	24%	
0,093	0,094	0,091	0,087	0,082	0,273	27%	
0,106	0,108	0,103	0,099	0,092	0,303	30%	
0,122	0,121	0,117	0,112	0,103	0,333	33%	
0,137	0,136	0,131	0,125	0,117	0,364	36%	
0,153	0,151	0,145	0,140	0,131	0,394	39%	
0,169	0,167	0,160	0,155	0,146	0,424	42%	
0,186	0,185	0,180	0,172	0,163	0,455	45%	
0,205	0,204	0,199	0,190	0,180	0,485	48%	
0,225	0,224	0,218	0,209	0,198	0,515	52%	
0,245	0,246	0,238	0,228	0,216	0,545	55%	
0,268	0,269	0,258	0,248	0,234	0,576	58%	
0,290	0,292	0,280	0,268	0,253	0,606	61%	
0,314	0,315	0,301	0,289	0,274	0,636	64%	
0,342	0,343	0,327	0,314	0,296	0,667	67%	
0,372	0,374	0,355	0,342	0,322	0,697	70%	
0,404	0,405	0,385	0,370	0,349	0,727	73%	
0,440	0,444	0,422	0,408	0,389	0,758	76%	
0,485	0,488	0,462	0,453	0,434	0,788	79%	
0,531	0,534	0,512	0,503	0,484	0,818	82%	
0,579	0,584	0,563	0,557	0,537	0,848	85%	
0,634	0,635	0,616	0,614	0,600	0,879	88%	
0,707	0,700	0,682	0,684	0,673	0,909	91%	
0,780	0,775	0,760	0,759	0,746	0,939	94%	
0,868	0,867	0,870	0,870	0,866	0,970	97%	
1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,425	0,424	0,441	0,454	0,474	-10,41%	GINI	

Table 77a: Gini Index for China – time series

2010	2009	2008	2007	2006	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0%	MOVEMENTS
0,008	0,010	0,009	0,009	0,008	0,030	3%	
0,019	0,020	0,020	0,019	0,018	0,061	6%	
0,030	0,031	0,031	0,030	0,028	0,091	9%	
0,041	0,043	0,043	0,041	0,039	0,121	12%	
0,054	0,056	0,056	0,053	0,050	0,152	15%	
0,067	0,068	0,068	0,065	0,062	0,182	18%	
0,081	0,082	0,080	0,078	0,075	0,212	21%	
0,094	0,096	0,093	0,091	0,088	0,242	24%	
0,110	0,110	0,106	0,104	0,101	0,273	27%	
0,125	0,125	0,120	0,119	0,115	0,303	30%	
0,141	0,141	0,136	0,134	0,130	0,333	33%	
0,157	0,157	0,153	0,149	0,145	0,364	36%	
0,175	0,174	0,169	0,166	0,161	0,394	39%	
0,194	0,192	0,187	0,183	0,178	0,424	42%	
0,213	0,210	0,206	0,200	0,195	0,455	45%	
0,233	0,230	0,225	0,219	0,214	0,485	48%	
0,256	0,254	0,248	0,241	0,234	0,515	52%	
0,281	0,279	0,271	0,264	0,255	0,545	55%	
0,306	0,305	0,296	0,287	0,276	0,576	58%	
0,332	0,331	0,320	0,311	0,299	0,606	61%	
0,358	0,359	0,346	0,337	0,322	0,636	64%	
0,390	0,390	0,376	0,366	0,350	0,667	67%	
0,422	0,423	0,408	0,398	0,380	0,697	70%	
0,456	0,456	0,440	0,431	0,411	0,727	73%	
0,492	0,491	0,479	0,472	0,453	0,758	76%	
0,532	0,533	0,519	0,516	0,500	0,788	79%	
0,577	0,578	0,561	0,562	0,549	0,818	82%	
0,625	0,624	0,610	0,613	0,601	0,848	85%	
0,673	0,672	0,660	0,665	0,655	0,879	88%	
0,741	0,739	0,731	0,735	0,726	0,909	91%	
0,813	0,809	0,806	0,807	0,798	0,939	94%	
0,886	0,883	0,886	0,889	0,884	0,970	97%	
1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,371	0,371	0,384	0,391	0,406	-8,73%	GINI	

Table 77b: Gini Index for China – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 3% on the X-axis regardless of its output as the sample is composed by thirty-three airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The numerical value of the Gini index is reported in Table 77a-b and the % variation refers to 2010 on 2006.

From Table 76a-b, fig. 44 (with reference to passengers) and fig. 45 (with reference to aircraft movements) it is possible to understand that Beijing airport accounts for approximately 11% of the total movements and for 13% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 90% of the Chinese passenger traffic output and 89% of the traffic movements. That is to say that in China there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 11% of the aircraft movements but only 10% of the passengers. In terms of movements, the 50% of the sample is handled by airport ranked from 1st to 8th position, while airport ranking from 1st to 7th position handle 51% of the passengers. In terms of movements, airports ranking from 1st to 25th account for 90% of the total traffic, while as for passengers airport ranked from 1st to 24th position account for 91% of the total traffic. At airports ranking from 2nd to 14th in terms of 2010 passengers, passengers are far more concentrated than movements suggesting a higher load factor or the usage of bigger aircrafts by airlines. In this country there is a strong variation of the Gini index over time in terms of both passengers and aircraft movements. That is to say that the air traffic market in this country is not yet mature; moreover, as it is logical, the market is expanding as the Gini index shows a reduction of approximately 10,4% in terms of passengers and of 8,7% in movements time series. Both variations take place between 2006 and 2010 (even if the changes are already relevant in 2008) especially in the middle of the sample: from the 2nd to the 26th airports in terms of passengers and from the 4th to the 20th airports in terms of movements (see fig. 44 and 45). Thus, the market is expanding at medium to big-sized airports and the concentration diminishes. On the other hand, the fact that the figures of the 1st airport (Beijing) doesn't change over time, means that this airport has been growing at a faster pace than the immediate followers. The growth of passengers' traffic from 2006 to 2010 has been dramatically evident: +96,8%. Geographically speaking, almost the 21,5% of the nation passengers traffic is concentrated in an area centered in Beijing with a mean radius of approximately 590 km (7 medium sized airports + Beijing). Chinese airports don't show phenomena of high airline concentration as, among the airlines competing for the market at each airport, no one has a dominant market share. 19 airports out of 33 have moderate concentration and the remaining low-concentration. At un-concentrated airport, the top 3 airlines gather less than 55% of the movements, at moderately concentrated airports they gather from 60% to 70% of the traffic.

In terms of airlines' presence at airports, the six airlines that contribute to reach the 80% of the daily movements in the majority of airports are legacy carriers (Air China International, China Eastern Airlines, China Southern Airlines, Hainan Airlines, Shenzhen Airlines and Xiamen Airlines). Given the vastness of the country, each of these legacy carriers is based in a target part of the country and its base airports acts like a proper hub. Moreover, with reference to the top 5 carriers of each airports, Air China International, China Eastern Airlines, China Southern Airlines have the best connected network and therefore are the leading airlines of the country. As the Dominance Index is given by formula (20), the carriers which have a significant number of movements at the majority of airports take the highest score. China Southern totals 218,18 points on 330 available, followed by China Eastern with 151 points and Air China International with 112 points. The difference in DI and the scarce concentration at airports suggest that there is scope for a greater competition; on the other hand, the presence of a vast majority of legacy carriers suggests that the government is still heavily involved in the airline ownership so some form of protectionism may be present.

	2010	2009	2008	2007	2006	2005
PAX GROUP	561.371.626	490.974.886	429.241.060	413.894.871	362.911.649	285.759.129
% ON PAX GROUP	91,28%	91,72%	92,49%	92,45%	92,72%	83,87%
% 2010 on 2005	96,45%					
PAX < 1000 km	132.509.525	115.698.175	98.817.745	91.790.942	80.420.433	67.318.643
% ON PAX GROUP	21,55%	21,61%	21,29%	20,50%	20,55%	19,76%
% 2010 on 2005	96,84%					
pax/kmq GROUP	66	57	50	48	42	33
pax/kmq < 1000 km	122	107	91	85	74	62
MEAN RADIUS	1651					
MEAN RADIUS < 1000 KM	587					

Table 78: Chinese traffic composition

HHI INDEX				un-concentrated		moderated		high-concentrated	
BEIJING		HONG KONG		GUANGZHOU BAIYUN		SHANGHAI PUDONG		SHANGHAI HONGQIAO	
HHI norm	0,187	HHI norm	0,099	HHI norm	0,186	HHI norm	0,110	HHI norm	0,138
N° carriers	50	N° carriers	50	N° carriers	50	N° carriers	50	N° carriers	20
1/N	0,020	1/N	0,020	1/N	0,020	1/N	0,020	1/N	0,050
HHI	0,204	HHI	0,117	HHI	0,202	HHI	0,128	HHI	0,181
1st carrier	38,03%	1st carrier	25,94%	1st carrier	39,52%	1st carrier	29,94%	1st carrier	30,94%
1st-2nd carrier	54,75%	1st-2nd carrier	40,04%	1st-2nd carrier	54,07%	1st-2nd carrier	39,54%	1st-2nd carrier	54,68%
1st-2nd-3rd carrier	65,87%	1st-2nd-3rd carrier	46,39%	1st-2nd-3rd carrier	64,67%	1st-2nd-3rd carrier	48,44%	1st-2nd-3rd carrier	64,03%
top5	79,20%	top5	53,39%	top5	77,81%	top5	62,43%	top5	78,71%
top10	86,84%	top10	64,05%	top10	88,78%	top10	77,23%	top10	95,40%
Shenzhen Bao'an		Chengdu Shuangliu		taiwan		Kunming Wujiaba		Xi'an Xianyang	
HHI norm	0,126	HHI norm	0,132	HHI norm	0,140	HHI norm	0,077	HHI norm	0,114
N° carriers	30	N° carriers	31	N° carriers	38	N° carriers	33	N° carriers	19
1/N	0,033	1/N	0,032	1/N	0,026	1/N	0,030	1/N	0,053
HHI	0,155	HHI	0,160	HHI	0,162	HHI	0,105	HHI	0,160
1st carrier	25,40%	1st carrier	27,92%	1st carrier	32,42%	1st carrier	19,25%	1st carrier	30,75%
1st-2nd carrier	48,87%	1st-2nd carrier	50,73%	1st-2nd carrier	52,85%	1st-2nd carrier	37,17%	1st-2nd carrier	46,95%
1st-2nd-3rd carrier	63,02%	1st-2nd-3rd carrier	61,50%	1st-2nd-3rd carrier	61,89%	1st-2nd-3rd carrier	47,12%	1st-2nd-3rd carrier	62,68%
top5	78,62%	top5	76,64%	top5	68,96%	top5	63,94%	top5	74,65%
top10	89,55%	top10	89,78%	top10	79,57%	top10	83,63%	top10	91,55%

HHI INDEX				un-concentrated		moderated		high-concentrated	
Hangzhou Xiaoshan		Chongqing Jiangbei		Xiamen Gaoqi		Changsha Huanghua		Nanjing Lukou	
HHI norm	0,091	HHI norm	0,064	HHI norm	0,160	HHI norm	0,090	HHI norm	0,108
N° carriers	31	N° carriers	43	N° carriers	27	N° carriers	22	N° carriers	31
1/N	0,032	1/N	0,023	1/N	0,037	1/N	0,045	1/N	0,032
HHI	0,120	HHI	0,086	HHI	0,191	HHI	0,131	HHI	0,137
1st carrier	18,78%	1st carrier	18,05%	1st carrier	39,04%	1st carrier	27,65%	1st carrier	27,83%
1st-2nd carrier	35,68%	1st-2nd carrier	30,96%	1st-2nd carrier	49,64%	1st-2nd carrier	42,18%	1st-2nd carrier	46,06%
1st-2nd-3rd carrier	51,17%	1st-2nd-3rd carrier	41,39%	1st-2nd-3rd carrier	60,24%	1st-2nd-3rd carrier	53,35%	1st-2nd-3rd carrier	57,88%
top5	72,77%	top5	57,78%	top5	73,98%	top5	68,44%	top5	68,23%
top10	86,85%	top10	79,80%	top10	89,88%	top10	87,15%	top10	83,74%
Wuhan Tianhe		Qingdao Liuting		Dalian Zhoushuizi		Sanya Phoenix		Ürümqi Diwopu	
HHI norm	0,080	HHI norm	0,121	HHI norm	0,086	HHI norm	0,069	HHI norm	0,197
N° carriers	19	N° carriers	18	N° carriers	30	N° carriers	20	N° carriers	18
1/N	0,053	1/N	0,056	1/N	0,033	1/N	0,050	1/N	0,056
HHI	0,128	HHI	0,170	HHI	0,117	HHI	0,116	HHI	0,241
1st carrier	25,58%	1st carrier	31,34%	1st carrier	24,11%	1st carrier	24,39%	1st carrier	45,30%
1st-2nd carrier	41,86%	1st-2nd carrier	49,25%	1st-2nd carrier	41,67%	1st-2nd carrier	39,37%	1st-2nd carrier	58,12%
1st-2nd-3rd carrier	52,91%	1st-2nd-3rd carrier	64,93%	1st-2nd-3rd carrier	52,08%	1st-2nd-3rd carrier	50,52%	1st-2nd-3rd carrier	67,95%
top5	68,90%	top5	78,36%	top5	64,88%	top5	65,16%	top5	77,35%
top10	88,37%	top10	93,28%	top10	82,74%	top10	83,97%	top10	91,88%

HHI INDEX				un-concentrated		moderated		high-concentrated	
Haikou Meilan		Zhengzhou Xinzheng		Shenyang Taoxian		Tianjin Binhai		Harbin Taiping	
HHI norm	0,092	HHI norm	0,180	HHI norm	0,139	HHI norm	0,065	HHI norm	0,079
N° carriers	23	N° carriers	16	N° carriers	21	N° carriers	30	N° carriers	19
1/N	0,043	1/N	0,063	1/N	0,048	1/N	0,033	1/N	0,053
HHI	0,131	HHI	0,232	HHI	0,180	HHI	0,096	HHI	0,127
1st carrier	23,58%	1st carrier	44,79%	1st carrier	36,99%	1st carrier	19,03%	1st carrier	29,52%
1st-2nd carrier	44,34%	1st-2nd carrier	54,05%	1st-2nd carrier	51,60%	1st-2nd carrier	34,60%	1st-2nd carrier	38,10%
1st-2nd-3rd carrier	53,77%	1st-2nd-3rd carrier	61,78%	1st-2nd-3rd carrier	58,90%	1st-2nd-3rd carrier	44,29%	1st-2nd-3rd carrier	45,71%
top5	71,38%	top5	74,90%	top5	72,15%	top5	62,28%	top5	60,00%
top10	89,31%	top10	92,66%	top10	89,50%	top10	81,66%	top10	84,76%
Jinan Yaoqiang		Fuzhou Changle		Guiyang Longdongbao		Nanning Wuxu		Wenzhou Yongqiang	
HHI norm	0,162	HHI norm	0,126	HHI norm	0,107	HHI norm	0,103	HHI norm	0,067
N° carriers	15	N° carriers	26	N° carriers	15	N° carriers	16	N° carriers	18
1/N	0,067	1/N	0,038	1/N	0,067	1/N	0,063	1/N	0,056
HHI	0,218	HHI	0,159	HHI	0,166	HHI	0,159	HHI	0,119
1st carrier	41,51%	1st carrier	34,24%	1st carrier	33,33%	1st carrier	31,34%	1st carrier	22,11%
1st-2nd carrier	54,72%	1st-2nd carrier	49,03%	1st-2nd carrier	46,20%	1st-2nd carrier	46,27%	1st-2nd carrier	40,20%
1st-2nd-3rd carrier	64,78%	1st-2nd-3rd carrier	56,81%	1st-2nd-3rd carrier	57,89%	1st-2nd-3rd carrier	61,19%	1st-2nd-3rd carrier	53,27%
top5	80,50%	top5	70,04%	top5	75,44%	top5	74,63%	top5	66,33%
top10	96,23%	top10	81,71%	top10	91,81%	top10	91,04%	top10	86,43%

HHI INDEX					
un-concentrated		moderated		high-concentrated	

Guilin Liangjiang		Taiyuan Wusu		Macau	
HHI norm	0,106	HHI norm	0,105	HHI norm	0,130
N° carriers	16	N° carriers	12	N° carriers	20
1/N	0,063	1/N	0,083	1/N	0,050
HHI	0,162	HHI	0,179	HHI	0,173
1st carrier	33,33%	1st carrier	35,09%	1st carrier	34,59%
1st-2nd carrier	48,72%	1st-2nd carrier	50,88%	1st-2nd carrier	53,46%
1st-2nd-3rd carrier	57,26%	1st-2nd-3rd carrier	59,65%	1st-2nd-3rd carrier	61,01%
top5	72,65%	top5	75,44%	top5	72,33%
top10	89,74%	top10	96,49%	top10	86,16%

Table 79 a-d: Airlines' concentration at Chinese major airports

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
China Southern	240	30	218,18
China Eastern Airlines	172	29	151,15
Air China International	148	25	112,12
Shenzhen Airlines	86	16	41,70
Xiamen Airlines	72	13	28,36
Hainan Airlines	66	14	28,00
Shandong Airlines	34	6	6,18
Sichuan Airlines	20	5	3,03
Tianjin Airlines	26	3	2,36
Cathay Pacific Airways	16	2	0,97
China Airlines	14	2	0,85
EVA Air	14	2	0,85
Shanghai Airlines	12	2	0,73
Spring Airways	10	2	0,61
Beijing Capital Airlines	8	2	0,48
Juneyao	6	2	0,36
Air Macau	10	1	0,30
Dragonair	8	1	0,24
Hong Kong Airlines	6	1	0,18
China Postal Airlines	4	1	0,12
Lucky Air	4	1	0,12
Okay Airways	4	1	0,12
TransAsia Airways	4	1	0,12
ANA - All Nippon Airways	2	1	0,06
Chengdu Airlines	2	1	0,06
Thai AirAsia	2	1	0,06

Table 80: Dominance Index at Chinese airports

Rank	MOVEMENTS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Paris Roissy	CDG	513.674	530.871	543.810	551.174	517.824	491.933	38%
2	Paris Orly	ORY	222.878	228.968	232.991	230.166	220.496	215.645	55%
3	Nice	NCE	122.751	124.666	130.008	128.187	148.918	146.671	67%
4	Lyon	LYS	123.437	124.189	126.578	126.980	120.127	116.121	76%
5	Marseille	MRS	87.831	90.640	96.779	95.869	96.338	97.317	83%
6	Toulouse	TLS	78.612	66.996	80.767	73.849	78.700	79.848	90%
7	Bordeaux	BOD	49.452	50.557	51.451	51.500	45.686	46.607	93%
8	Nantes	NTE	33.511	37.154	37.055	38.200	37.109	39.833	96%
9	Beauvais	BVA	13.228	13.196	15.286	17.862	18.618	20.528	98%
10	Strasbourg	SXB	37.164	39.385	36.472	32.851	27.841	25.283	100%
TOT GROUP			1.282.538	1.306.622	1.351.197	1.346.638	1.311.657	1.279.786	
TOT COUNTRY			1.652.135	1.729.182	1.744.643	1.750.873	1.630.977	1.603.180	

Rank	PASSENGERS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Paris Roissy	CDG	53.798.308	58.849.567	59.922.177	60.874.681	57.906.866	58.167.062	46%
2	Paris Orly	ORY	24.860.532	25.622.152	26.440.736	26.209.703	25.107.693	25.203.969	66%
3	Nice	NCE	9.754.772	9.948.035	10.399.513	10.382.566	9.830.987	9.603.014	74%
4	Lyon	LYS	6.561.365	6.752.333	7.320.952	7.924.063	7.717.609	7.979.228	80%
5	Marseille	MRS	5.859.480	6.115.943	6.962.773	6.965.933	7.290.119	7.522.167	86%
6	Toulouse	TLS	5.799.536	5.956.552	6.162.288	6.349.805	6.282.076	6.405.906	91%
7	Bordeaux	BOD	3.096.827	3.255.960	3.463.205	3.556.916	3.318.059	3.660.042	94%
8	Nantes	NTE	2.161.177	2.423.778	2.589.890	2.731.563	2.650.611	3.031.510	97%
9	Beauvais	BVA	1.848.484	1.887.971	2.155.633	2.484.635	2.591.864	2.931.796	99%
10	Strasbourg	SXB	1.954.746	2.032.957	1.733.050	1.329.626	1.109.397	1.060.705	100%
TOT GROUP			115.695.227	122.845.248	127.150.217	128.809.491	123.805.281	125.565.399	
TOT COUNTRY			128.715.026	134.655.620	141.407.824	143.555.889	137.821.315	139.254.486	

Table 81: French traffic data

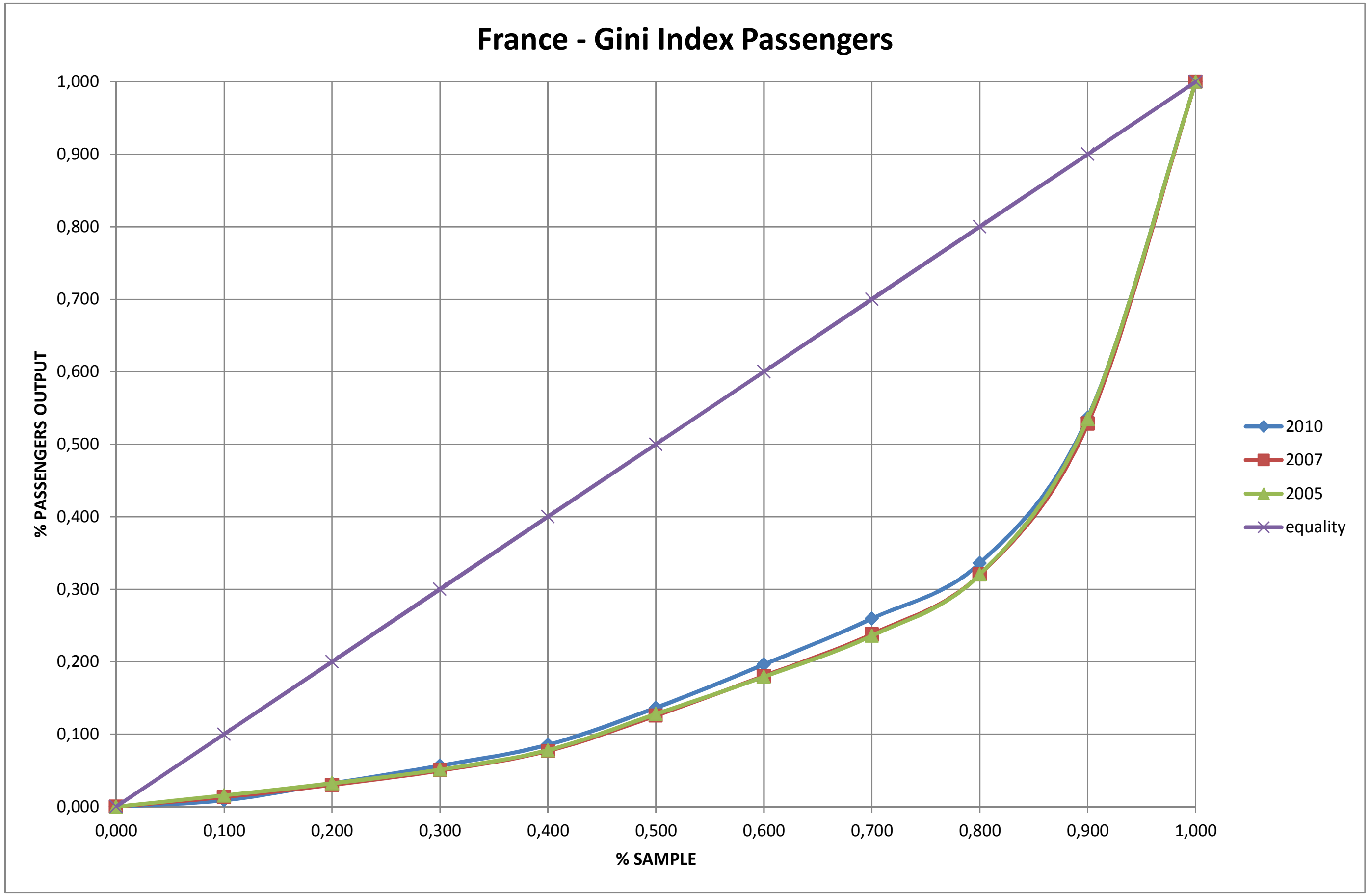


Fig. 46: Lorenz curve France Passengers

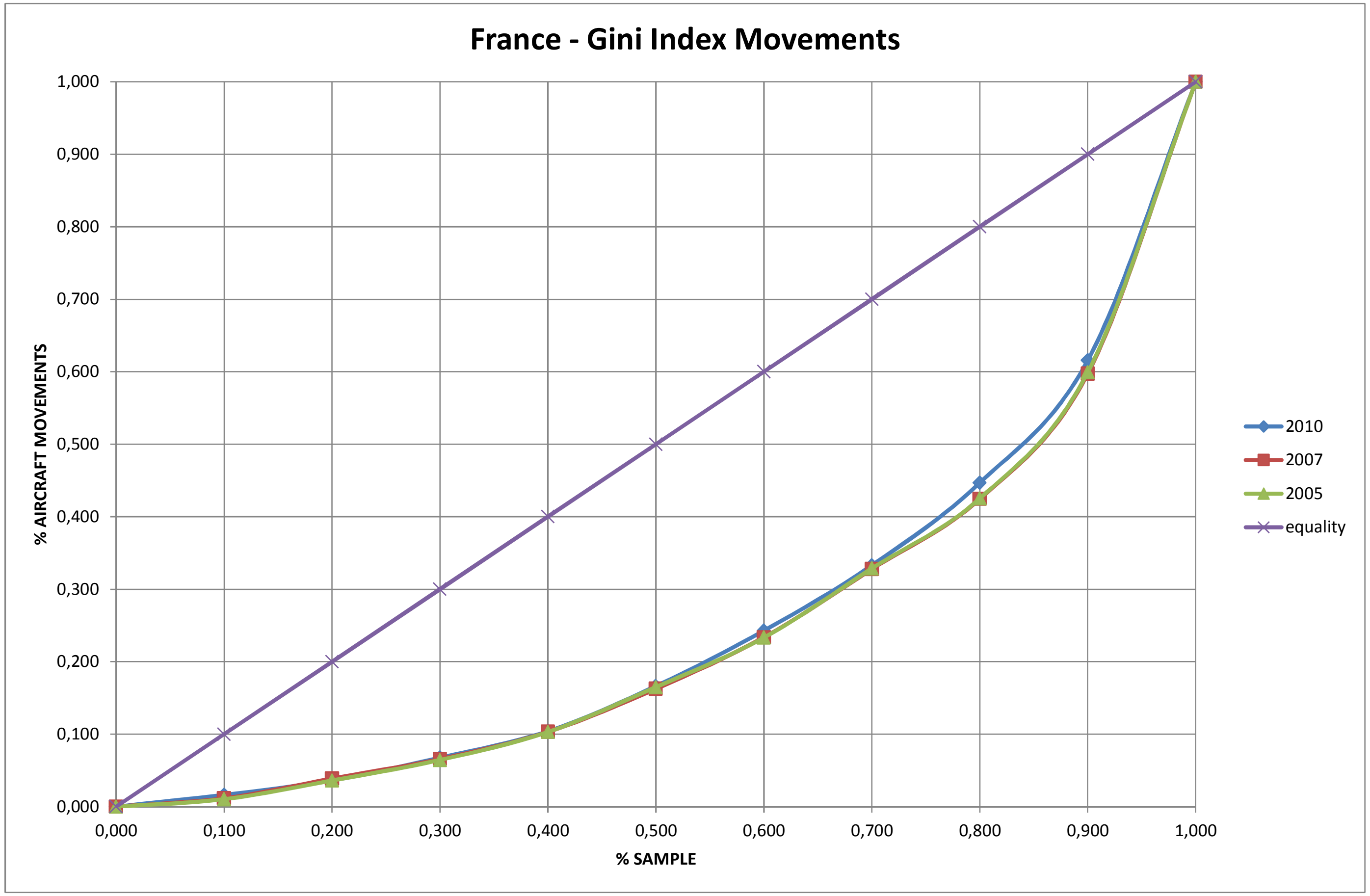


Fig. 47: Lorenz curve France Movements

2005	2006	2007	2008	2009	2010	equality		MOVEMENTS
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,010	0,011	0,012	0,013	0,014	0,016	0,100	10%	
0,036	0,038	0,039	0,038	0,035	0,036	0,200	20%	
0,064	0,069	0,066	0,066	0,064	0,068	0,300	30%	
0,103	0,107	0,103	0,104	0,098	0,104	0,400	40%	
0,165	0,159	0,163	0,159	0,158	0,166	0,500	50%	
0,233	0,228	0,234	0,230	0,232	0,243	0,600	60%	
0,329	0,323	0,328	0,325	0,324	0,333	0,700	70%	
0,425	0,419	0,425	0,420	0,437	0,447	0,800	80%	
0,599	0,593	0,597	0,590	0,605	0,616	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,507	0,511	0,507	0,511	0,507	0,494	-2,51%	GINI	

2005	2006	2007	2008	2009	2010	equality		PASSENGERS
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,016	0,015	0,013	0,010	0,009	0,009	0,100	10%	
0,032	0,032	0,030	0,029	0,030	0,032	0,200	20%	
0,051	0,052	0,050	0,050	0,051	0,057	0,300	30%	
0,078	0,078	0,077	0,078	0,078	0,085	0,400	40%	
0,128	0,126	0,126	0,127	0,129	0,136	0,500	50%	
0,179	0,176	0,180	0,182	0,188	0,196	0,600	60%	
0,236	0,231	0,238	0,243	0,251	0,259	0,700	70%	
0,320	0,312	0,320	0,323	0,330	0,336	0,800	80%	
0,535	0,520	0,528	0,527	0,532	0,537	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,585	0,592	0,587	0,586	0,580	0,571	-2,47%	GINI	

Table 82: Gini Index for France – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 10% on the X-axis regardless of its output as the sample is composed by ten airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 82 and the % variation refers to 2010 on 2005.

From Table 81, fig. 46 (with reference to passengers) and fig. 47 (with reference to aircraft movements) it is possible to understand that Paris Roissy airport accounts for approximately 38% of the total movements and for 46% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 90% of the French passenger traffic output and 77% of the traffic movements. That is to say that in France there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 23% of the aircraft movements but only 10% of the passengers. In terms of movements, the 55% of the sample is handled by Paris Roissy and Orly airports, while the same airports handle 66% of the total passengers output of the group. In terms of both movements and passengers, airports ranking from 1st to 6th account for 90% of the total traffic. At Paris Roissy, passengers are far more concentrated than movements suggesting a higher load factor, the usage of bigger aircrafts by airlines or a decision by the government to attract the majority of the traffic at the principal airport (Paris is served by four airports: Roissy/Charles de Gaulle, Orly, Beauvais-Tille and Le Bourget). In this country there has been a reduction over time of approximately 2,5% of the Gini index in terms of both passengers and aircraft movements. That is to say that the market is still expanding at medium airports. Both variations took place in 2010: in both fig. 46 and 47 it is possible to see the blue Lorenz curve for 2010 getting closer to the equity, while both the red and the green Lorenz curve remain below. In terms of movements, the most notable variation took place at Paris Orly and Lyon airports: with regard to Paris Orly, it is possible to notice that in 2008 it handled 29% of the total output of Paris Roissy + Paris Orly; in 2010 the traffic diminished of about 75.000 movements but the highest loss was at Paris Roissy; therefore in 2010 Paris Orly handled a bigger share than in 2008 and that's why the concentration index diminishes. Taking into consideration Table 82, it is clear that the French market at present is un-stable as there have been fluctuations on market concentration: years 2006 on 2005 and 2008 on 2007 show an increase of the Gini index, while year 2007 on 2006, 2009 on 2008 and 2010 on 2009 present a sharp loss of the index. This may be explained with the devolution of airport ownership from the central to the local governments and with the urge for traffic growth at medium sized airport. Therefore, secondary airports are growing their traffic at a faster pace than Paris Roissy or, as data show, they are losing traffic at a slower pace. Thus, the market is expanding and the concentration diminishes. From 2005 to 2010 there has been a traffic growth in terms of both passengers and movements, but from 2008 to 2010 there has been a market contraction. Geographically speaking, almost the 65% of the nation passengers' traffic is concentrated in an area centered in Paris Roissy with a mean radius of approximately 260 km (Paris Roissy, Paris Orly, Nantes, Paris Beauvais and Strasbourg airports). The phenomena of airline concentration is uneven at French airports: there are three airports with low-concentration (Nice, Lyon and Toulouse) where the 1st and 2nd carriers handle approximately 42% of the traffic and the top 3 carriers handle approximately 52% of the total movements. Then there are three airports with moderate concentration (Orly, Marseille and Nantes) where the top 2 airlines handle over 51% and the top 3 almost 62% (mean values), while Roissy, Bordeaux, Strasbourg and Beauvais are highly-concentrated as the dominant carrier has a market share above 40% (Beauvais is dominated by Ryanair with a 84,6% share) and the top 5 above 80% (Roissy is an exception because it is the hub airport, therefore the majority of the market is in the hands of Air France while other airlines operate far less movements). In terms of airlines' presence at airports, the airline which contribute to reach the 80% of the daily movements in the majority of airports is Air France (in 9 out of 10 airports) followed by the regional carrier "Regional Compagnie Aerienne Europeene". Hence, with reference to the top 5 carriers of each airport, Air France is the leading carrier followed by the aforementioned regional carrier and by the Low-cost EasyJet with 6 out of 10 airports. As the Dominance Index is given by formula (20), the carriers which have a significant number of movements at the majority of airports take the highest score. Air France totals 74 points on 100 available, followed by Regional Compagnie Aerienne Europeene and EasyJet with less than 30 points. It is possible to conclude then that Air France is by far the dominant carrier (as part of its shares are administered by the Government) and that at French airport there is sufficient scope for a higher competition. This is the country with the highest Gini index. Moreover, taking into consideration Table 86, it is possible to note that the Paris system is capable of attracting 27,7 departing passengers for each inhabitants, denoting a good hub-capability. A good performance is achieved by Nice as well (12,4 passengers/inhabitants), thanks to its tourism-related demand.

HHI INDEX				un-concentrated		moderate		high-concentrate	
PARIS CDG		PARIS ORLY		NICE		LYON		MARSEILLE	
HHI norm	0,282	HHI norm	0,184	HHI norm	0,100	HHI norm	0,081	HHI norm	0,159
N° carrier	50	N° carrier	33	N° carrier	23	N° carrier	26	N° carrier	19
1/N	0,020	1/N	0,030	1/N	0,043	1/N	0,038	1/N	0,053
HHI	0,296	HHI	0,209	HHI	0,139	HHI	0,116	HHI	0,203
1st carrier	50,59%	1st carrier	43,47%	1st carrier	31,43%	1st carrier	19,94%	1st carrier	41,28%
1st-2nd carrier	57,22%	1st-2nd carrier	50,80%	1st-2nd carrier	42,86%	1st-2nd carrier	38,01%	1st-2nd carrier	51,38%
1st-2nd-3rd carrier	63,50%	1st-2nd-3rd carrier	57,17%	1st-2nd-3rd carrier	53,33%	1st-2nd-3rd carrier	52,34%	1st-2nd-3rd carrier	60,55%
top5	69,44%	top5	66,08%	top5	64,76%	top5	71,03%	top5	72,48%
top10	76,15%	top10	79,94%	top10	82,86%	top10	84,11%	top10	87,16%
TOULOUSE		BORDEAUX		NANTES		PARIS BVA		STRASBOURG	
HHI norm	0,099	HHI norm	0,209	HHI norm	0,118	HHI norm	0,479	HHI norm	0,151
N° carrier	21	N° carrier	12	N° carrier	11	N° carrier	2	N° carrier	6
1/N	0,048	1/N	0,083	1/N	0,091	1/N	0,500	1/N	0,167
HHI	0,142	HHI	0,274	HHI	0,198	HHI	0,740	HHI	0,293
1st carrier	31,34%	1st carrier	48,00%	1st carrier	32,14%	1st carrier	84,62%	1st carrier	40,54%
1st-2nd carrier	45,16%	1st-2nd carrier	65,60%	1st-2nd carrier	53,57%	1st-2nd carrier	100,00%	1st-2nd carrier	70,27%
1st-2nd-3rd carrier	52,53%	1st-2nd-3rd carrier	70,40%	1st-2nd-3rd carrier	73,21%	1st-2nd-3rd carrier	100,00%	1st-2nd-3rd carrier	89,19%
top5	65,90%	top5	80,00%	top5	83,93%	top5	100,00%	top5	97,30%
top10	84,33%	top10	96,00%	top10	98,21%	top10	100,00%	top10	100,00%

Table 83: Airlines' concentration at French major airports

	2010	2009	2008	2007	2006	2005
PAX GROUP	125.565.399	123.805.281	128.809.491	127.150.217	122.845.248	115.695.227
% ON PAX GROUP	90,17%	89,83%	89,73%	89,92%	91,23%	89,88%
% 2010 vs 2005	8,53%					
PAX < 500 km	90.395.042	89.366.431	93.630.208	92.841.486	90.816.425	84.623.247
% ON PAX GROUP	64,91%	64,84%	65,22%	65,66%	67,44%	65,74%
% 2010 vs 2005	6,82%					
pax/kmq GROUP	157	155	162	159	154	145
pax/kmq < 500 km	432	427	448	444	434	405
raggio medio	504					
raggio medio entro i 500	258					

Table 84a: French traffic composition

AIRLINE	CDG	ORY	NCE	LYS	MRS	TLS	BOD	NTE	BVA	SXB	N°	SERVICE
Aigle Azur		X									1	NC
Air Algerie				X	X						2	NC
Air Europa	X										1	NC - CH
Air France	X	X	X	X	X	X	X	X		X	9	NC
Air Nostrum			X	X		X	X	X			5	RC
Airlinair		X		X				X			3	RC
Alitalia	X										1	NC
Brit Air		X		X		X		X		X	5	RC
British Airways	X		X								2	NC
Brussels Airlines				X							1	NC
CCM - Air Corsica			X		X	X					3	RC
Cityjet	X	X									2	RC
Continental Airlines	X										1	NC
Delta Air Lines	X										1	NC
Easyjet	X	X	X	X		X	X				6	LC
Finnair	X										1	NC
FlyBE	X										1	LC
Iberia		X									1	NC
KLM	X				X						2	NC
KLM Cityhopper			X			X					2	RC
Lufthansa	X		X								2	NC
Lufthansa Cityline			X	X	X	X					4	RC
Regional Compagnie Aerienne Europeene	X			X	X	X	X	X		X	7	RC
Royal Air Maroc		X									1	NC
Ryanair					X		X		X		3	LC
SAS - Scandinavian Airlines	X										1	NC
SWISS	X		X								2	NC
TAP-Air Portugal		X									1	NC
Transavia France		X									1	LC
Twin Jet					X	X					2	RC
Vueling		X									1	LC

Table 84b: French traffic composition

AIRLINE	POINTS TOT	FREQUENCY	DOMINANCE
Air France	82	9	73,80
Regional Compagnie Aerienne Europeene	46	6	27,60
Easyjet	38	6	22,80
Brit Air	28	4	11,20
Ryanair	22	3	6,60
Airlinair	14	3	4,20
CCM	14	2	2,80
Air Nostrum	6	3	1,80
Lufthansa Cityline	6	2	1,20
Wizzair	8	1	0,80
Brussels Airlines	4	1	0,40
Lufthansa	4	1	0,40
SWISS	4	1	0,40
Twin Jet	4	1	0,40
British Airways	2	1	0,20
Cityjet	2	1	0,20
Czech Airlines	2	1	0,20
Vueling	2	1	0,20

Table 85: Dominance Index at French airports

AIRPORT	INHABITANTS	PASSENGERS	PAX/INHAB
CDG+ORY+BVA	3.112.100	86.302.827	27,73
NCE	775.300	9.603.014	12,39
LYS	915.900	7.979.228	8,71
MRS	1.417.800	7.522.167	5,31
TLS	671.000	6.405.906	9,55
BOD	392.000	3.660.042	9,34
NTE	435.000	3.031.510	6,97
SXB	500.000	1.060.705	2,12

Table 86: Hub capability at French airports

Rank	MOVEMENTS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Frankfurt	FRA	475.591	474.926	479.508	473.839	452.367	453.232	26%
2	Munich	MUC	374.626	386.128	406.594	408.292	376.770	367.760	48%
3	Düsseldorf	DUS	185.988	200.586	213.222	214.757	202.879	203.383	59%
4	Berlin Tegel	TXL	136.481	133.549	144.626	154.010	148.256	150.987	68%
5	Hamburg	HAM	132.735	144.611	150.452	149.589	136.836	137.290	76%
6	Cologne/Bonn	CGN	137.590	136.542	136.603	127.011	118.922	119.286	83%
7	Stuttgart	STR	140.353	130.825	132.152	127.941	111.536	106.177	89%
8	Berlin Schoenefeld	SXF	46.093	52.766	54.799	57.046	60.298	76.595	94%
9	Hanover	HAJ	70.310	70.444	69.774	69.413	60.484	57.931	97%
10	Nuremberg	NUE	5.705	56.174	57.291	53.505	50.303	49.820	100%
TOT GROUP			1.705.472	1.786.551	1.845.021	1.835.403	1.718.651	1.722.461	
TOT COUNTRY			1.925.615	1.985.349	2.049.114	2.102.965	1.964.766	1.957.983	

Rank	PASSENGERS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Frankfurt	FRA	52.219.412	52.810.683	54.161.856	53.467.450	50.932.840	53.009.221	31%
2	Munich	MUC	28.619.427	30.757.978	33.959.422	34.530.593	32.681.067	34.721.605	52%
3	Düsseldorf	DUS	15.910.990	16.590.055	17.831.248	18.151.252	17.793.493	18.988.149	63%
4	Berlin Tegel	TXL	11.532.302	11.812.625	13.357.741	14.486.610	14.180.237	15.025.600	72%
5	Hamburg	HAM	10.676.016	11.954.117	12.780.631	12.838.350	12.229.319	12.962.429	79%
6	Cologne/Bonn	CGN	9.452.185	9.904.236	10.471.657	10.342.931	9.739.581	9.849.779	85%
7	Stuttgart	STR	9.405.887	10.104.958	10.321.438	9.924.697	8.934.493	9.218.095	90%
8	Berlin Schoenefeld	SXF	5.075.172	6.059.343	6.331.191	6.638.162	6.797.158	7.297.911	95%
9	Hanover	HAJ	5.637.385	5.699.299	5.644.582	5.637.517	4.969.799	5.059.800	98%
10	Nuremberg	NUE	3.843.610	3.961.458	4.238.275	4.269.606	3.965.743	4.068.799	100%
TOT GROUP			152.372.386	159.654.752	169.098.041	170.287.168	162.223.730	170.201.388	
TOT COUNTRY			165.448.549	174.215.286	184.691.434	191.018.401	182.175.295	190.687.112	

Table 87: German traffic data

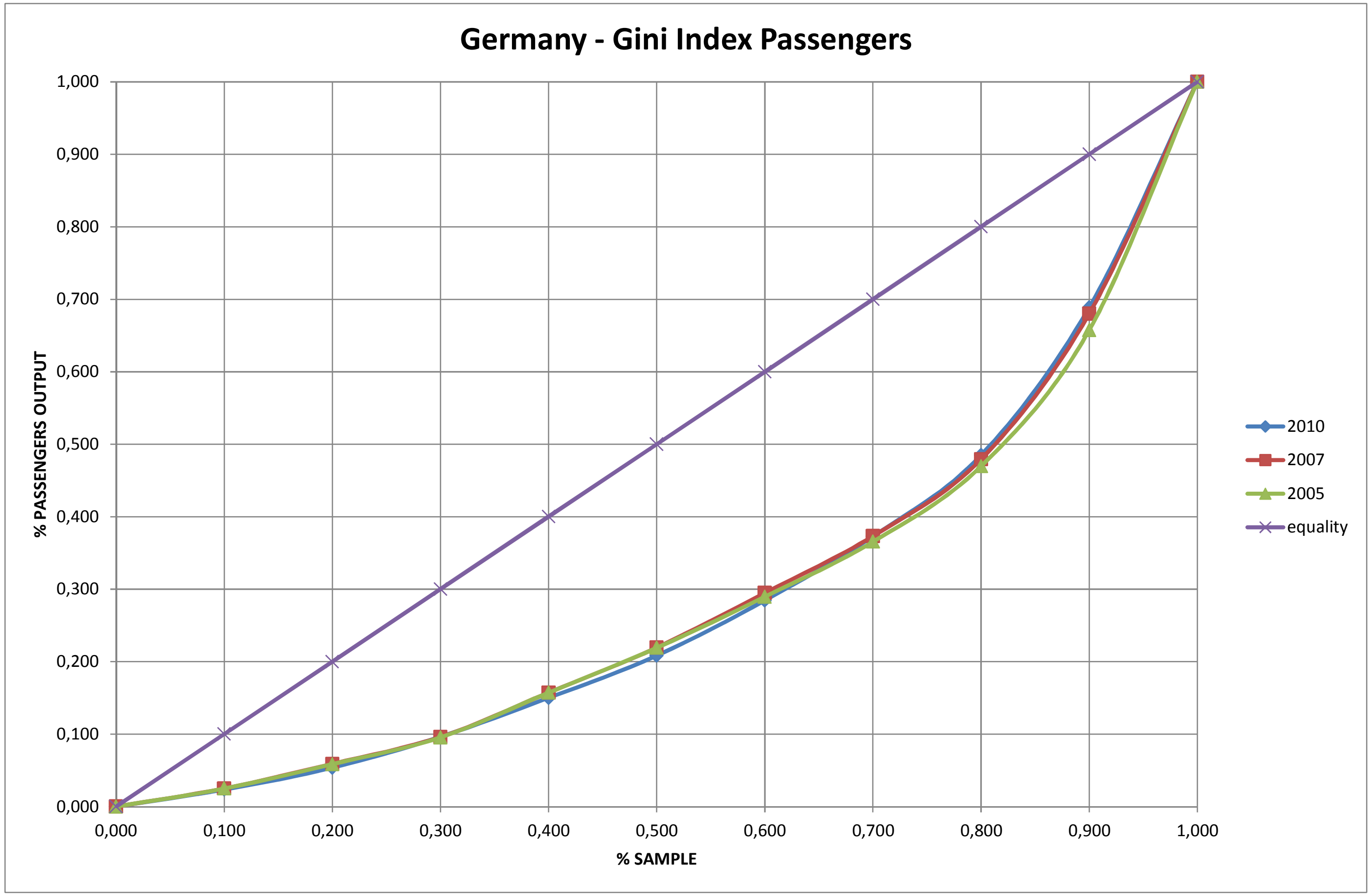


Fig. 48: Lorenz curve Germany Passengers

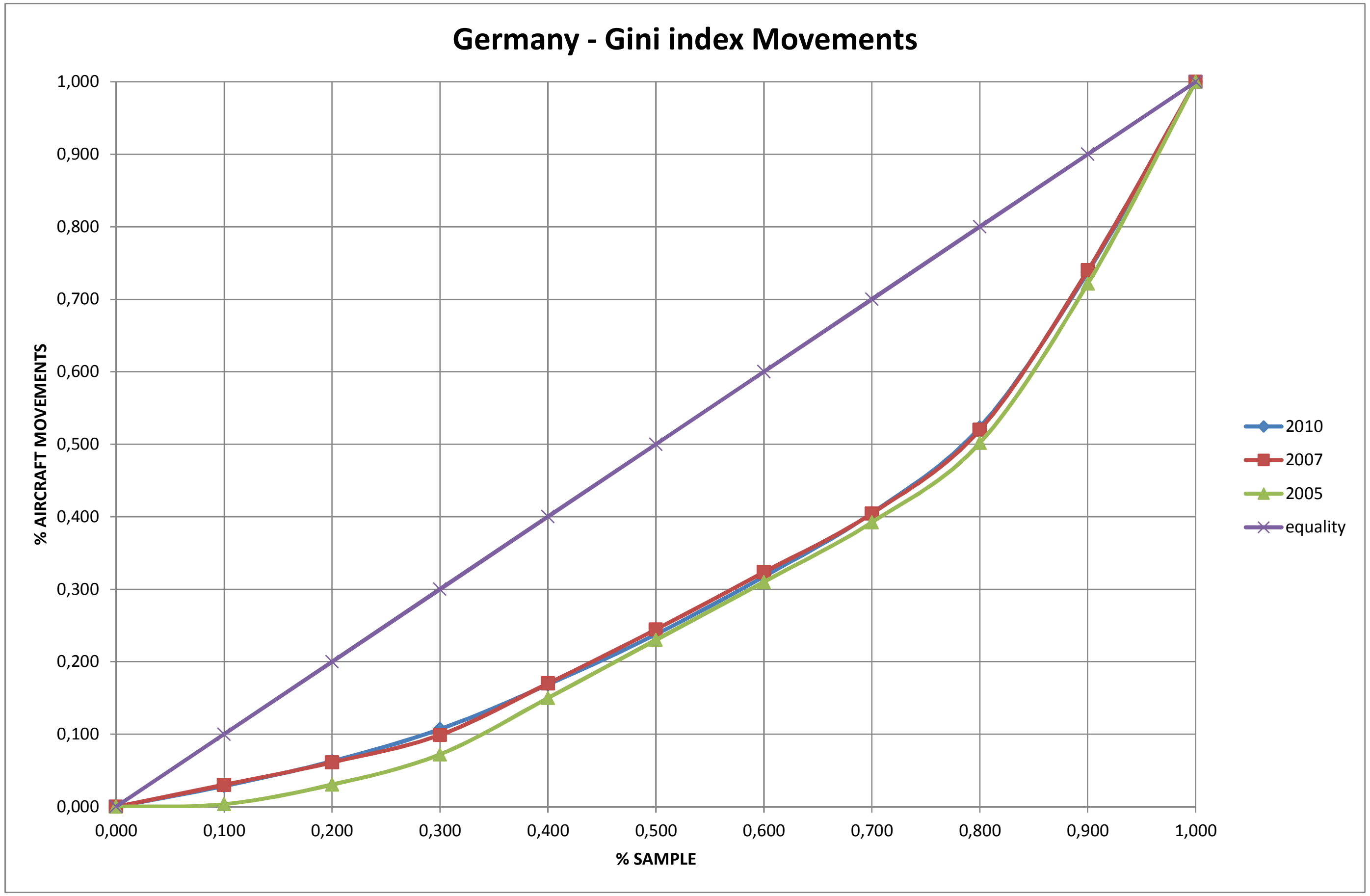


Fig. 49: Lorenz curve Germany Movements

2005	2006	2007	2008	2009	2010	equity		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	P
0,025	0,025	0,025	0,025	0,025	0,024	0,100	10%	A
0,059	0,061	0,059	0,058	0,055	0,054	0,200	20%	S
0,095	0,099	0,096	0,098	0,097	0,096	0,300	30%	S
0,157	0,161	0,157	0,156	0,152	0,150	0,400	40%	E
0,219	0,224	0,219	0,216	0,211	0,208	0,500	50%	N
0,290	0,298	0,295	0,291	0,287	0,284	0,600	60%	G
0,366	0,374	0,373	0,377	0,374	0,373	0,700	70%	E
0,470	0,477	0,479	0,483	0,484	0,485	0,800	80%	R
0,657	0,670	0,680	0,686	0,685	0,689	0,900	90%	S
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,433	0,422	0,423	0,422	0,426	0,427	-1,18%	GINI	

2005	2006	2007	2008	2009	2010	equity		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,003	0,030	0,030	0,029	0,030	0,028	0,100	10%	M
0,030	0,061	0,061	0,060	0,065	0,063	0,200	20%	O
0,072	0,100	0,099	0,098	0,100	0,107	0,300	30%	V
0,150	0,174	0,170	0,166	0,166	0,168	0,400	40%	E
0,230	0,248	0,244	0,237	0,235	0,238	0,500	50%	M
0,310	0,325	0,323	0,318	0,315	0,317	0,600	60%	E
0,392	0,406	0,404	0,402	0,401	0,405	0,700	70%	N
0,502	0,518	0,520	0,519	0,518	0,523	0,800	80%	T
0,722	0,734	0,740	0,742	0,737	0,737	0,900	90%	S
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,418	0,381	0,382	0,386	0,387	0,383	-8,40%	GINI	

Table 88: Gini Index for Germany – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 10% on the X-axis regardless of its output as the sample is composed by ten airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 88 and the % variation refers to 2010 on 2005.

From Table 87, fig. 48 (with reference to passengers) and fig. 49 (with reference to aircraft movements) it is possible to understand that Frankfurt airport accounts for approximately 26% of the total movements and for 31% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 90% of the German passenger traffic output and 88% of the traffic movements. That is to say that in Germany there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 12% of the aircraft movements but only 10% of the passengers. In terms of movements, the 48% of the sample is handled by Frankfurt and Munich, while the same airports handle 52% of the total passengers output of the group. In terms of both movements and passengers, airports ranking from 1st to 7th account for approximately 90% of the total traffic. In general passengers are more concentrated than movements at the major airports suggesting a higher load factor or the usage of bigger aircrafts by airlines. In this country there has been a reduction over time of approximately 1,2% of the Gini index in terms of passengers and a relevant reduction of 8,4% in terms of aircraft movements. From Table 88 it is evident that the sharp loss of traffic took place between 2005 and 2006; the Gini index had been approximately constant from 2006 to 2010. From fig. 48 it is possible to derive a two-sided trend of the Lorenz curve for 2010: at x=0,5 it is below Lorenz curve for 2005 and 2008 highlighting the passenger share handled by the 50% of the sample is higher, but for x ranging between 0,7 and 1 the Lorenz curve for 2010 is above the others highlighting the fact that at bigger airport the passengers' share processed is lower. As the variation is negative, the loss at bigger airports is higher than the gain at medium airport. From fig. 49 we notice that 2010 Lorenz curve (which overlaps 2008 Lorenz curve) is always above 2005 Lorenz curve and the difference is substantial at the smaller airports of the sample (for $x<0,5$). That is to say that the market is still expanding at medium airports. Therefore, secondary airports are growing their traffic at a faster pace than Frankfurt or, as data show, they are losing traffic at a slower pace: data show a traffic growth from 2005 to 2008, followed by a loss in terms of movements (with the only exception of Berlin Schoenefeld); the passenger output diminished in 2009 but the losses were recovered in 2010; again Berlin Schoenefeld data show a remarkable growth. Geographically speaking, almost the 75% of the nation passengers' traffic is concentrated in an area centered in Frankfurt with a mean radius of approximately 270 km (which gathers Frankfurt, Nuremberg, Hanover, Stuttgard, Cologne/Bonn, Dusseldorf and Munich). The phenomena of airline concentration is uneven at French airports: there are four airports with low-concentration (Dusseldorf, Hamburg, Stuttgart and Hanover) where the 1st and 2nd airlines taken together handle from 33% to 49% of the traffic and the top 3 carriers gather from 45% to 60% of the total movements. Then there are five airports with moderate concentration (Munich, the 2 airports of Berlin, Cologne-Bonn and Nuremberg) where the top 2 airlines handle from 49% to 64% of the traffic and the top 3 airlines gather from 58% to 78% of the traffic; the only high-concentrated airport is Frankfurt where the dominant carrier has a market share above 51%. In terms of airlines' presence at airports, the airlines which contribute to reach the 80% of the daily movements in the majority of airports are the legacy carriers: Lufthansa and Air Berlin with 9 out of 10 airports (many authors still consider Air Berlin an hybrid low-cost carrier, we consider it as a legacy carrier as it recently joined an alliance as only legacy carriers do at present) followed by other countries' legacy carriers as Air France and British Airways. Hence, with reference to the top 5 carriers of each airport, Lufthansa is the leading carrier followed by Air Berlin and other regional and low-cost carriers belonging to the Lufthansa group. As the Dominance Index is given by formula (20), the carriers which have a significant number of movements at the majority of airports take the highest score. Lufthansa totals 70 points on 100 available, followed by Air Berlin with 48 points; the remaining carriers don't reach the threshold of 10 points. It is possible to conclude that the Lufthansa group plays a leading role at German airports with an extended network of feeder flights + a double hub structure in Frankfurt and Munich (it is peculiar the fact that neither of the two hub is located in the capital city). Nevertheless both Frankfurt and Munich have a high hub-capability (respectively 47,7 and 25,1 passengers/inhabitants); Frankfurt is indeed the EU airport with the highest connectivity (N. Gualandi, L. Mantecchini, F. Paganelli, 2010). Even Dusseldorf has a highest hub-capability than Berlin; things might change with the opening of the new airport in Berlin Brandenburg.

HHI INDEX				un-concentrated		moderated		high-concentrated	
FRANKFURT		MUNICH		DUSSELDORF		BERLIN TEGEL		HAMBURG	
HHI norm	0,312	HHI norm	0,142	HHI norm	0,110	HHI norm	0,193	HHI norm	0,127
N° carriers	50	N° carriers	50	N° carriers	45	N° carriers	35	N° carriers	39
1/N	0,020	1/N	0,020	1/N	0,022	1/N	0,029	1/N	0,026
HHI	0,326	HHI	0,159	HHI	0,129	HHI	0,216	HHI	0,149
1st carrier	51,35%	1st carrier	31,10%	1st carrier	22,67%	1st carrier	36,88%	1st carrier	32,43%
1st-2nd carrier	61,47%	1st-2nd carrier	48,97%	1st-2nd carrier	43,67%	1st-2nd carrier	64,07%	1st-2nd carrier	49,19%
1st-2nd-3rd carrier	63,51%	1st-2nd-3rd carrier	57,73%	1st-2nd-3rd carrier	60,33%	1st-2nd-3rd carrier	67,38%	1st-2nd-3rd carrier	58,38%
top5	67,06%	top5	72,21%	top5	66,00%	top5	73,29%	top5	65,41%
top10	72,32%	top10	79,07%	top10	76,83%	top10	82,51%	top10	77,03%
COLOGNE - BONN		STUTTGARD		BERLIN SCHOENEFELD		HANOVER		NUREMBERG	
HHI norm	0,181	HHI norm	0,057	HHI norm	0,124	HHI norm	0,069	HHI norm	0,107
N° carriers	16	N° carriers	29	N° carriers	15	N° carriers	18	N° carriers	9
1/N	0,063	1/N	0,034	1/N	0,067	1/N	0,056	1/N	0,111
HHI	0,232	HHI	0,090	HHI	0,182	HHI	0,121	HHI	0,207
1st carrier	38,71%	1st carrier	17,72%	1st carrier	31,58%	1st carrier	20,69%	1st carrier	39,42%
1st-2nd carrier	60,37%	1st-2nd carrier	33,07%	1st-2nd carrier	56,14%	1st-2nd carrier	38,79%	1st-2nd carrier	49,04%
1st-2nd-3rd carrier	77,88%	1st-2nd-3rd carrier	45,67%	1st-2nd-3rd carrier	64,91%	1st-2nd-3rd carrier	54,31%	1st-2nd-3rd carrier	58,65%
top5	84,33%	top5	58,66%	top5	77,19%	top5	69,83%	top5	77,88%
top10	94,47%	top10	77,17%	top10	92,98%	top10	87,93%	top10	100,00%

Table 89: Airlines' concentration at German major airports

	2005	2006	2007	2008	2009	2010
PAX GROUP	152.372.386	159.654.752	169.098.041	170.287.168	162.223.730	170.201.388
% ON PAX GROUP	92,10%	91,64%	91,56%	89,15%	89,05%	89,26%
% 2010 ON 2005	11,70%					
PAX < 500 km	125.088.896	129.828.667	136.628.478	136.324.046	129.017.016	134.915.448
% ON PAX GROUP	75,61%	74,52%	73,98%	71,37%	70,82%	70,75%
% 2010 ON 2005	7,86%					
PAX/kmq GROUP	361	378	400	403	384	403
PAX/kmq < 500 km	537	557	586	585	553	579
MEAN RADIUS	367					
MEAN RADIUS < 500 km	272					

Table 90a: French traffic composition

	FRA	MUC	DUS	TXL	HAM	CGN	STR	SXF	HAJ	NUE	N°	SERVICE
Adria Airways	X										1	NC
Aeroflot Russian International Airlines	X							X			2	NC
Air Berlin	X	X	X	X	X	X	X		X	X	9	NC
Air Canada	X										1	NC
Air China International	X										1	NC
Air Dolomiti	X	X									2	RC
Air France	X	X	X	X	X	X	X				7	NC
Augsburg Airways		X					X			X	3	RC
Austrian	X										1	NC
bmi	X										1	NC
bmi Regional									X		1	RC
British Airways	X	X	X	X	X		X				6	NC
Brussels Airlines				X	X						2	NC
Cirrus Airlines					X						1	RC
Condor	X		X		X						3	CH
Contact Air			X				X				2	RC
easyJet		X			X			X			3	LC
Easyjet Switzerland								X			1	LC
Eurowings			X		X					X	3	RC
FlyBE			X								1	LC
Germanwings		X				X	X	X	X		5	LC
KLM				X							1	NC
KLM Cityhopper	X		X		X		X		X		5	RC
LOT - Polish Airlines	X	X									2	NC
Lufthansa	X	X	X	X	X	X	X		X	X	9	NC
Lufthansa Cityline	X	X	X				X				4	RC
Luxair	X										1	NC
Norwegian air shuttle								X			1	LC
Regional Compagnie Aerienne Europeene									X	X	2	RC
Ryanair								X			1	LC
SAS - Scandinavian Airlines	X	X	X	X							4	NC
SWISS	X	X	X	X	X		X		X	X	8	NC
Turkish Airlines	X			X	X		X				4	NC
Tyrolean Airways	X						X				2	NC
United Airlines	X										1	NC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 90b: French traffic composition

AIRLINE	POINTS TOT	FREQUENCY	DOMINANCE
Lufthansa	78	9	70,20
Air Berlin	60	8	48,00
Germanwings	28	3	8,40
Lufthansa Cityline	20	4	8,00
Eurowings	16	3	4,80
SAS - Scandinavian Airlines	10	3	3,00
SWISS	10	3	3,00
Regional Compagnie Aerienne Europeene	12	2	2,40
Augsburg Airways	8	2	1,60
EasyJet Airlines	10	1	1,00
Germanwings	8	1	0,80
British Airways	6	1	0,60
Norwegian air shuttle	6	1	0,60
Aeroflot Russian International Airlines	4	1	0,40
Air France	4	1	0,40
Condor	4	1	0,40
Contact Air	4	1	0,40
KLM Cityhopper	4	1	0,40
Air Dolomiti	2	1	0,20
Brussels Airlines	2	1	0,20
Ryanair	2	1	0,20
Tyrolean Airways	2	1	0,20

Table 91: Dominance Index at German airports

AIRPORT	INHABITANTS	PASSENGERS	PAX/INHAB
FRA	1.109.996	53.009.221	47,76
MUC	1.380.000	34.721.605	25,16
DUS	1.162.000	18.988.149	16,34
TXL+SXF	3.627.000	22.323.511	6,15
HAM	1.800.000	12.962.429	7,20
CGN	1.423.000	9.849.779	6,92
STR	903.000	9.218.095	10,21
HAJ	622.000	5.059.800	8,13
NUE	735.000	4.068.799	5,54

Table 92: Hub capability at German airports

Rank	MOVEMENTS	IATA CODE	2003	2004	% on 2004
1	Mumbai	DEL	137.212	153.166	28%
2	Dehli	BOM	105.540	122.123	51%
3	Chennai	MAA	51.251	61.233	62%
4	Bangalore	BLR	46.923	55.547	72%
5	Kolkata	CCU	38.820	42.374	80%
6	Hyderabad	HYD	28.077	35.473	87%
7	Cochin	COK	16.590	18.075	90%
8	Ahmedabad	AMD	13.126	14.893	93%
8	Goa	LKO	11.074	13.029	95%
10	Trivandrum	CJB	10.476	10.422	97%
11	Lucknow	TRV	8.119	8.551	99%
12	Coimbatore	GOI	5.393	7.104	100%
TOT GROUP			472.601	541.990	
TOT COUNTRY			641.389	717.597	

Rank	PASSENGERS	IATA CODE	2003	2004	2009	2010	% on 2010
1	Mumbai	DEL	13.284.445	15.665.777	24.804.766	28.137.797	25%
2	Dehli	BOM	10.394.164	12.782.979	25.251.379	28.531.607	50%
3	Chennai	MAA	4.555.821	5.633.926	10.148.499	11.699.894	60%
4	Bangalore	BLR	3.181.248	4.113.383	9.434.131	11.237.468	70%
5	Kolkata	CCU	3.090.853	3.494.564	7.636.935	9.181.182	78%
6	Hyderabad	HYD	2.211.766	2.845.029	6.356.673	7.298.064	85%
7	Cochin	COK	1.332.601	1.596.126	3.707.662	4.232.453	88%
8	Ahmedabad	AMD	976.687	1.289.747	3.381.828	3.784.818	92%
8	Goa	LKO	987.681	1.265.410	1.081.653	1.184.518	93%
10	Trivandrum	CJB	1.073.582	1.160.151	2.166.458	2.513.856	95%
11	Lucknow	TRV	384.393	453.345	1.474.899	2.975.878	97%
12	Coimbatore	GOI	279.324	391.175	2.916.570	2.916.570	100%
TOT GROUP			41.752.565	50.691.612	98.361.453	113.694.105	
TOT COUNTRY			48.779.611	59.283.800	123.755.433	143.430.273	

Table 93: Indian traffic data

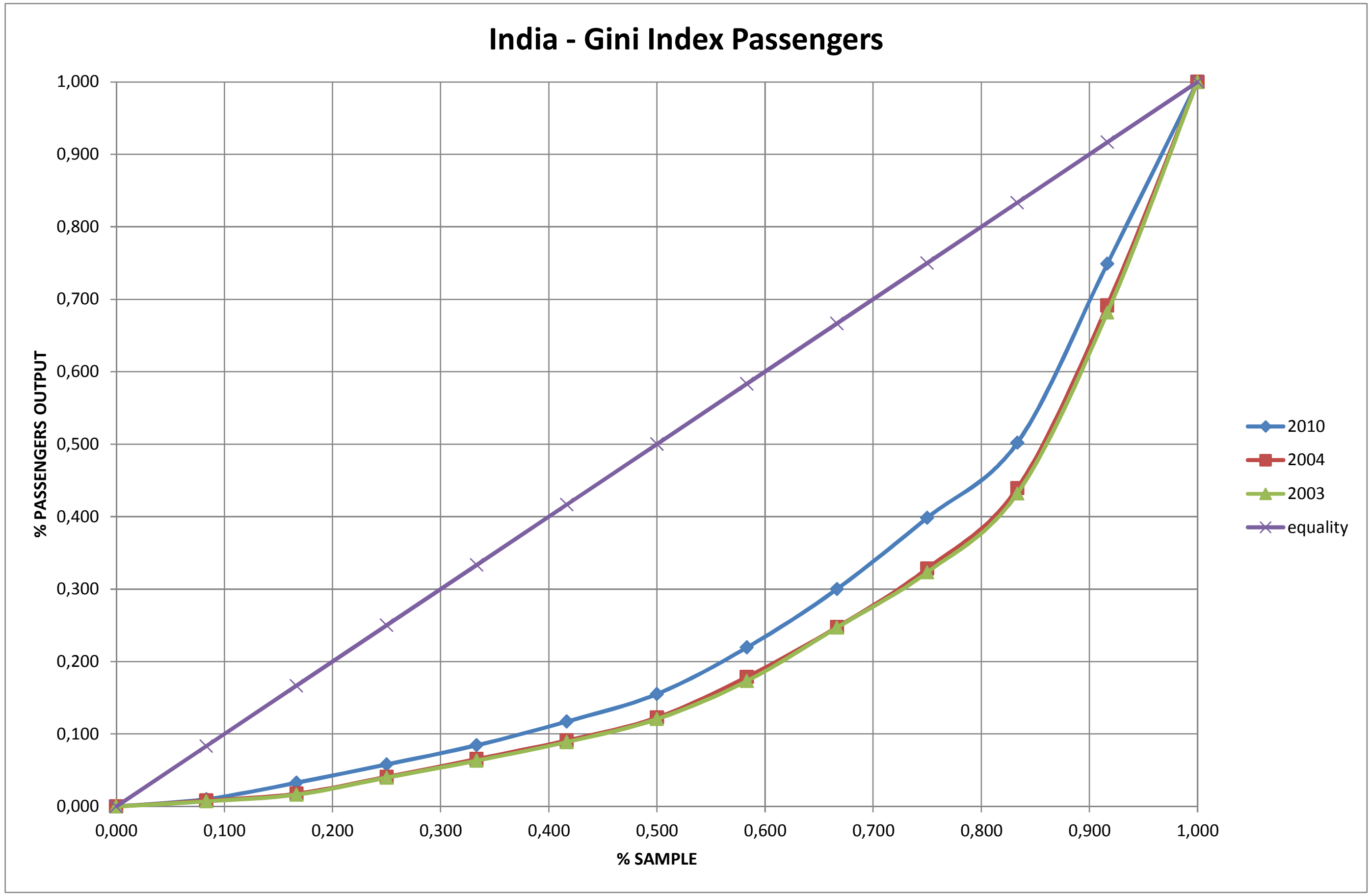


Fig. 50: Lorenz curve India Passengers

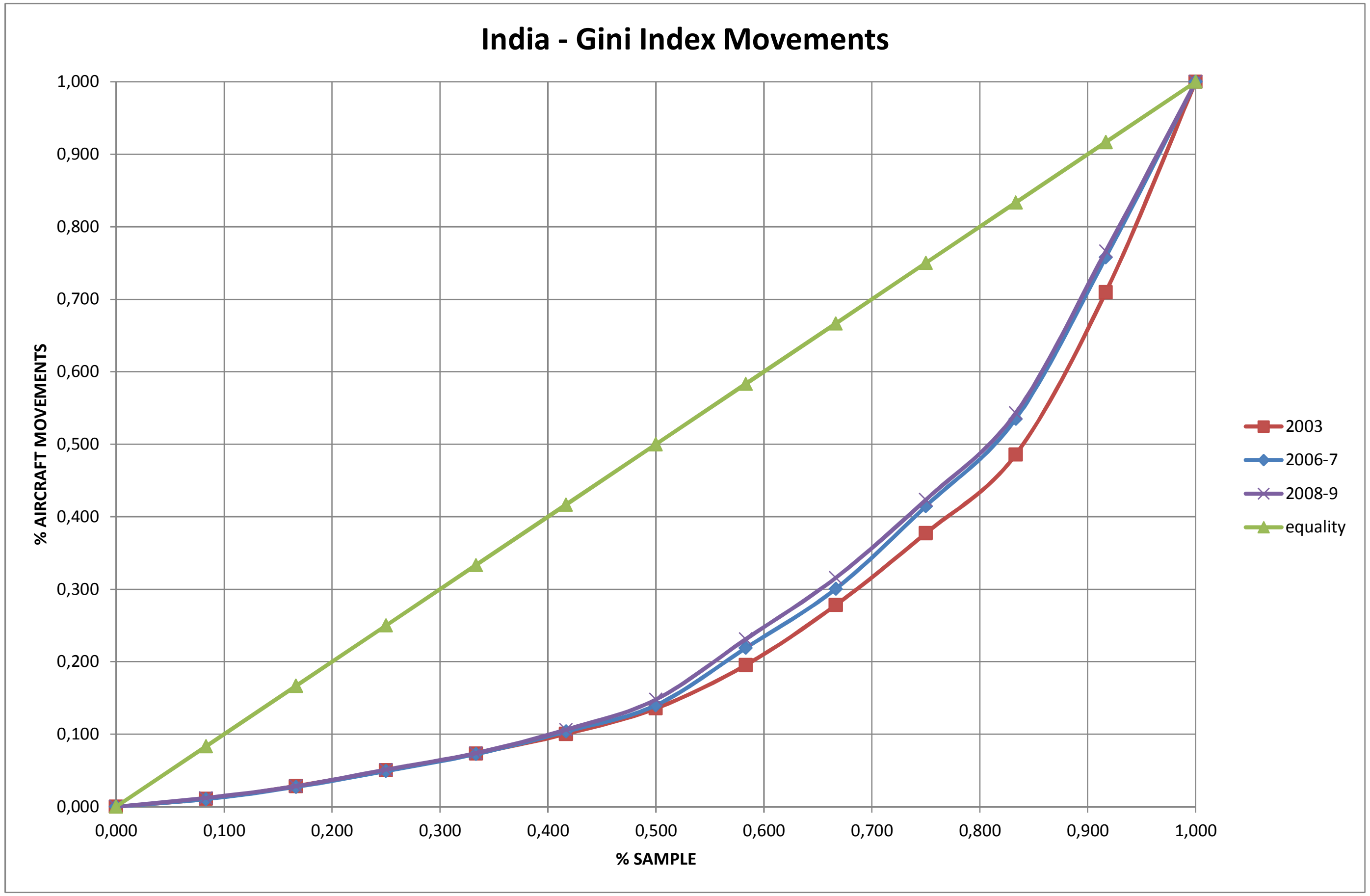


Fig. 51: Lorenz curve India Movements

2010	2009	2004	2003	equality		PASSENGER
0,000	0,000	0,000	0,000	0,000	0%	
0,010	0,011	0,008	0,007	0,083	8%	
0,033	0,026	0,018	0,016	0,167	17%	
0,058	0,049	0,041	0,040	0,250	25%	
0,084	0,079	0,065	0,063	0,333	33%	
0,117	0,113	0,091	0,089	0,417	42%	
0,155	0,151	0,123	0,121	0,500	50%	
0,219	0,215	0,179	0,173	0,583	58%	
0,300	0,293	0,248	0,247	0,667	67%	
0,398	0,389	0,328	0,323	0,750	75%	
0,502	0,492	0,439	0,432	0,833	83%	
0,749	0,743	0,692	0,681	0,917	92%	
1,000	1,000	1,000	1,000	1,000	100%	
0,479	0,490	0,545	0,551	-13,11%	GINI	

2008-9	2007-8	2006-7	2004	2003	equality		MOVEMENTS
0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,012	0,011	0,010	0,013	0,011	0,083	8%	
0,028	0,028	0,027	0,029	0,028	0,167	17%	
0,051	0,052	0,049	0,049	0,050	0,250	25%	
0,074	0,075	0,073	0,073	0,073	0,333	33%	
0,106	0,110	0,104	0,101	0,100	0,417	42%	
0,148	0,150	0,140	0,134	0,136	0,500	50%	
0,231	0,232	0,219	0,199	0,195	0,583	58%	
0,316	0,315	0,301	0,277	0,278	0,667	67%	
0,423	0,430	0,415	0,379	0,377	0,750	75%	
0,543	0,548	0,535	0,492	0,486	0,833	83%	
0,766	0,764	0,758	0,718	0,710	0,917	92%	
1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,467	0,464	0,478	0,506	0,509	-8,31%	GINI	

Table 94: Gini Index for India – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 8,3% on the X-axis regardless of its output as the sample is composed by twelve airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The numerical value of the Gini index is reported in Table 94 and the % variation refers to the more recent year on the less recent year.

From Table 93, fig. 50 (with reference to passengers) and fig. 51 (with reference to aircraft movements) it is possible to understand that Mumbai airport accounts for approximately 25% of the total movements and for 25% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 80% of the Indian passenger traffic output and 75% of the traffic movements. That is to say that in India there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 25% of the aircraft movements but only 20% of the passengers. In terms of movements, the 57,7% of the sample is handled by airport ranked from 1st to 3rd position, while Mumbai and Delhi airports are sufficient to handle the 50% of the passengers. In terms of both movements and passengers, airports ranking from 1st to 8th account for approximately the 92% of the total. At top 3 airports passengers and movements are equally concentrated, suggesting a low load factor (if compared with the aforementioned countries) or the usage of medium sized aircrafts by airlines. In this country there is a strong variation of the Gini index over time in terms of both passengers and aircraft movements. That is to say that the air traffic market in this country is not yet mature; moreover, as it is logical, the market is expanding as the Gini index time series shows a reduction of approximately 13% in terms of passengers and of 8,3% in movements. Passengers data in 2003 was 41,7 million; in 2010 was 113,7 million (+170%) so it is possible to say that the traffic is increasing at a fast pace but fig. 50 suggests that the growth at 2nd, 3rd and 4th airport is faster than that at airport ranked 1st. In conclusion, all the airports taken into consideration had been growing from 2003 to 2010. As for movements, the total number doubled from 2003 to 2010; no relevant variation took place as for the six smaller airports' (although, they registered a sensible growth in absolute terms as well) while taking into consideration the market share of the top 6 airports it is possible to notice a deeper loss of share in % terms (but there was a traffic growth in absolute terms) for top 3 airports (whose majority took place between 2003 and 2006-7 as negligible variations are present from 2006-7 to 2008-9) with respect to the others. Thus, the market share of the bottom 6 airports is the same, while a re-allocation of the market shares took place among the top 6 airports. Thus, the market is expanding and the concentration diminishes. Geographically speaking, almost the 25% of the Indian passengers' traffic is concentrated in an area centered in Delhi with a mean radius of approximately 590 km (which gathers Delhi, Lucknow and Ahmedabad). Only Kolkata, Hyderabad and Coimbatore show a mild airline concentration: the leading carrier doesn't achieve the 25% of market share and the top 5 carriers handle from 80% to 87% of the total traffic. As the Indian market is one of the fastest growing at present, there is no concern about airline monopoly at its airport at present while airport infrastructures are quite congested. In terms of airlines' presence at airports, five airlines dominate the Indian market: three are legacy carriers (Kingfishers, Air India and Jet Airways) and two are low cost carriers (Spice Jet and Indigo). Indigo and Jet Airways contribute to reach the 80% of the daily movements at all airports, Air India and Spice Jet at 11 out of 12 airports and Kingfishers at 10 out of 12. Moreover, with reference to the top 5 carriers of each airport, Jet Airways and Air India have the best connected network and therefore are the leading airlines of the country. Low cost carrier Indigo is present at 11 out of 12 airports while Spice Jet at 10 out of 12. As the Dominance Index is given by formula (20), the carriers which have a significant number of movements at the majority of airports take the highest score. Jet Airways totals 88 points (on 120 available, thus it is not possible to define properly as a dominant airline), followed by Air India with 66 points and Indigo with 55. The difference in DI and the scarce concentration at airports suggest that there is scope for a greater competition; on the other hand, the presence of more than one legacy carriers suggests that the government might still be heavily involved in the airline ownership so some form of protectionism may be present as well.

HHI INDEX				un-concentrated		moderate		high-concentrate	
DEHLI		MUMBAI		CHENNAI		BANGALORE		KOLKATA	
HHI norm	0,105	HHI norm	0,119	HHI norm	0,112	HHI norm	0,090	HHI norm	0,113
N° carriers	50	N° carriers	41	N° carriers	26	N° carriers	25	N° carriers	21
1/N	0,020	1/N	0,024	1/N	0,038	1/N	0,040	1/N	0,048
HHI	0,123	HHI	0,141	HHI	0,146	HHI	0,127	HHI	0,155
1st carrier	22,01%	1st carrier	26,69%	1st carrier	25,57%	1st carrier	20,40%	1st carrier	23,57%
1st-2nd carrier	36,80%	1st-2nd carrier	44,95%	1st-2nd carrier	42,05%	1st-2nd carrier	39,66%	1st-2nd carrier	45,71%
1st-2nd-3rd carrier	50,77%	1st-2nd-3rd carrier	56,85%	1st-2nd-3rd carrier	58,52%	1st-2nd-3rd carrier	53,26%	1st-2nd-3rd carrier	61,43%
top5	72,31%	top5	74,00%	top5	80,11%	top5	73,09%	top5	81,43%
top10	88,76%	top10	88,11%	top10	88,64%	top10	90,37%	top10	92,14%
HYDERABAD		COCHIN		AHMEDABAD		LUCKNOW		COIMBATORE	
HHI norm	0,117	HHI norm	0,056	HHI norm	0,070	HHI norm	0,036	HHI norm	0,034
N° carriers	16	N° carriers	20	N° carriers	12	N° carriers	9	N° carriers	8
1/N	0,063	1/N	0,050	1/N	0,083	1/N	0,111	1/N	0,125
HHI	0,172	HHI	0,103	HHI	0,148	HHI	0,143	HHI	0,154
1st carrier	23,97%	1st carrier	19,17%	1st carrier	23,53%	1st carrier	18,87%	1st carrier	21,28%
1st-2nd carrier	47,95%	1st-2nd carrier	35,83%	1st-2nd carrier	45,38%	1st-2nd carrier	37,74%	1st-2nd carrier	42,55%
1st-2nd-3rd carrier	64,38%	1st-2nd-3rd carrier	47,50%	1st-2nd-3rd carrier	57,14%	1st-2nd-3rd carrier	52,83%	1st-2nd-3rd carrier	55,32%
top5	87,67%	top5	64,17%	top5	77,31%	top5	79,25%	top5	80,85%
top10	95,89%	top10	83,33%	top10	96,64%	top10	100,00%	top10	100,00%

HHI INDEX	un-concentrated		moderate		high-concentrate	

TRIVANDRUM		GOA	
HHI norm	0,064	HHI norm	0,052
N° carriers	17	N° carriers	12
1/N	0,059	1/N	0,083
HHI	0,119	HHI	0,131
1st carrier	22,62%	1st carrier	17,39%
1st-2nd carrier	41,67%	1st-2nd carrier	32,61%
1st-2nd-3rd carrier	51,19%	1st-2nd-3rd carrier	47,83%
top5	65,48%	top5	77,17%
top10	84,52%	top10	95,65%

Table 95a-b: Airlines' concentration at Indian major airports

	2010	2009	2004	2003
PAX GROUP	113.694.105	98.361.453	50.691.612	41.752.565
% ON PAX GROUP	79,27%	79,48%	85,51%	85,59%
% 2010 ON 2005	172,30%			
PAX < 1000 km	34.898.493	29.661.493	17.408.869	14.645.525
% ON PAX GROUP	24,33%	23,97%	29,37%	30,02%
% 2010 ON 2005	138,29%			
pax/kmq GROUP	17	14	7	6
pax/kmq < 1000 km	32	27	16	13
MEAN RADIUS	1470			
MEAN RADIUS < 1000 km	591			

AIRLINE	DEL	BOM	MAA	BLR	CCU	HYD	COK	AMD	LKO	CJB	TRV	GOI	N°	SERVICE
Air Arabia							X				X		2	LC
Air India	X	X	X	X	X	X	X	X	X		X	X	11	NC
Air India Express							X				X		2	LC
Emirates							X				X		2	NC
GoAir	X	X					X		X			X	5	LC
IndiGo	X	X	X	X	X	X	X	X	X	X	X	X	12	LC
Jet Airways (India)	X	X	X	X	X	X	X	X	X	X	X	X	12	NC
JetLite	X			X	X			X	X	X			6	RC
Kingfisher	X	X	X	X		X	X	X	X	X		X	10	NC
Maldivian											X		1	NC
SpiceJet	X	X	X	X	X	X	X	X		X	X	X	11	LC
Sri Lankan Airlines											X		1	NC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 96: Indian traffic composition

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
Jet Airways (India)	88	12	88,00
Air India	72	11	66,00
IndiGo	60	11	55,00
SpiceJet	62	10	51,67
Kingfisher	42	8	28,00
JetLite	22	4	7,33
Air India Express	10	2	1,67
GoAir	4	2	0,67

Table 97: Dominance Index at Indian airports

Rank	MOVEMENTS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	London Heathrow	LHR	469.786	472.041	470.891	475.789	473.207	460.178	31%
2	London Gatwick	LGW	241.174	251.953	254.414	258.921	256.352	245.377	48%
3	London Stansted	STN	176.769	178.012	189.995	191.522	177.285	155.985	59%
4	Manchester	MAN	208.493	217.987	213.026	206.503	191.228	162.126	70%
5	London Luton	LTN	64.243	75.424	78.840	83.319	85.661	75.094	75%
6	Birmingham	BHX	109.202	112.963	108.658	104.481	102.856	93.936	81%
7	Edinburgh	EDI	111.768	115.959	115.846	115.190	113.535	106.477	88%
8	Glasgow	GLA	92.146	96.555	96.754	93.668	86.647	74.051	93%
9	Bristol	BRS	54.793	61.311	65.825	58.741	60.068	53.796	97%
10	Liverpool	LPL	39.736	49.341	47.792	45.772	43.708	42.143	100%
TOT GROUP			1.568.110	1.631.546	1.642.041	1.633.906	1.590.547	1.469.163	
TOT COUNTRY			2.292.794	2.414.995	2.458.236	2.497.190	2.447.096	2.234.673	

Rank	PASSENGERS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	London Heathrow	LHR	67.109.174	67.683.317	67.339.227	67.852.387	66.906.954	65.906.641	36%
2	London Gatwick	LGW	31.391.546	32.693.005	34.080.345	35.165.404	34.162.014	32.360.773	54%
3	London Stansted	STN	20.907.023	21.991.733	23.680.352	23.759.250	22.340.375	19.949.689	65%
4	Manchester	MAN	20.969.163	22.083.008	22.123.762	21.891.723	21.062.749	18.630.394	75%
5	London Luton	LTN	7.520.467	9.134.748	9.414.829	9.919.361	10.173.902	9.115.327	80%
6	Birmingham	BHX	8.796.712	9.311.403	9.056.004	9.134.055	9.576.700	9.093.201	85%
7	Edinburgh	EDI	7.992.453	8.448.604	8.606.651	9.037.200	8.992.178	9.043.452	90%
8	Glasgow	GLA	8.557.047	8.775.355	8.820.462	8.726.013	8.135.260	7.213.397	94%
9	Bristol	BRS	4.603.106	5.199.220	5.710.222	5.883.856	6.228.656	5.615.200	97%
10	Liverpool	LPL	3.351.922	4.409.018	4.962.460	5.463.234	5.329.826	4.879.468	100%
TOT GROUP			181.198.613	189.729.411	193.794.314	196.832.483	192.908.614	181.807.542	
TOT COUNTRY			218.143.637	230.624.448	237.619.696	243.234.729	238.698.078	221.271.666	

Table 98: UK traffic data

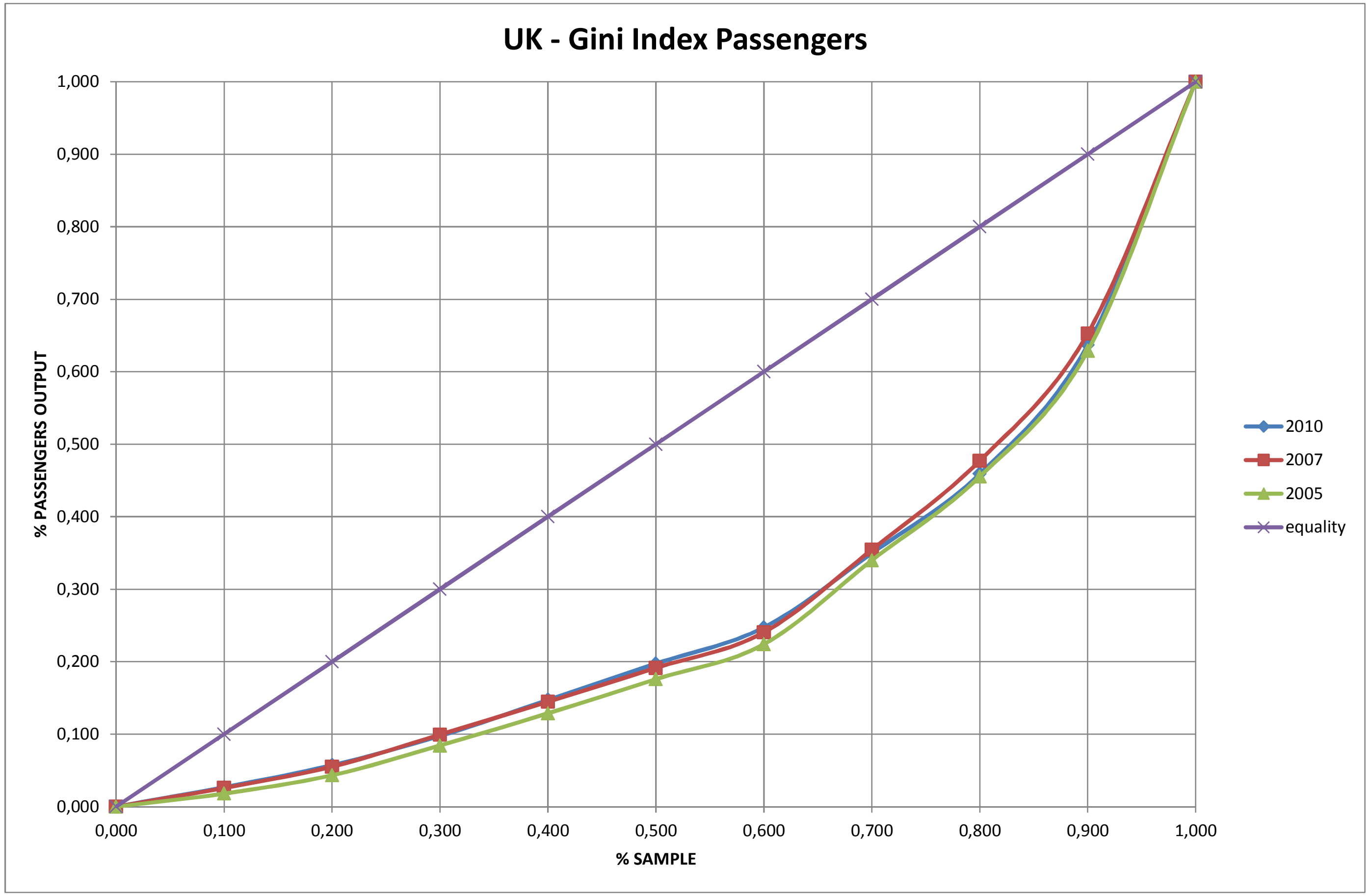


Fig. 52: Lorenz curve UK Passengers

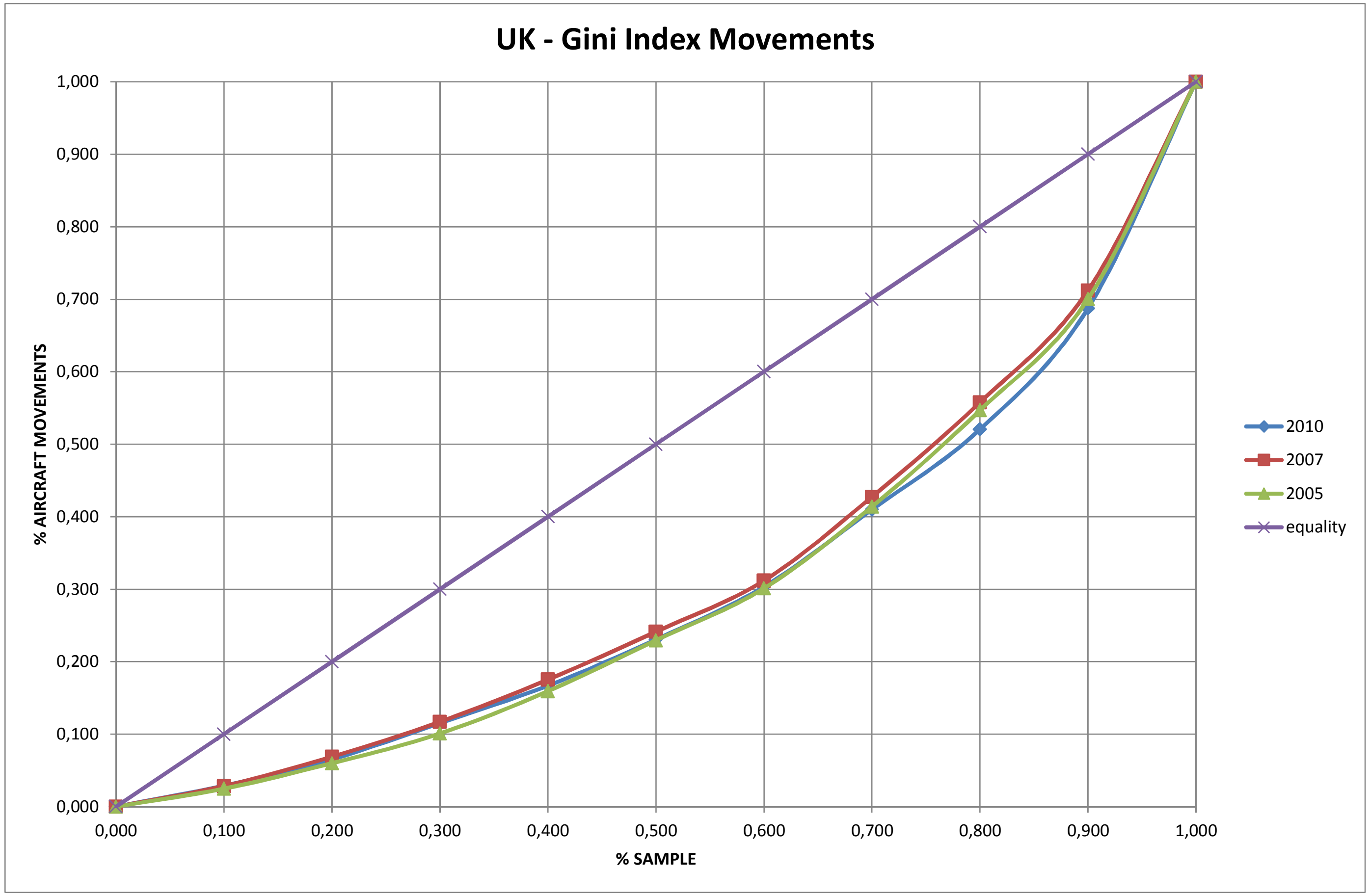


Fig. 53: Lorenz curve UK Movements

2005	2006	2007	2008	2009	2010	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	PASSENGERS
0,018	0,023	0,026	0,027	0,027	0,027	0,100	10%	
0,043	0,051	0,055	0,057	0,059	0,057	0,200	20%	
0,084	0,096	0,099	0,101	0,101	0,097	0,300	30%	
0,129	0,142	0,145	0,147	0,149	0,147	0,400	40%	
0,176	0,191	0,191	0,194	0,198	0,197	0,500	50%	
0,224	0,239	0,240	0,244	0,251	0,247	0,600	60%	
0,340	0,355	0,355	0,356	0,360	0,350	0,700	70%	
0,455	0,471	0,477	0,477	0,476	0,459	0,800	80%	
0,629	0,644	0,653	0,656	0,653	0,637	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,480	0,457	0,452	0,448	0,445	0,456	-5,02%	GINI	

2005	2006	2007	2008	2009	2010	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	MOVEMENTS
0,025	0,030	0,028	0,027	0,028	0,029	0,100	10%	
0,060	0,067	0,069	0,064	0,066	0,065	0,200	20%	
0,101	0,113	0,117	0,114	0,120	0,115	0,300	30%	
0,159	0,172	0,175	0,172	0,174	0,167	0,400	40%	
0,230	0,242	0,241	0,236	0,239	0,231	0,500	50%	
0,301	0,313	0,312	0,306	0,310	0,303	0,600	60%	
0,414	0,423	0,427	0,424	0,421	0,410	0,700	70%	
0,547	0,556	0,558	0,550	0,541	0,520	0,800	80%	
0,700	0,711	0,712	0,709	0,703	0,687	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,393	0,375	0,372	0,379	0,380	0,394	0,43%	GINI	

Table 99: Gini Index for UK – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 10% on the X-axis regardless of its output as the sample is composed by ten airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 99 and the % variation refers to 2010 on 2005.

From Table 98, fig. 52 (with reference to passengers) and fig. 53 (with reference to aircraft movements) it is possible to understand that London Heathrow airport accounts for approximately 31% of the total movements and for 36% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 82% of the UK passenger traffic output and 65% of the traffic movements. That is to say that in UK there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 35% of the aircraft movements but only 18% of the passengers. In terms of movements, the 48% of the sample is handled by London Heathrow and Gatwick, the same airports handle the 54% of the total passengers output of the group. In terms of movements, airports ranking from 1st to 8th account for 93% of the total traffic, while in terms of passengers the top 7 airports gather the 90% of the total traffic. In general passengers are more concentrated than movements at the major airports suggesting a higher load factor or the usage of bigger aircrafts by airlines. In this country there has been a reduction over time of approximately 5% of the Gini index in terms of passengers and a mild growth of 0,4% in terms of aircraft movements. From Table 99 it is evident that the sharp loss of traffic took place between 2005 and 2006 and then from 2006 to 2009; the 2010 brought the data back to 2006 level; from 2005 to 2010 the number of passengers carried grew faster than the 10 airports considered. From fig. 52 it is possible to derive that the Lorenz curves for 2007 and 2010 overlap up to x=0,7 and are above the Lorenz curve of 2005; then Lorenz curve for 2005 and 2010 overlap and stay below the Lorenz curve for 2007. Thus, there has been a re-allocation of the market share at the bottom 7 airport (which gained market share) with these airports growing faster than the top 3 airports. As for movements, from fig. 53 we notice that 2010 Lorenz curve is always below Lorenz curves for 2007 and 2005 for x=0,8; that is to say that from 2005 to 2010 London Gatwick gained market shares towards both London Heathrow and Stansted (which lost almost 2 million movements in the meantime) and this led to a growth in market concentration. Negligible variations are present at bottom airports. Geographically speaking, almost the 75% of the nation passengers' traffic is concentrated in an area centered in London with a mean radius of approximately 170 km (which gathers London Heathrow, Gatwick, Stansted, Luton, Liverpool, Bristol and Birmingham). To better explain this, we took into consideration the airport up to 500 km far from London Heathrow and we calculated the mean radius. The airports reported in brackets are less than 500km away from London Heathrow and the mean radius is 170km.

There are four un-concentrated airports: Manchester (which is losing traffic), Birmingham, Edinburgh (which experiment competition from London airports) and Glasgow; there are three moderated concentrated airports (Heathrow, Gatwick and Bristol) where the leading airline has from 35% to 43% market share and the top 3 airlines gather from 545 to 65% of the traffic and 3 airports highly-concentrated (Stansted, Luton and Liverpool). At those airports, the leading carrier has a movements share ranging from 50% to 60% and the top5 airlines detain more than 90% of the traffic. In terms of airlines' presence at airports, the airlines which contribute to reach the 80% of the daily movements in 8 out of 10 airports are low cost carriers (Ryanair and EasyJet) while British Airways is present at 5 out of 10 airports. Hence, with reference to the top 5 carriers of each airport, three low-cost carriers have the highest DI: EasyJet, Ryanair and Flybe which total 48, 40 and 39 points on 100 available. It is then possible to conclude that at UK airports there is scope for competition between airlines as the legacy carrier is ranked 4th in terms of dominance because it is more focused on its international network. London is capable of attracting a lot of passengers, London Stansted is the airport with the highest connectivity among those with a majority share of traffic held by low cost carriers (N. Gualandi, L. Mantecchini, F. Paganelli , 2010) and hence it has a hub-capability of 14,64 passengers/inhabitants. Better results in terms of hub capability are reached by Edinburgh and Manchester (16,4 and 15,4 respectively).

HHI INDEX				un-concentrated		moderate		high-concentrate	
L. HEATHROW		L. GATWICK		L. STANSTED		MANCHESTER		L. LUTON	
HHI norm	0,211	HHI norm	0,157	HHI norm	0,387	HHI norm	0,052	HHI norm	0,267
N° carriers	50	N° carriers	31	N° carriers	16	N° carriers	42	N° carriers	10
1/N	0,020	1/N	0,032	1/N	0,063	1/N	0,024	1/N	0,100
HHI	0,227	HHI	0,184	HHI	0,425	HHI	0,074	HHI	0,341
1st carrier	43,82%	1st carrier	35,84%	1st carrier	60,27%	1st carrier	22,11%	1st carrier	50,00%
1st-2nd carrier	50,30%	1st-2nd carrier	54,55%	1st-2nd carrier	84,59%	1st-2nd carrier	29,40%	1st-2nd carrier	77,70%
1st-2nd-3rd carrier	54,74%	1st-2nd-3rd carrier	65,38%	1st-2nd-3rd carrier	88,70%	1st-2nd-3rd carrier	35,68%	1st-2nd-3rd carrier	88,51%
top5	61,39%	top5	75,35%	top5	92,12%	top5	44,97%	top5	93,24%
top10	71,70%	top10	86,89%	top10	96,92%	top10	61,81%	top10	100,00%
BIRMINGHAM		EDIMBURGH		GLASGOW		BRISTOL		LIVERPOOL	
HHI norm	0,115	HHI norm	0,055	HHI norm	0,085	HHI norm	0,104	HHI norm	0,193
N° carriers	27	N° carriers	18	N° carriers	16	N° carriers	11	N° carriers	4
1/N	0,037	1/N	0,056	1/N	0,063	1/N	0,091	1/N	0,250
HHI	0,148	HHI	0,108	HHI	0,142	HHI	0,185	HHI	0,395
1st carrier	35,58%	1st carrier	19,14%	1st carrier	21,76%	1st carrier	36,84%	1st carrier	50,00%
1st-2nd carrier	43,27%	1st-2nd carrier	36,72%	1st-2nd carrier	42,49%	1st-2nd carrier	48,25%	1st-2nd carrier	86,84%
1st-2nd-3rd carrier	47,12%	1st-2nd-3rd carrier	47,66%	1st-2nd-3rd carrier	56,99%	1st-2nd-3rd carrier	58,77%	1st-2nd-3rd carrier	94,74%
top5	54,81%	top5	64,06%	top5	77,20%	top5	75,44%	top5	100,00%
top10	69,23%	top10	89,06%	top10	93,78%	top10	98,25%	top10	100,00%

Table 100: Airlines' concentration at UK major airports

	2005	2006	2007	2008	2009	2010
PAX GROUP	181.198.613	189.729.411	193.794.314	196.832.483	192.908.614	181.807.542
% ON PAX GROUP	83,06%	82,27%	81,56%	80,92%	80,82%	82,16%
% 2010 on 2005	0,34%					
PAX < 500 km	164.649.113	172.505.452	176.367.201	179.069.270	175.781.176	165.550.693
% ON PAX GROUP	75,48%	74,80%	74,22%	73,62%	73,64%	74,82%
% 2010 on 2005	0,55%					
PAX/kmq GROUP	752	787	804	817	801	755
PAX/kmq < 500 km	1.770	1.855	1.896	1.925	1.890	1.780
MEAN RADIUS	277					
MEAN RADIUS < 500 km	172					

Table 101a: UK traffic composition

AIRLINE	LHR	LGW	STN	MAN	LTN	BHX	EDI	GLA	BRS	LPL	N°	SERVICE
Aer Arann				X		X		X	X		4	RC
Aer Lingus	X			X		X					3	NC
Air Canada	X										1	NC
Air France	X			X		X					3	NC
Alitalia	X										1	NC
American Airlines	X										1	NC
BA CityFlyer							X	X			2	RC
Blue Islands									X		1	RC
bmi	X			X		X	X				4	NC
bmi Regional	X			X			X				3	RC
bmibaby						X					1	LC
British Airways	X	X		X			X	X			5	NC
Brussels Airlines				X		X					2	NC
Delta Air Lines	X										1	NC
Eastern Airways						X					1	RC - CH
easyJet		X	X	X	X		X	X	X	X	8	LC
Eurowings				X		X					2	RC
FlyBE		X		X		X	X	X	X		6	LC
Helvetic Airways						X					1	CH
Iberia	X										1	NC
Jet2.com				X							1	LC
KLM	X			X		X					3	NC
KLM Cityhopper									X		1	RC
Loganair							X	X			2	RC
Lufthansa	X			X							2	NC
Lufthansa Cityline						X					1	RC
Monarch Airlines		X		X							2	CH
Norwegian Air Shuttle		X									1	LC
Ryanair		X	X	X	X	X	X		X	X	8	LC
SAS - Scandinavian Airlines	X										1	NC
Sun Air				X							1	RC
SWISS	X			X							2	NC
TAP-Air Portugal	X										1	NC
Thomas Cook Airlines UK				X							1	CH
Thomson		X		X		X					3	NC - CH
United Airlines	X										1	NC
Virgin Atlantic Airways	X										1	NC
Wizzair					X						1	LC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 101b: UK traffic composition

AIRLINE	POINTS TOT	FREQUENCY	DOMINANCE
easyJet	68	7	47,6
Ryanair	50	8	40
FlyBE	56	7	39,2
British Airways	36	5	18
Aer Lingus	6	2	1,2
BMI Regional	6	2	1,2
BMI Baby	6	2	1,2
Wizzair	8	1	0,8
BMI	8	1	0,8
Brussels Airlines	6	1	0,6
German Wings	6	1	0,6
Loganair	6	1	0,6
Lufthansa	6	1	0,6
Air Berlin	4	1	0,4
Blue Air	4	1	0,4
Blue Islands	4	1	0,4
KLM Cityhopper	4	1	0,4
Norwegian Air Shuttle	4	1	0,4
Aer Arann	2	1	0,2
BA CityFlyer	2	1	0,2
Monarch Airlines	2	1	0,2
Thomson	2	1	0,2
Virgin Atlantic Airways	2	1	0,2

Table 102: Dominance Index at UK airports

AIRPORT	INHABITANTS	PASSENGERS	PAX/INHAB
EDI	550.400	9.043.452	16,43
MAN	1.205.500	18.630.394	15,45
LHR+LGW+STN+LTN	8.700.000	127.332.430	14,64
GLA	847.300	7.213.397	8,51
BRS	661.500	5.615.200	8,49
BHX	1.985.000	9.093.201	4,58
LPL	1.100.700	4.879.468	4,43

Table 103: Hub capability at UK airports

Rank	MOVEMENTS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Rome-Fiumicino	FCO	302.890	310.100	328.282	340.971	318.849	329.252	32%
2	Milan-Malpensa	MXP	227.718	247.456	263.584	212.841	183.182	189.580	51%
3	Milan Linate	LIN	93.942	100.113	100.467	96.823	93.764	91.907	60%
4	Milan/Orio al Serio	BGY	47.820	53.741	58.613	61.980	63.188	67.167	66%
5	Venice	VCE	75.196	77.386	80.896	73.744	73.066	72.763	73%
6	Catania	CTA	53.397	52.217	59.301	56.704	55.331	57.249	79%
7	Naples	NAP	49.096	52.569	62.774	60.448	57.055	55.914	84%
8	Bologna	BLQ	54.780	58.206	61.618	56.993	59.027	64.193	91%
9	Rome-Ciampino	CIA	49.915	57.195	58.375	51.275	34.283	47.749	95%
10	Palermo	PMO	42.751	45.892	49.106	47.120	49.389	46.569	100%
TOT GROUP			997.505	1.054.875	1.123.016	1.058.899	987.134	1.022.343	
TOT COUNTRY			1.348.715	1.419.875	1.532.987	1.468.880	1.382.289	1.433.221	

Rank	PASSENGERS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Rome-Fiumicino	FCO	28.208.161	29.726.051	32.479.653	34.815.230	33.415.945	35.956.295	35%
2	Milan-Malpensa	MXP	19.499.158	21.621.236	23.717.177	19.014.186	17.349.602	18.714.187	53%
3	Milan Linate	LIN	9.085.999	9.623.156	9.924.558	9.264.561	8.293.839	8.295.436	61%
4	Milan/Orio al Serio	BGY	4.291.239	5.226.340	5.720.481	6.462.591	7.144.203	7.661.061	68%
5	Venice	VCE	5.780.783	6.296.345	7.032.499	6.848.244	6.655.612	6.801.941	75%
6	Catania	CTA	5.169.927	5.370.411	6.046.263	6.020.606	5.905.074	6.301.832	81%
7	Naples	NAP	4.573.158	5.056.643	5.720.260	5.594.043	5.310.965	5.535.984	86%
8	Bologna	BLQ	3.624.072	3.928.887	4.253.198	4.124.298	4.765.232	5.432.248	91%
9	Rome-Ciampino	CIA	4.222.263	4.933.487	5.388.749	4.778.059	4.757.136	4.563.852	96%
10	Palermo	PMO	3.809.637	4.246.555	4.486.364	4.424.867	4.352.778	4.341.696	100%
TOT GROUP			88.264.397	96.029.111	104.769.202	101.346.685	97.950.386	103.604.532	
TOT COUNTRY			112.931.916	122.889.091	135.308.151	132.952.402	129.891.116	138.909.695	

Table 104: Italy traffic data

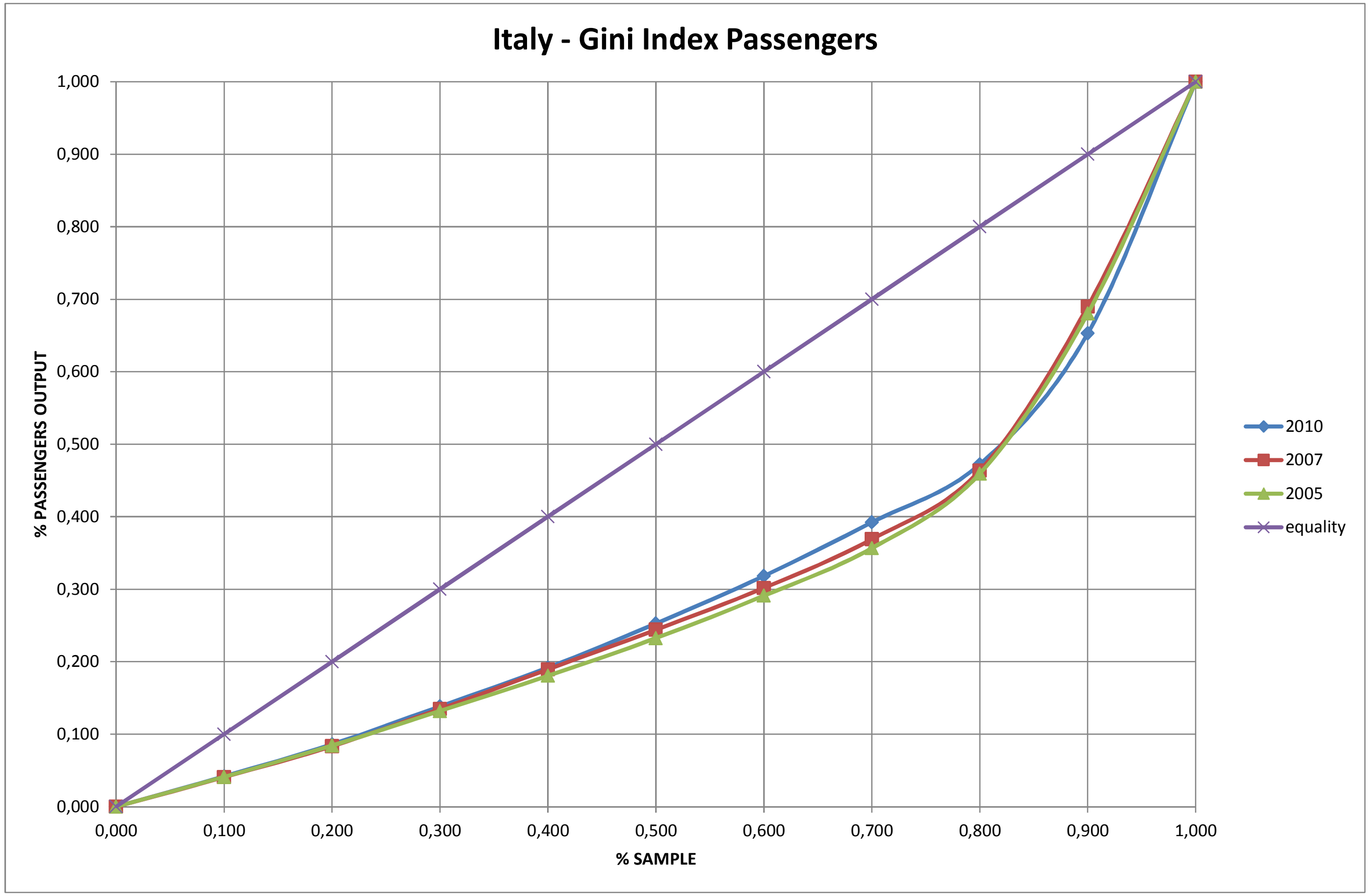


Fig. 54: Lorenz curve Italy Passengers

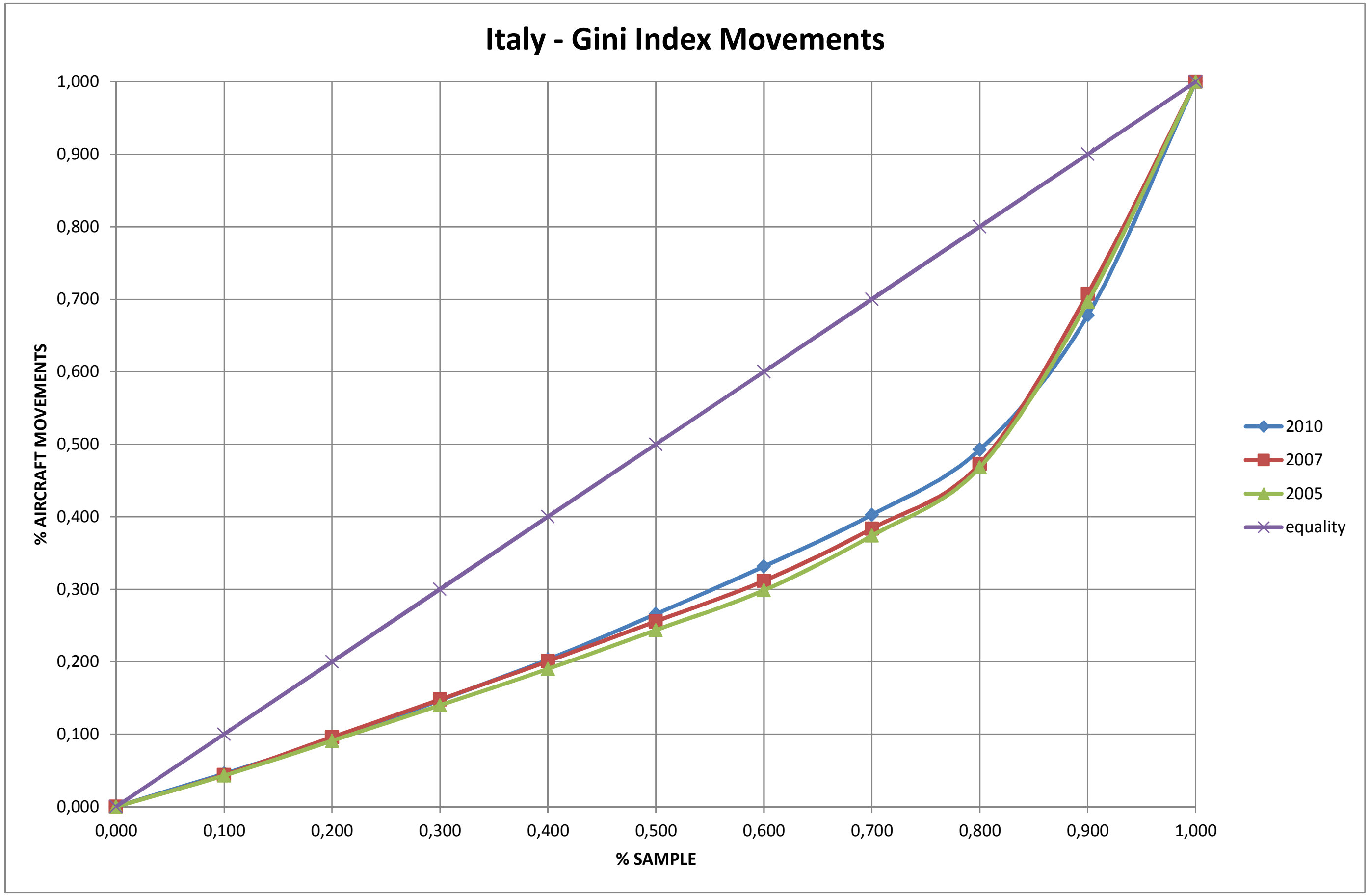


Fig. 55: Lorenz curve Italy Movements

2005	2006	2007	2008	2009	2010	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	P
0,041	0,041	0,041	0,041	0,044	0,042	0,100	10%	A
0,084	0,085	0,083	0,084	0,093	0,086	0,200	20%	S
0,132	0,136	0,135	0,131	0,142	0,138	0,300	30%	S
0,181	0,189	0,189	0,187	0,196	0,192	0,400	40%	E
0,232	0,244	0,244	0,246	0,256	0,253	0,500	50%	N
0,291	0,299	0,302	0,310	0,324	0,318	0,600	60%	G
0,357	0,365	0,369	0,377	0,397	0,392	0,700	70%	E
0,459	0,465	0,464	0,469	0,482	0,472	0,800	80%	R
0,680	0,690	0,690	0,656	0,659	0,653	0,900	90%	S
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,408	0,397	0,397	0,400	0,381	0,391	-4,33%		GINI

2005	2006	2007	2008	2009	2010	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	
0,043	0,044	0,044	0,044	0,035	0,046	0,100	10%	M
0,091	0,093	0,096	0,093	0,085	0,092	0,200	20%	O
0,140	0,143	0,148	0,146	0,141	0,147	0,300	30%	V
0,190	0,194	0,201	0,200	0,199	0,203	0,400	40%	E
0,244	0,248	0,256	0,257	0,258	0,266	0,500	50%	M
0,299	0,303	0,311	0,316	0,322	0,331	0,600	60%	E
0,374	0,377	0,384	0,386	0,396	0,403	0,700	70%	N
0,468	0,471	0,473	0,477	0,491	0,493	0,800	80%	T
0,696	0,706	0,708	0,678	0,677	0,678	0,900	90%	S
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,391	0,384	0,376	0,380	0,379	0,368	-5,82%		GINI

Table 105: Gini Index for Italy – time series

The Lorenz curve might be read both from left to right (that is from the smaller to the biggest airport among the sample), both from right to left (that is from the biggest to the smallest airport among the sample). Each airport accounts for a 10% on the X-axis regardless of its output as the sample is composed by ten airports, so the relevant data are on the Y-axis while the information on the X-axis will be given in terms of airports involved. On the graphical representations of Lorenz curve, the first and the last year of the time series are taken into consideration plus a further year approximately in the middle of the time series itself. The Gini index is the area between the equity curve (the hypotenuse of the triangle) and the Lorenz curve. The

numerical value of the Gini index is reported in Table 105 and the % variation refers to 2010 on 2005.

From Table 104, fig. 54 (with reference to passengers) and fig. 55 (with reference to aircraft movements) it is possible to understand that Rome Fiumicino airport accounts for approximately 32% of the total movements and for 35% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 77% of the Italian passenger traffic output and 72% of the traffic movements. That is to say that in Italy there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 28% of the aircraft movements but only 23% of the passengers. In terms of movements, the 51% of the sample is handled by Rome Fiumicino and Milan Malpensa; the same airports handle the 53% of the total passengers output of the group. In terms of both movements and passengers, airports ranking from 1st to 8th account for 91% of the total traffic. In general passengers are more concentrated than movements at the major airports suggesting a higher load factor or the usage of bigger aircrafts by airlines. In this country there has been a reduction over time of approximately 4,83% of the Gini index in terms of passengers and of a 5,82% in terms of aircraft movements. From Table 105 it is evident that the sharp loss of traffic took place between 2005 and 2006 and then from 2008 to 2009; the 2010 registered a +1% on 2009; from 2005 to 2010 the number of passengers carried grew at all airports with the only exceptions being Linate and Malpensa as a consequence of the de-hubbing of Alitalia. Rome Fiumicino and Milan Orio al serio were the fastest growing airports in the period. From fig. 54 it is possible to derive the growth of Fiumicino's market share in 2010 at x=0,9 (blue Lorenz curve) and the loss at Milan Linate (x=0,7). As for movements, from fig. 55 we notice that 2010 Lorenz curve is below Lorenz curves for 2007 and 2005 for x=0,9; that is to say that from 2005 to 2010 Rome Fiumicino gained market shares towards both

Milan Malpensa and Linate and this led to a growth in market concentration. Relevant variations are present also for x=0,6 (Milan Orio al Serio). Geographically speaking, almost the 36% of the nation passengers' traffic is concentrated in an area centered in Rome with a mean radius of approximately 230 km (which gathers Rome Fiumicino and Ciampino, Bologna and Naples).

Five out of 10 Italian airport present airline concentration (Fiumicino, Ciampino, Linate, Orio al Serio and Catania): the leading carrier has market share ranging from 44% to 93% (Milan Orio al Serio and Ciampino are dominated by Ryanair) and the top 3 airlines gathering together from 70% to 100% (Rome Fiumicino has not been taken into consideration as it is the main hub, so other airlines have negligible shares). There are four un-concentrated airport (Malpensa, Venice, Naples, Bologna) and one airport where the concentration is moderate. The top 3 airlines' share ranges from 30% to 70%. In terms of airlines' presence at airports, the airlines which contribute to reach the 80% of the daily movements in 8 out of 10 airports are legacy carriers (Alitalia with 8 out of 10 airports and Lufthansa with 6 out of 10 airports) followed by EasyJet with 6 airports as well. Hence, with reference to the top 5 carriers of each airports, airlines part of the Alitalia group rank 1st and 2th (Airone city-liner) with 6 and 5 airport respectively, then there are two low cost carriers (EasyJet and Ryanair) with 5 and 4 airports respectively. The highest DI is obtained by Alitalia (33,6 points on 100 available), followed by EasyJet with 20 points and Ryanair with 14,4. It is then possible to conclude that at Italian airports there is scope for competition between airlines as the legacy carrier is still recovering from its bankruptcy and market loss. Nevertheless, the high percentage of dominated airports highlights the easiness to obtain monopoly from management entities. Moreover, the traffic is very dispersed among the territory due to the geography of the country. Milan is the city which has higher hub capability (16,32 passenger/inhabitants) followed by Venice (thanks to its touristic sightseeing) and Rome which is in a peripheral position with reference to the other EU hubs.

HHI INDEX				un-concentrated		moderate		high-concentrated	
ROME FIUMICINO		MILAN MALPENSA		MILAN LINATE		MILAN ORIO AL SERIO		VENICE	
HHI norm	0,263	HHI norm	0,049	HHI norm	0,291022	HHI norm	0,609567	HHI norm	0,03004
N° carriers	50	N° carriers	50	N° carriers	17	N° carriers	10	N° carriers	25
1/N	0,020	1/N	0,020	1/N	0,059	1/N	0,100	1/N	0,040
HHI	0,278	HHI	0,068	HHI	0,333	HHI	0,649	HHI	0,069
1st carrier	48,22%	1st carrier	19,85%	1st carrier	55,97%	1st carrier	79,86%	1st carrier	14,06%
1st-2nd carrier	53,14%	1st-2nd carrier	25,88%	1st-2nd carrier	63,43%	1st-2nd carrier	89,58%	1st-2nd carrier	28,13%
1st-2nd-3rd carrier	57,51%	1st-2nd-3rd carrier	30,90%	1st-2nd-3rd carrier	70,52%	1st-2nd-3rd carrier	90,97%	1st-2nd-3rd carrier	35,94%
top5	62,43%	top5	35,93%	top5	79,48%	top5	93,75%	top5	46,88%
top10	71,45%	top10	46,73%	top10	92,91%	top10	100,00%	top10	68,75%
CATANIA		NAPLES		BOLOGNA		ROME CIAMPINO		PALERMO	
HHI norm	0,162829	HHI norm	0,08864	HHI norm	0,059145	HHI norm	0,756204	HHI norm	0,078578
N° carriers	9	N° carriers	16	N° carriers	21	N° carriers	2	N° carriers	8
1/N	0,111	1/N	0,063	1/N	0,048	1/N	0,500	1/N	0,125
HHI	0,256	HHI	0,146	HHI	0,104	HHI	0,878	HHI	0,194
1st carrier	44,04%	1st carrier	24,00%	1st carrier	26,28%	1st carrier	93,48%	1st carrier	30,30%
1st-2nd carrier	66,06%	1st-2nd carrier	44,00%	1st-2nd carrier	33,58%	1st-2nd carrier	100,00%	1st-2nd carrier	51,52%
1st-2nd-3rd carrier	73,39%	1st-2nd-3rd carrier	62,00%	1st-2nd-3rd carrier	40,88%	1st-2nd-3rd carrier	100,00%	1st-2nd-3rd carrier	69,70%
top5	84,40%	top5	76,00%	top5	54,01%	top5	100,00%	top5	87,88%
top10	100,00%	top10	88,00%	top10	75,18%	top10	100,00%	top10	100,00%

Table 106: Airlines' concentration at Italian major airports

	2005	2006	2007	2008	2009	2010
PAX GROUP	88.264.397	96.029.111	104.769.202	101.346.685	97.950.386	103.604.532
% ON PAX GROUP	78,16%	78,14%	77,43%	76,23%	75,41%	74,58%
% 2010 ON 2005	17,38%					
PAX < 500 km	40.627.654	43.645.068	47.841.860	49.311.630	48.249.278	51.488.379
% ON PAX GROUP	35,98%	35,52%	35,36%	37,09%	37,15%	37,07%
% 2010 ON 2005	26,73%					
PAX/kmq GROUP	109	118	129	125	121	127
PAX/kmq < 500 km	241	259	284	293	286	305
MEAN RADIUS	509					
MEAN RADIUS < 500 km	232					

Table 107a: Italian traffic composition

AIRLINE	FCO	MXP	LIN	BGY	VCE	CTA	NAP	BLQ	CIA	PMO	N°	SERVICE
Air alps aviation	X										1	RC
Air berlin		X									1	NC
Air Dolomiti		X			X			X			3	RC
Air France	X		X		X			X			4	NC
Air Nostrum								X			1	RC
Air One		X				X	X	X			4	NC
Air One CityLiner	X		X			X	X				4	RC
Alitalia	X	X	X		X	X	X	X		X	8	NC
Austrian		X									1	NC
Belle air		X									1	LC
Blue Panorama	X					X					2	CH
British Airways	X	X			X			X			4	NC
Brussels Airlines		X			X						2	NC
CAI first			X								1	RC
Cargolux italia		X									1	FC
Cathay pacific airways		X									1	NC
Contact Air		X			X						2	RC
Czech airlines		X									1	NC
Darwin Airlines	X										1	RC
Easyjet	X	X			X		X	X		X	6	LC
El Al		X									1	NC
Emirates		X									1	NC
Ethiopian Airlines		X									1	NC
Eurowings		X									1	RC
Finnair		X									1	NC
Germanwings	X	X									2	LC
Helvetic Airlines		X									1	CH
Iberia	X	X			X						3	NC
KLM	X	X									2	NC
KLM Cityhopper					X			X			2	RC
Korean Air		X									1	NC
Lot - Polish Airlines		X									1	NC
Lufthansa	X	X	X		X		X	X			6	NC
Luxair		X									1	NC
Malev		X									1	NC
Meridiana	X	X	X				X	X			5	NC
Niki		X									1	LC
Qatar airways		X									1	NC
Regional compagnie aerienne europeene		X			X						2	RC
Ryanair				X				X	X	X	4	LC
SAS - Scandinavian airlines		X									1	NC
Singapore airlines		X									1	NC
Sky Work airlines		X									1	RC - CH
Swiss	X	X									2	NC
Tap- air portugal	X	X									2	NC
Turkish Airlines		X			X						2	NC
Tyrolean Airways					X			X			2	NC
Vueling	X	X									2	LC
Wind Jet	X	X			X	X				X	5	LC
Wizzair	X			X							2	LC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 107b: Italian traffic composition

AIRLINE	POINTS TOT	FREQUENCY	DOMINANCE
Alitalia	56	6	33,6
easyJet	40	5	20
Ryanair	36	4	14,4
Air One CityLiner	26	5	13
Wind Jet	24	4	9,6
Blue panorama	12	3	3,6
lufthansa	12	3	3,6
Meridiana	12	3	3,6
Wizzair	18	2	3,6
Air one	10	2	2
Air france	8	2	1,6
Air Nostrum	8	1	0,8
Air France	6	1	0,6
Air Dolomiti	4	1	0,4
CAI first	4	1	0,4
Carpatair	4	1	0,4
Turkish airlines	4	1	0,4
British airways	2	1	0,2
Brussels airlines	2	1	0,2

Table 108: Dominance Index at Italian airports

AIRPORT	INHABITANTS	PASSENGERS	PAX/INHAB
MXP+LIN+BGY	2.124.400	34.670.684	16,32
VCE+TSF	705.250	8.946.279	12,69
FCO+CIA	3.209.400	40.520.147	12,63
CTA	617.550	6.301.832	10,20
BLQ	639.000	5.432.248	8,50
PMO	858.800	4.341.696	5,06
NAP	1.863.650	5.535.984	2,97

Table 109: Hub capability at Italian airports

Rank	MOVEMENTS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Madrid	MAD	415.704	434.959	483.292	469.746	435.187	433.706	31%
2	Barcelona	BCN	307.811	327.650	352.501	321.693	278.981	277.832	51%
3	Palma de Mallorca	PMI	182.028	190.304	197.384	193.379	177.502	174.635	63%
4	Malaga	AGP	123.959	127.776	129.698	119.821	103.539	105.634	71%
5	Gran Canaria	LPA	110.748	114.949	114.355	116.252	101.557	103.093	78%
6	Alicante	ALC	76.109	76.813	79.756	81.097	74.281	74.476	83%
7	Tenerife Sur	TFS	63.649	65.774	65.036	60.779	49.779	51.858	87%
8	Ibiza	IBZ	49.603	54.146	57.855	57.233	53.552	56.988	91%
9	Lanzarote	ACE	47.158	50.172	52.968	53.375	42.915	46.669	94%
10	Valencia	VLC	87.045	87.920	96.616	96.795	81.126	77.806	100%
TOT GROUP			1.463.814	1.530.463	1.629.461	1.570.170	1.398.419	1.402.697	
TOT COUNTRY			2.210.449	2.318.525	2.501.537	2.420.072	2.168.580	2.119.665	

Rank	PASSENGERS	IATA CODE	2.005	2.006	2.007	2.008	2.009	2.010	% on 2010
1	Madrid	MAD	42.146.784	45.799.983	52.110.787	50.846.494	48.437.147	49.866.113	33%
2	Barcelona	BCN	27.152.745	30.008.302	32.898.249	30.272.084	27.421.682	29.209.536	52%
3	Palma de Mallorca	PMI	21.240.736	22.408.427	23.228.879	22.832.857	21.203.041	21.117.417	65%
4	Malaga	AGP	12.669.019	13.076.252	13.590.803	12.813.472	11.622.429	12.064.521	73%
5	Gran Canaria	LPA	9.827.157	10.286.726	10.354.903	10.212.123	9.155.665	9.486.035	79%
6	Alicante	ALC	8.795.705	8.893.720	9.120.631	9.578.304	9.139.479	9.382.931	85%
7	Tenerife Sur	TFS	8.631.923	8.845.668	8.639.341	8.251.989	7.108.055	7.358.986	90%
8	Ibiza	IBZ	4.164.703	4.460.143	4.765.625	4.647.360	4.572.819	5.040.800	94%
9	Lanzarote	ACE	5.467.499	5.626.087	5.625.580	5.438.178	4.701.669	4.938.343	97%
10	Valencia	VLC	4.639.314	4.969.120	5.933.424	5.779.343	4.748.997	4.934.268	100%
TOT GROUP			144.735.585	154.374.428	166.268.222	160.672.204	148.110.983	153.398.950	
TOT COUNTRY			181.277.741	193.553.178	210.498.760	203.862.028	187.631.102	192.792.606	

Table 110: Spain traffic data

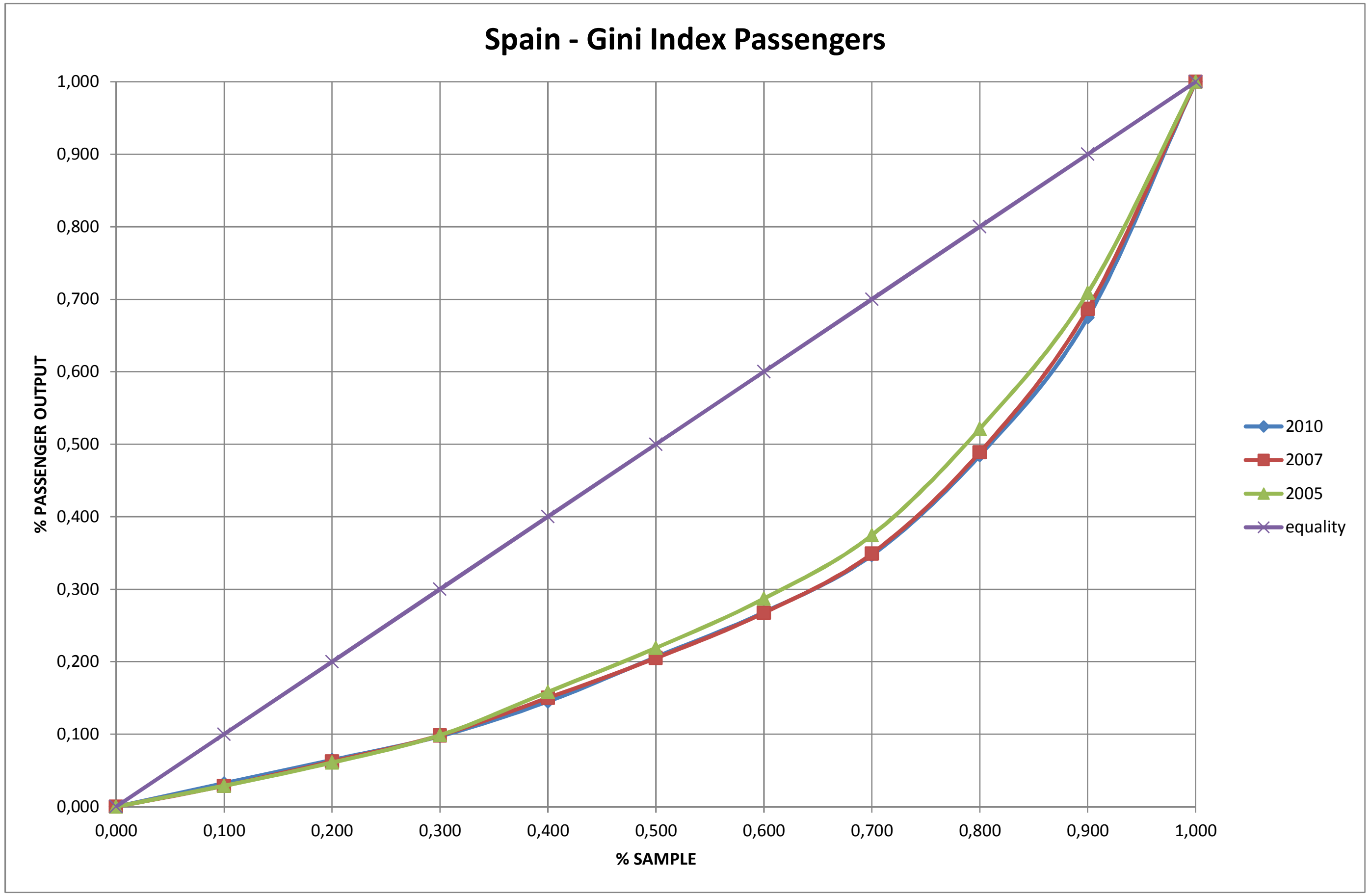


Fig. 56: Lorenz curve Spain Passengers

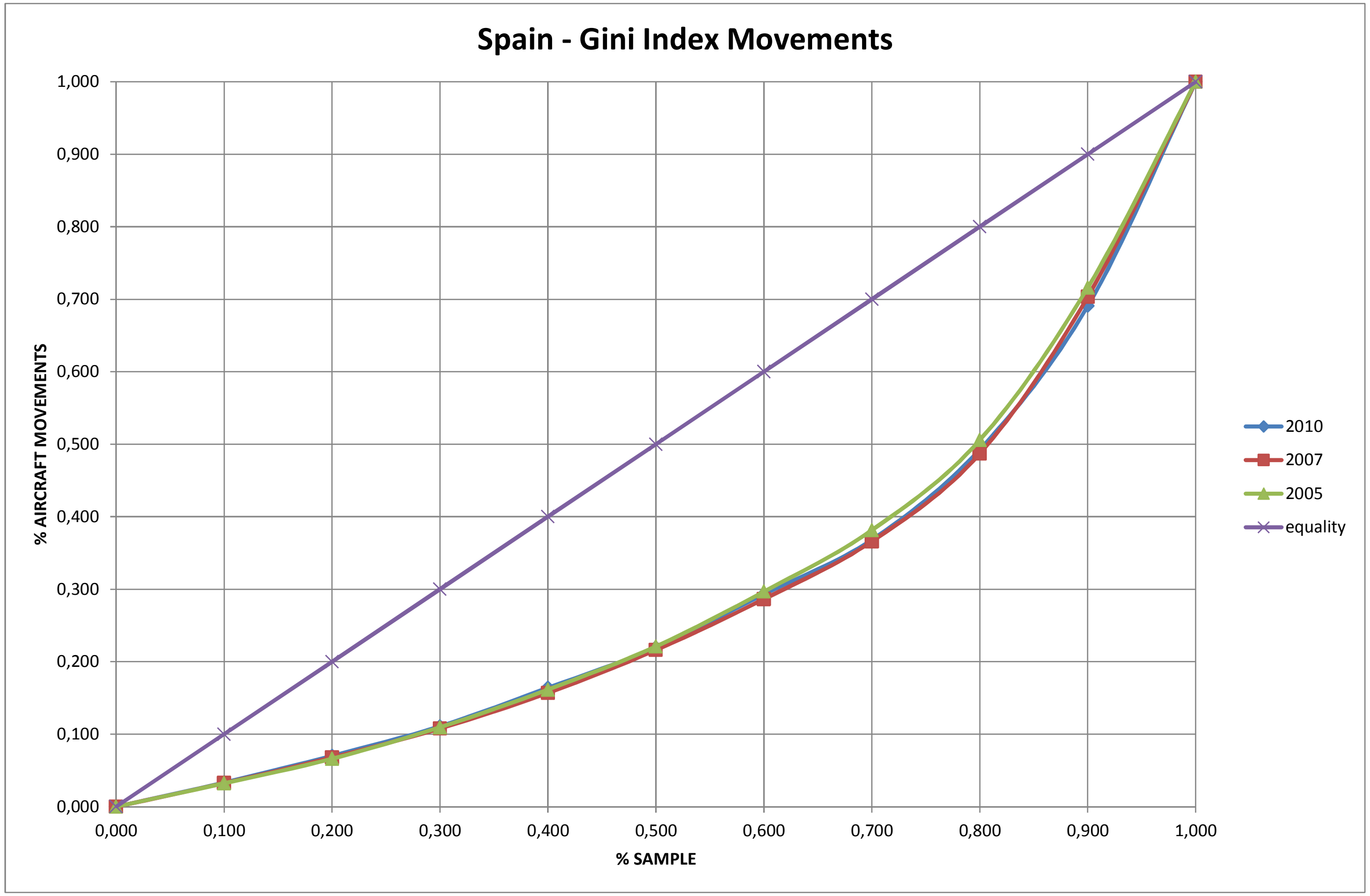


Fig. 57: Lorenz curve Spain Movements

2005	2006	2007	2008	2009	2010	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	PASSENGERS
0,029	0,029	0,029	0,029	0,031	0,032	0,100	10%	
0,061	0,061	0,062	0,063	0,063	0,064	0,200	20%	
0,099	0,098	0,098	0,099	0,095	0,097	0,300	30%	
0,158	0,155	0,150	0,150	0,143	0,145	0,400	40%	
0,219	0,212	0,205	0,210	0,204	0,206	0,500	50%	
0,287	0,279	0,267	0,273	0,266	0,268	0,600	60%	
0,374	0,364	0,349	0,353	0,345	0,347	0,700	70%	
0,521	0,509	0,489	0,495	0,488	0,485	0,800	80%	
0,709	0,703	0,687	0,684	0,673	0,675	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,409	0,418	0,433	0,429	0,439	0,436	6,71%		GINI

2005	2006	2007	2008	2009	2010	equality		
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0%	MOVEMENTS
0,032	0,033	0,033	0,034	0,031	0,033	0,100	10%	
0,066	0,068	0,068	0,070	0,066	0,070	0,200	20%	
0,110	0,111	0,108	0,109	0,105	0,111	0,300	30%	
0,162	0,161	0,157	0,161	0,158	0,164	0,400	40%	
0,221	0,219	0,216	0,222	0,216	0,219	0,500	50%	
0,297	0,294	0,286	0,296	0,288	0,293	0,600	60%	
0,381	0,377	0,366	0,373	0,362	0,368	0,700	70%	
0,506	0,502	0,487	0,496	0,489	0,493	0,800	80%	
0,716	0,716	0,703	0,701	0,689	0,691	0,900	90%	
1,000	1,000	1,000	1,000	1,000	1,000	1,000	100%	
0,402	0,404	0,415	0,407	0,419	0,412	2,38%		GINI

Table 111: Gini Index for Spain – time series

The numerical value of the Gini index is reported in Table 111 and the % variation refers to 2010 on 2005.

From Table 110, fig. 56 (with reference to passengers) and fig. 57 (with reference to aircraft movements) it is possible to understand that Madrid airport accounts for approximately 31% of the total movements and for 33% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 79% of the Spanish passenger traffic output and 65% of the traffic movements. That is to say that in Spain there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 35% of the aircraft movements but only 21% of the passengers.

In terms of movements, the 51% of the sample is handled by Madrid and Barcelona; the same airports handle the 52% of the total passengers output of the group. In terms of movements, airports ranking from 1st to 8th account for 91% of the total traffic, while the 90% of the passenger output is handled by airport ranked from1st to 7th. In general passengers are more concentrated than movements at the major airports suggesting a higher load factor or the usage of bigger aircrafts by airlines. This is the only country up to now in which there has been a growth of concentration in both passengers (+6,71%) and movements (+2,4%) from 2005 to 2010. From Table 111 it is evident that the growth has been slightly constant with mild losses in 2008 and 2010 and peak values achieved in 2009. From 2005 to 2010 the number of movements fell at all airports with the only exceptions being Madrid and Ibiza. As a consequence in fig. 57, the Lorenz curve for 2010 is below the Lorenz curves for 2005 and 2007. The relevant growth of the Gini index in terms of passengers is explained by Table 110: from 2005 to 2010 Madrid and Barcelona registered a growth in terms of passengers carried while the others showed no changes or registered mild losses; therefore, Lorenz curve for 2010 is below Lorenz curve for 2005. It is worth noticing that Lorenz curve for 2007 overlaps the curve for 2010 even if the absolute values were higher. That is to say that the traffic loss between 2007 and 2010 was even Spanish at all airports. Geographically speaking, almost the 66% of the Spanish passengers' traffic is concentrated in an area centered in Madrid with a mean radius of approximately 540 km.

Only Ibiza and Valencia register high-concentration with the dominant carrier accounting for, respectively, 52% and 43% and the top 3 carriers accounting for 84% and 75%. The dominant carrier is Air nostrum, Regional carrier which operates in behalf of Iberia on regional routes. Madrid, Palma de Maiorca and Lanzarote register a significant concentration with top 3 airlines accounting for more than 60% of the daily movements. The other 5 airports are un-concentrated with the highest top 5 reaching 71%. Spain is a peculiar country as there is a lot of tourism: indeed, 7 out of 10 airports serve islands and coastal towns. In terms of airlines' presence at airports, the airline which contribute to reach the 80% of the daily movements in 10 out of 10 airports is the low cost carrier Ryanair, followed by Air nostrum 7 and Air Europa with 6 (a regional and a charter carrier). The 4th airline is Spanair which has recently filed for bankruptcy, so the Spanish scenario is likely to evolve on the account of the carrier which will be able to take over its place. Due to tourism and to the fact that the legacy carrier Iberia is focused on the international network towards Latin America, the Spanish market is dominated – in terms of DI – by low cost and regional carriers: Ryanair scores 63 points, Air Nostrum 27,6 , Air Europa and Vueling 12 points. It is then possible to conclude that at Spanish airports there is scope for competition between airlines as the legacy carrier is oriented towards the international routes; moreover the merging with British Airways is likely to lead to a rationalization of the slots. Madrid and Barcelona are ranked 7th and 8th among those airports in term of hub capability as they have a significant number of inhabitants. On the other hand, touristic destinations like Lanzarote, Palma de Maiorca and Ibiza have high values of hub capability.

HHI INDEX				un-concentrated		moderated		high-concentrated	
MADRID		BARCELONA		PALMA MAIORCA		MALAGA		LAS PALMAS	
HHI norm	0,153	HHI norm	0,073	HHI norm	0,135	HHI norm	0,068	HHI norm	0,063
N° carriers	50	N° carriers	50	N° carriers	11	N° carriers	24	N° carriers	25
1/N	0,020	1/N	0,020	1/N	0,091	1/N	0,042	1/N	0,040
HHI	0,170	HHI	0,091	HHI	0,214	HHI	0,107	HHI	0,100
1st carrier	30,98%	1st carrier	20,63%	1st carrier	34,34%	1st carrier	21,80%	1st carrier	23,61%
1st-2nd carrier	52,34%	1st-2nd carrier	33,58%	1st-2nd carrier	58,59%	1st-2nd carrier	41,35%	1st-2nd carrier	34,43%
1st-2nd-3rd carrier	60,59%	1st-2nd-3rd carrier	45,41%	1st-2nd-3rd carrier	72,73%	1st-2nd-3rd carrier	48,87%	1st-2nd-3rd carrier	42,95%
top5	73,42%	top5	58,74%	top5	89,90%	top5	59,40%	top5	58,36%
top10	84,60%	top10	76,10%	top10	98,99%	top10	75,94%	top10	80,00%
ALICANTE		TENERIFE		IBIZA		LANZAROTE		VALENCIA	
HHI norm	0,053	HHI norm	0,062	HHI norm	0,201	HHI norm	0,131	HHI norm	0,197
N° carriers	11	N° carriers	19	N° carriers	6	N° carriers	8	N° carriers	11
1/N	0,091	1/N	0,053	1/N	0,167	1/N	0,125	1/N	0,091
HHI	0,139	HHI	0,112	HHI	0,334	HHI	0,240	HHI	0,270
1st carrier	26,51%	1st carrier	19,39%	1st carrier	52,00%	1st carrier	38,67%	1st carrier	43,52%
1st-2nd carrier	42,17%	1st-2nd carrier	37,76%	1st-2nd carrier	72,00%	1st-2nd carrier	60,00%	1st-2nd carrier	69,44%
1st-2nd-3rd carrier	54,22%	1st-2nd-3rd carrier	52,04%	1st-2nd-3rd carrier	84,00%	1st-2nd-3rd carrier	78,67%	1st-2nd-3rd carrier	75,93%
top5	71,08%	top5	66,33%	top5	96,00%	top5	89,33%	top5	86,11%
top10	97,59%	top10	83,67%	top10	100,00%	top10	100,00%	top10	98,15%

Table 112: Airlines' concentration at Spanish major airports

	2005	2006	2007	2008	2009	2010
PAX GROUP	144.735.585	154.374.428	166.268.222	160.672.204	148.110.983	153.398.950
% ON PAX GROUP	79,84%	79,76%	78,99%	78,81%	78,94%	79,57%
% 2010 on 2005	5,99%					
PAX < 1000	120.809.006	129.615.947	141.648.398	136.769.914	127.145.594	131.615.586
% ON PAX GROUP	66,64%	66,97%	67,29%	67,09%	67,76%	68,27%
% 2010 on 2005	8,95%					
PAX/kmq GROUP	45	48	52	50	46	48
PAX/kmq < 1000 km	133	143	156	151	140	145
MEAN RADIUS	1007					
MEAN RADIUS < 1000 km	537					

Table 113a: Spanish traffic composition

AIRLINE	MAD	BCN	PMI	AGP	LPA	ALC	TFS	IBZ	ACE	VLC	N°	SERVICE
Ryanair	X	X	X	X	X	X	X	X	X	X	10	LC
Air Nostrum	X	X	X	X		X		X		X	7	RC
Air Europa	X	X	X	X			X			X	6	NC - CH
Spanair (bankrupcy 28-01-12)	X	X		X	X	X		X			6	NC
easyjet	X	X		X		X	X				5	LC
Vueling	X	X		X		X				X	5	LC
Air Berlin			X	X	X		X				4	NC
Iberia	X	X			X	X					4	NC
Transavia				X		X	X				3	LC
Binter Canarias					X				X		2	RC
Condor					X		X				2	CH
Hapagfly					X		X				2	CH
Islas Airways					X				X		2	RC
NAYSA					X				X		2	RC
Air France		X									1	NC
British Airways		X									1	NC
FlexFlight ApS				X							1	CH
Jetairfly							X				1	LC
KLM		X									1	NC
Lufthansa		X									1	NC
Niki							X				1	LC
Norwegian Air Shuttle				X							1	LC
Portugalia Airlines				X							1	RC
SWISS		X									1	NC
TAP-Air Portugal		X									1	NC
Tatarstan				X							1	NC
TUIfly Nordic					X						1	CH

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 113b: Spanish traffic composition

AIRLINE	POINTS TOT	FREQUENCY	DOMINANCE
Ryanair	70	9	63
Air Nostrum	46	6	27,6
Air Europa	24	5	12
Vueling	24	5	12
Spanair	22	5	11
Air Berlin	24	4	9,6
Iberia	18	3	5,4
NAYSA	20	2	4
easyJet	12	3	3,6
Islas Airways	14	2	2,8
Hapagfly	10	2	2
Binter Canarias	8	2	1,6
Condor	6	1	0,6
Portugalia Airlines	2	1	0,2

Table 114: Dominance Index at Spanish airports

AIRPORT	INHABITANTS	PASSENGERS	PAX/INHAB
ACE	96.700	4.938.343	51,07
PMI	700.000	21.117.417	30,17
IBZ	205.700	5.040.800	24,51
LPA	617.500	9.486.035	15,36
TFS	583.200	7.358.986	12,62
AGP	1.086.900	12.064.521	11,10
MAD	4.822.000	49.866.113	10,34
BCN	2.850.000	29.209.536	10,25
ALC	1.208.700	9.382.931	7,76
VLC	1.344.300	4.934.268	3,67

Table 115: Hub capability at Spanish airports

Rank	Movements	City	IATA CODE	mov 2009	mov 2010	% on 2010
1	Atatürk International Airport	Istanbul	IST	283.926	288.249	36%
2	Antalya Airport	Antalya	AYT	127.278	148.825	55%
3	Sabiha Gökçen International Airport	Istanbul / Pendik	SAW	63.812	104.175	68%
4	Esenboga International Airport	Ankara	ESB	62.625	73.936	78%
5	Adnan Menderes Airport	Izmir	ADB	54.167	63.162	86%
6	Dalaman Airport	Dalaman	DLM	24.008	27.070	89%
7	Milas-Bodrum Airport	Bodrum	BJV	23.475	25.822	92%
8	Adana Sakirpasa Airport	Adana	ADA	26.326	30.343	96%
9	Trabzon Airport	Trabzon	TZX	14.893	17.797	99%
10	Diyarbakir Airport	Diyarbakir	DIY	8.883	11.335	100%
TOT GROUP				689.393	790.714	
TOT COUNTRY				1.066.083	1.213.125	

Rank	Passengers	City	IATA CODE	pax 2008	pax 2009	pax 2010	% on 2010
1	Atatürk International Airport	Istanbul	IST	28.553.132	29.812.888	32.145.619	34%
2	Antalya Airport	Antalya	AYT	18.789.257	18.345.693	21.996.601	58%
3	Sabiha Gökçen International Airport	Istanbul / Pendik	SAW	4.281.193	6.517.486	11.129.472	70%
4	Esenboga International Airport	Ankara	ESB	5.692.133	6.084.404	7.759.479	78%
5	Adnan Menderes Airport	Izmir	ADB	5.455.298	6.201.794	7.485.067	86%
6	Dalaman Airport	Dalaman	DLM	3.208.668	3.347.996	3.784.440	90%
7	Milas-Bodrum Airport	Bodrum	BJV	2.749.788	2.780.944	3.071.418	93%
8	Adana Sakirpasa Airport	Adana	ADA	2.290.427	2.482.402	2.841.220	96%
9	Trabzon Airport	Trabzon	TZX	1.469.713	1.596.905	1.963.168	98%
10	Diyarbakir Airport	Diyarbakir	DIY	967.088	1.060.381	1.404.639	100%
TOT GROUP				73.456.697	78.230.893	93.581.123	
TOT COUNTRY				79.438.289	85.208.880	102.705.805	

Table 116: Turkey traffic data

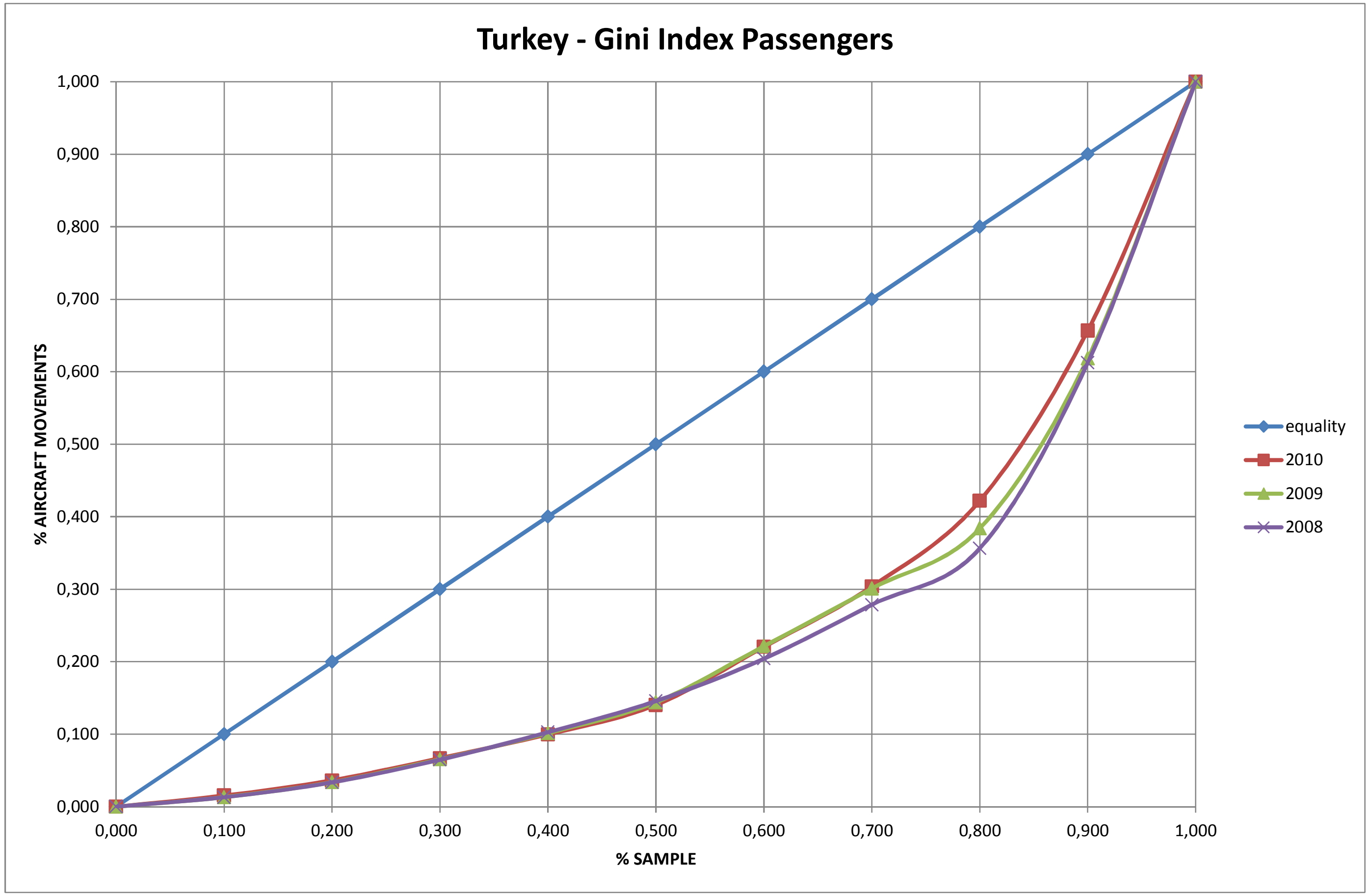


Fig. 58: Lorenz curve Turkey Passengers

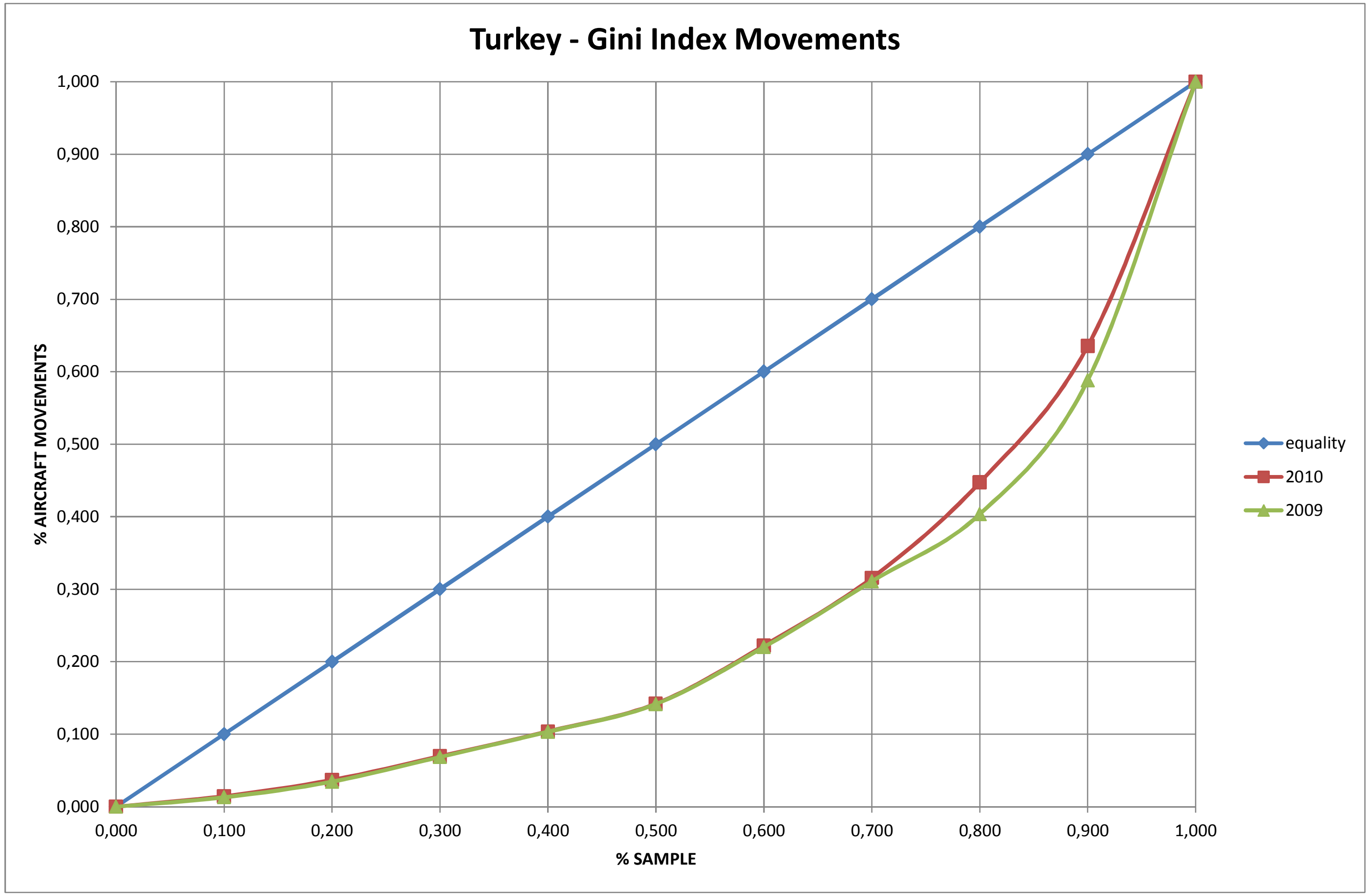


Fig. 59: Lorenz curve Turkey Movements

2010	2009	equality		
0,000	0,000	0,000	0%	MOVEMENTS
0,014	0,013	0,100	10%	
0,037	0,034	0,200	20%	
0,069	0,069	0,300	30%	
0,104	0,103	0,400	40%	
0,142	0,142	0,500	50%	
0,222	0,220	0,600	60%	
0,315	0,311	0,700	70%	
0,447	0,404	0,800	80%	
0,635	0,588	0,900	90%	
1,000	1,000	1,000	100%	
0,503	0,523	-3,94%	GINI	

2010	2009	2008	equality		
0,000	0,000	0,000	0,000	0%	PASSENGERS
0,015	0,013	0,013	0,100	10%	
0,036	0,034	0,033	0,200	20%	
0,067	0,065	0,065	0,300	30%	
0,100	0,101	0,103	0,400	40%	
0,140	0,144	0,146	0,500	50%	
0,220	0,221	0,204	0,600	60%	
0,304	0,301	0,279	0,700	70%	
0,422	0,384	0,356	0,800	80%	
0,657	0,618	0,612	0,900	90%	
1,000	1,000	1,000	1,000	100%	
0,508	0,524	0,538	-5,60%	GINI	

Table 117: Gini Index for Turkey – time series

The numerical value of the Gini index is reported in Table 117 and the % variation refers to 2010 on 2008 (for passengers) and on 2009 (for movements).

From Table 116, fig. 58 (with reference to passengers) and fig. 59 (with reference to aircraft movements) it is possible to understand that Istanbul Ataturk airport accounts for approximately 34% of the total movements and for 36% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 91% of the Turkish passenger traffic output and 65% of the traffic movements. That is to say that in Turkey there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 35% of the aircraft movements but only 9% of the passengers. In terms of movements, the 55% of the sample is handled by Istanbul Ataturk and Antalya; the same airports handle the 58% of the total passengers output of the group. In terms of movements, airports ranking from 1st to 7th account for 92% of the total traffic, while the 90% of the passenger output is handled by airport ranked from1st to 6th. At Istanbul Ataturk passengers are less concentrated than movements; the opposite happens at Antalya and Istanbul Sabiha. In general there is a substantial equilibrium between passengers and movements from the 3rd airport on. From 2009 to 2010 there has been a decrease of 3,94% of the Gini index with regard to movements; from 2008 to 2010 a -5,6% loss in terms of passengers' Gini index has been registered. From Table 117 it is evident the decreasing trend as Turkey is another country whose air traffic market is growing at a fast pace. Thus, a diminution of the concentration index is foreseeable. From 2008 to 2010 passengers traffic rose of 28% and a growth has been registered at all airports, in particular at the 2nd airport of Istanbul. In fig. 58 no relevant change is visible in % shares for bottom 5 airports, from x=0,6 onwards Lorenz curves for 2009 and 2010 are above Lorenz curve for 2008 as the top 4 airports' share has decreased in % terms. With reference to movements, we take into consideration fig. 59: in % terms nothing changes for X-axis values ranging from 0 to 0,7, then the +40.000 movements/year at 2nd Istanbul airport lead to a sharp decrease of the to 2 airports' share and so Lorenz curve for 2010 stand above Lorenz curve for 2009. Geographically speaking, almost the 50% of the Turkish passengers' traffic is concentrated in an area centered in Istanbul and gathering 3 airports; the mean radius is of approximately 280 km.

9 out of 10 airports considered register high-concentration. The principal reason is the scarce number of airlines operating, so there is scope for the entry of new competitors in Turkish market provided that the government

would not impose some forms of protectionism. The top 3 carriers at each airport gather more than 75% of the daily movements. The only airport with a moderate concentration is Antalya. In terms of airlines' presence at airports, the airlines which contribute to reach the 80% of the daily movements in 9 out of 10 airports are the legacy carrier Turkish Airlines and the low cost carrier Pegasus Airlines. Another low cost carrier, Anadolujet follows with 7 airports. In terms of DI, Pegasus Airlines and Turkish Airlines dominate the market with 78 points each. Other carriers which operate low cost and charter services have lower values of Dominance Index.

HHI INDEX				un-concentrated		moderate		high-concentrated	
ISTAMBUL ATATURK		ANTALYA		ISTAMBUL SABIHA		ANKARA		IZMIR	
HHI norm	0,521	HHI norm	0,079	HHI norm	0,551	HHI norm	0,239	HHI norm	0,125
N° carriers	50	N° carriers	8	N° carriers	8	N° carriers	8	N° carriers	7
1/N	0,020	1/N	0,125	1/N	0,125	1/N	0,125	1/N	0,143
HHI	0,530	HHI	0,194	HHI	0,607	HHI	0,334	HHI	0,250
1st carrier	72,45%	1st carrier	28,95%	1st carrier	76,53%	1st carrier	48,42%	1st carrier	39,67%
1st-2nd carrier	77,32%	1st-2nd carrier	47,37%	1st-2nd carrier	90,31%	1st-2nd carrier	74,74%	1st-2nd carrier	64,46%
1st-2nd-3rd carrier	81,59%	1st-2nd-3rd carrier	65,79%	1st-2nd-3rd carrier	94,90%	1st-2nd-3rd carrier	91,58%	1st-2nd-3rd carrier	76,03%
top5	84,09%	top5	92,11%	top5	97,96%	top5	96,84%	top5	93,39%
top10	88,12%	top10	100,00%	top10	100,00%	top10	100,00%	top10	100,00%
DALAMAN		BODRUM		ADANA SAKIRPASA		TRABZON		DIYARKABIR	
HHI norm	0,063	HHI norm	0,016	HHI norm	0,104	HHI norm	0,066	HHI norm	0,040
N° carriers	3	N° carriers	3	N° carriers	5	N° carriers	5	N° carriers	4
1/N	0,333	1/N	0,333	1/N	0,200	1/N	0,200	1/N	0,250
HHI	0,375	HHI	0,344	HHI	0,283	HHI	0,253	HHI	0,280
1st carrier	50,00%	1st carrier	37,50%	1st carrier	39,34%	1st carrier	33,33%	1st carrier	40,00%
1st-2nd carrier	75,00%	1st-2nd carrier	75,00%	1st-2nd carrier	68,85%	1st-2nd carrier	61,11%	1st-2nd carrier	60,00%
1st-2nd-3rd carrier	100,00%	1st-2nd-3rd carrier	100,00%	1st-2nd-3rd carrier	86,89%	1st-2nd-3rd carrier	83,33%	1st-2nd-3rd carrier	80,00%
top5	100,00%	top5	100,00%	top5	100,00%	top5	100,00%	top5	100,00%
top10	100,00%	top10	100,00%	top10	100,00%	top10	100,00%	top10	100,00%

Table 118: Airlines' concentration at Turkish major airports

	2010	2009	2008
PAX GROUP	93.581.123	78.230.893	73.456.697
% ON PAX GROUP	91,12%	91,81%	92,47%
% 2010 on 2008	27,40%		
PAX < 500 km	51.034.570	42.414.778	38.526.458
% ON PAX GROUP	49,69%	49,78%	48,50%
% 2010 on 2008	32,47%		
pax/kmq GROUP	49	41	39
pax/kmq < 500 km	208	173	157
MEAN RADIUS	778		
MEAN RADIUS < 500 km	280		

AIRLINE	IST	AYT	SAW	ESB	ADB	DLM	BJV	ADA	TZX	DIY	N°	SERVICE
AnadoluJet		X	X	X	X			X	X	X	7	LC
Atlasjet	X	X				X	X				4	CH
Onur Air	X										1	RC - CH
Pegasus Airlines		X	X	X	X	X	X	X	X	X	9	LC
SunExpress					X						1	NC - CH
Turkish Airlines	X	X		X	X	X	X	X	X	X	9	NC

NC = National carrier/Network carrier , LC = Low cost carrier , RC = Regional carrier , CH = Charter , FC = Freight carrier

Table 119: Turkish traffic composition

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
Pegasus Airlines	78	10	78,00
Turkish Airlines	78	10	78,00
AnadoluJet	54	7	37,80
Atlasjet	32	6	19,20
Onur Air	20	5	10,00
SunExpress	16	4	6,40
Lufthansa	6	2	1,20
Transavia	2	1	0,20

Table 120: Dominance Index at Turkish airports

Rank	Movements	IATA CODE	2006	2007	2008	2009	2010	% on 2010
1	Hartsfield–Jackson Atlanta International	ATL	976.447	994.346	978.824	970.235	950.119	6%
2	O'Hare International	ORD	958.643	926.973	881.568	827.899	882.617	11%
3	Los Angeles International	LAX	656.842	680.954	622.504	634.383	666.938	15%
4	Dallas/Fort Worth International	DFW	699.773	685.491	656.310	638.782	652.261	19%
5	Denver International	DEN	598.489	614.065	616.272	607.019	630.063	23%
6	John F. Kennedy International	JFK	378.389	446.348	435.450	416.945	399.626	25%
7	George Bush Intercontinental	IAH	602.672	603.656	576.062	538.168	531.347	28%
8	McCarran International	LAS	619.486	609.472	578.949	511.064	505.591	31%
9	San Francisco International	SFO	359.201	379.500	387.710	379.751	387.248	34%
10	Phoenix Sky Harbor International	PHX	546.510	539.211	502.499	457.207	449.351	36%
11	Charlotte/Douglas International	CLT	509.559	522.541	536.253	509.448	529.101	39%
12	Miami International	MIA	384.477	386.058	372.891	351.417	376.208	42%
13	Orlando International	MCO	350.119	360.075	334.774	300.401	307.784	43%
14	Newark Liberty International	EWR	444.374	435.691	433.251	411.607	403.880	46%
15	Minneapolis−Saint Paul International	MSP	475.668	452.972	449.972	432.395	436.625	49%
16	Detroit Metropolitan Wayne County	DTW	481.740	467.230	462.284	432.589	452.616	51%
17	Seattle–Tacoma International	SEA	340.058	347.046	342.889	317.873	313.954	53%
18	Philadelphia International	PHL	515.869	499.653	492.018	472.668	460.779	56%
19	Boston Logan International	BOS	406.119	399.537	371.604	345.306	352.643	58%
20	LaGuardia	LGA	399.827	391.872	378.521	354.594	362.137	60%
21	Washington Dulles International	IAD	379.571	382.939	360.154	340.367	336.531	62%
22	Fort Lauderdale – Hollywood International	FLL	297.088	307.975	295.496	266.979	272.293	64%
23	Baltimore/Washington International Thurgood Marshall	BWI	305.630	296.872	277.662	268.005	276.457	65%
24	Salt Lake City International	SLC	421.436	422.010	387.671	372.300	362.654	68%
25	Ronald Reagan Washington National	DCA	276.419	275.433	277.296	272.146	271.097	69%
26	Chicago Midway International	MDW	298.548	304.657	265.572	244.810	245.533	71%
27	San Diego International	SAN	220.839	227.329	223.089	199.209	190.137	72%
28	Tampa International	TPA	257.071	258.349	237.885	199.960	195.359	73%

Rank	Movements	IATA CODE	2006	2007	2008	2009	2010	% on 2010
29	Portland International	PDX	260.510	264.518	252.572	226.548	223.068	74%
30	Lambert-St. Louis International	STL	272.585	254.302	247.617	209.057	185.720	75%
31	Memphis International	MEM	384.823	374.989	363.139	338.973	336.016	77%
32	Kansas City International	MCI	178.466	194.969	176.608	150.323	146.588	78%
33	Oakland International	OAK	330.418	342.024	269.631	233.183	219.652	80%
34	General Mitchell International	MKE	202.505	200.205	183.247	169.693	191.553	81%
35	Cleveland Hopkins International	CLE	249.967	244.719	235.975	200.268	192.863	82%
36	Raleigh-Durham International	RDU	245.099	252.708	228.694	202.401	198.295	83%
37	William P. Hobby	HOU	234.709	232.976	221.929	209.459	209.614	84%
38	Nashville International	BNA	216.617	213.185	190.978	175.618	175.450	85%
39	Sacramento International	SMF	172.522	174.946	152.675	136.834	126.110	86%
40	Austin-Bergstrom International	AUS	209.150	214.440	208.563	174.514	176.914	87%
41	John Wayne	SNA	347.194	331.452	267.751	218.157	200.278	88%
42	San Jose International	SJC	188.458	187.267	172.674	145.838	123.490	89%
43	Louis Armstrong New Orleans International	MSY	103.356	114.318	116.197	106.617	109.107	90%
44	Pittsburgh International	PIT	235.264	209.303	167.729	147.720	144.563	91%
45	San Antonio International	SAT	218.934	219.437	216.634	194.657	177.415	92%
46	Cincinnati/Northern Kentucky International	CVG	345.754	328.059	278.894	222.677	177.597	93%
47	Dallas Love Field	DAL	248.805	244.609	218.640	172.962	168.544	94%
48	Indianapolis International	IND	213.740	203.136	197.202	171.318	166.358	95%
49	Southwest Florida International	RSW	86.170	92.008	89.303	83.120	83.742	95%
50	Port Columbus International	CMH	196.082	173.984	155.914	146.437	136.081	96%
51	Palm Beach International	PBI	192.850	186.583	168.549	138.092	141.387	97%
52	Albuquerque International Sunport	ABQ	192.520	191.050	180.439	158.353	156.505	98%
53	Jacksonville International	JAX	118.854	118.493	106.714	95.927	96.440	99%
54	Bradley International	BDL	156.620	147.720	128.344	108.868	105.985	99%
55	Buffalo Niagara International	BUF	137.518	127.307	136.979	131.325	136.574	100%
TOT GROUP			19.102.360	19.058.969	18.071.029	16.744.475	16.708.868	
TOT COUNTRY			30.458.061	30.904.331	27.974.274	27.991.401	27.279.644	

Rank	Passengers	IATA CODE	2006	2007	2008	2009	2010	% on 2010
1	Hartsfield–Jackson Atlanta International	ATL	84.846.639	89.379.287	90.039.280	88.032.086	89.331.622	7%
2	O'Hare International	ORD	77.028.134	76.177.855	69.353.480	64.158.343	66.774.738	13%
3	Los Angeles International	LAX	61.041.066	61.896.075	59.716.459	56.520.843	59.070.127	17%
4	Dallas/Fort Worth International	DFW	60.226.138	59.786.476	57.080.333	56.030.457	56.906.610	22%
5	Denver International	DEN	47.325.016	49.863.352	51.245.334	50.167.485	52.209.377	26%
6	John F. Kennedy International	JFK	43.762.282	47.716.941	47.799.090	45.915.069	46.514.154	30%
7	George Bush Intercontinental	IAH	42.550.432	42.998.040	41.701.953	40.007.354	40.479.569	33%
8	McCarran International	LAS	46.193.329	46.961.011	44.074.707	40.469.012	39.757.359	37%
9	San Francisco International	SFO	33.574.807	35.792.707	37.255.490	37.338.942	39.253.999	40%
10	Phoenix Sky Harbor International	PHX	41.436.737	42.184.515	39.891.193	37.824.982	38.554.215	43%
11	Charlotte/Douglas International	CLT	29.693.949	33.165.688	34.786.389	34.536.666	38.254.207	46%
12	Miami International	MIA	32.533.974	33.740.416	34.063.531	33.886.025	35.698.025	49%
13	Orlando International	MCO	34.640.451	36.480.416	35.659.551	33.693.649	34.877.899	52%
14	Newark Liberty International	EWR	36.724.167	36.367.240	35.336.733	33.399.207	33.107.041	54%
15	Minneapolis−Saint Paul International	MSP	35.612.133	35.157.322	34.051.280	32.378.599	32.839.441	57%
16	Detroit Metropolitan Wayne County	DTW	35.972.673	35.983.478	35.144.841	31.357.388	32.377.064	60%
17	Seattle–Tacoma International	SEA	29.979.097	31.296.628	32.187.941	31.227.512	31.553.166	62%
18	Philadelphia International	PHL	31.768.272	32.211.439	31.832.392	30.669.564	30.775.961	65%
19	Boston Logan International	BOS	27.725.443	28.102.455	26.102.391	25.512.086	27.428.962	67%
20	LaGuardia	LGA	26.571.146	25.026.267	23.078.228	22.142.336	23.983.082	69%
21	Washington Dulles International	IAD	22.813.067	24.525.487	23.698.105	23.073.665	23.591.554	71%
22	Fort Lauderdale – Hollywood International	FLL	21.369.787	22.681.903	22.621.500	21.060.144	22.412.627	73%
23	Baltimore/Washington International Thurgood Marshall	BWI	21.184.208	21.498.091	20.889.413	20.963.048	21.949.902	74%
24	Salt Lake City International	SLC	21.557.656	22.045.333	20.824.098	20.442.178	21.016.686	76%
25	Ronald Reagan Washington National	DCA	18.545.557	18.670.924	18.019.495	17.568.095	18.105.802	78%
26	Chicago Midway International	MDW	18.680.663	19.378.855	17.345.535	17.028.761	17.566.281	79%
27	San Diego International	SAN	17.481.942	18.336.761	18.125.701	16.974.172	16.889.622	80%
28	Tampa International	TPA	18.867.541	19.154.957	18.262.863	16.965.545	16.645.765	82%

Rank	Passengers	IATA CODE	2006	2007	2008	2009	2010	% on 2010
29	Portland International	PDX	14.043.489	14.654.222	14.299.075	12.929.675	13.184.843	83%
30	Lambert-St. Louis International	STL	15.205.944	15.384.557	14.405.111	12.796.302	12.331.436	84%
31	Memphis International	MEM	11.176.460	11.290.477	10.532.141	10.264.327	10.368.048	85%
32	Kansas City International	MCI	11.237.480	12.000.997	11.166.835	10.041.165	10.168.035	85%
33	Oakland International	OAK	14.692.875	14.846.832	11.474.260	9.652.782	9.857.845	86%
34	General Mitchell International	MKE	7.299.294	7.713.144	7.956.968	7.946.562	9.848.377	87%
35	Cleveland Hopkins International	CLE	11.321.050	11.459.390	11.104.469	9.715.604	9.492.455	88%
36	Raleigh-Durham International	RDU	9.422.112	10.219.138	9.715.926	8.973.209	9.101.870	88%
37	William P. Hobby	HOU	8.549.289	8.819.521	8.774.686	8.498.441	9.054.001	89%
38	Nashville International	BNA	9.663.386	9.876.524	9.388.253	8.936.860	9.037.456	90%
39	Sacramento International	SMF	10.362.800	10.748.982	9.971.312	8.914.510	8.849.711	91%
40	Austin-Bergstrom International	AUS	8.261.310	8.885.391	9.039.075	8.220.898	8.702.365	91%
41	John Wayne	SNA	9.613.540	9.979.699	8.989.603	8.705.199	8.663.452	92%
42	San Jose International	SJC	10.708.065	10.658.389	9.720.186	8.321.750	8.246.064	93%
43	Louis Armstrong New Orleans International	MSY	6.231.044	7.525.533	7.942.705	7.787.373	8.203.305	93%
44	Pittsburgh International	PIT	9.987.310	9.822.588	8.710.291	8.031.175	8.195.359	94%
45	San Antonio International	SAT	8.031.405	8.033.314	8.339.907	7.831.267	8.034.720	95%
46	Cincinnati/Northern Kentucky International	CVG	16.244.962	15.736.220	13.630.443	10.622.185	7.977.588	95%
47	Dallas Love Field	DAL	6.874.717	7.953.385	8.060.792	7.744.522	7.960.809	96%
48	Indianapolis International	IND	8.085.394	8.271.632	8.123.650	7.465.719	7.526.414	97%
49	Southwest Florida International	RSW	7.643.217	8.029.204	7.603.507	7.415.958	7.514.316	97%
50	Port Columbus International	CMH	6.738.348	7.726.421	6.910.045	6.243.717	6.366.191	98%
51	Palm Beach International	PBI	6.824.789	6.967.277	6.476.303	5.994.606	5.887.723	98%
52	Albuquerque International Sunport	ABQ	6.493.339	6.727.384	6.489.128	5.895.211	5.801.641	99%
53	Jacksonville International	JAX	5.946.188	6.319.016	6.002.698	5.605.934	5.601.500	99%
54	Bradley International	BDL	6.907.042	6.519.181	6.088.872	5.334.322	5.380.987	100%
55	Buffalo Niagara International	BUF	5.044.616	5.308.723	5.521.982	5.327.093	5.203.104	100%
TOT GROUP			1.272.317.777	1.308.059.067	1.266.627.537	1.204.561.588	1.234.486.482	
TOT COUNTRY			1.438.096.606	1.454.251.442	1.397.277.261	1.371.900.801	1.372.371.624	

Table 121a-d: USA traffic data

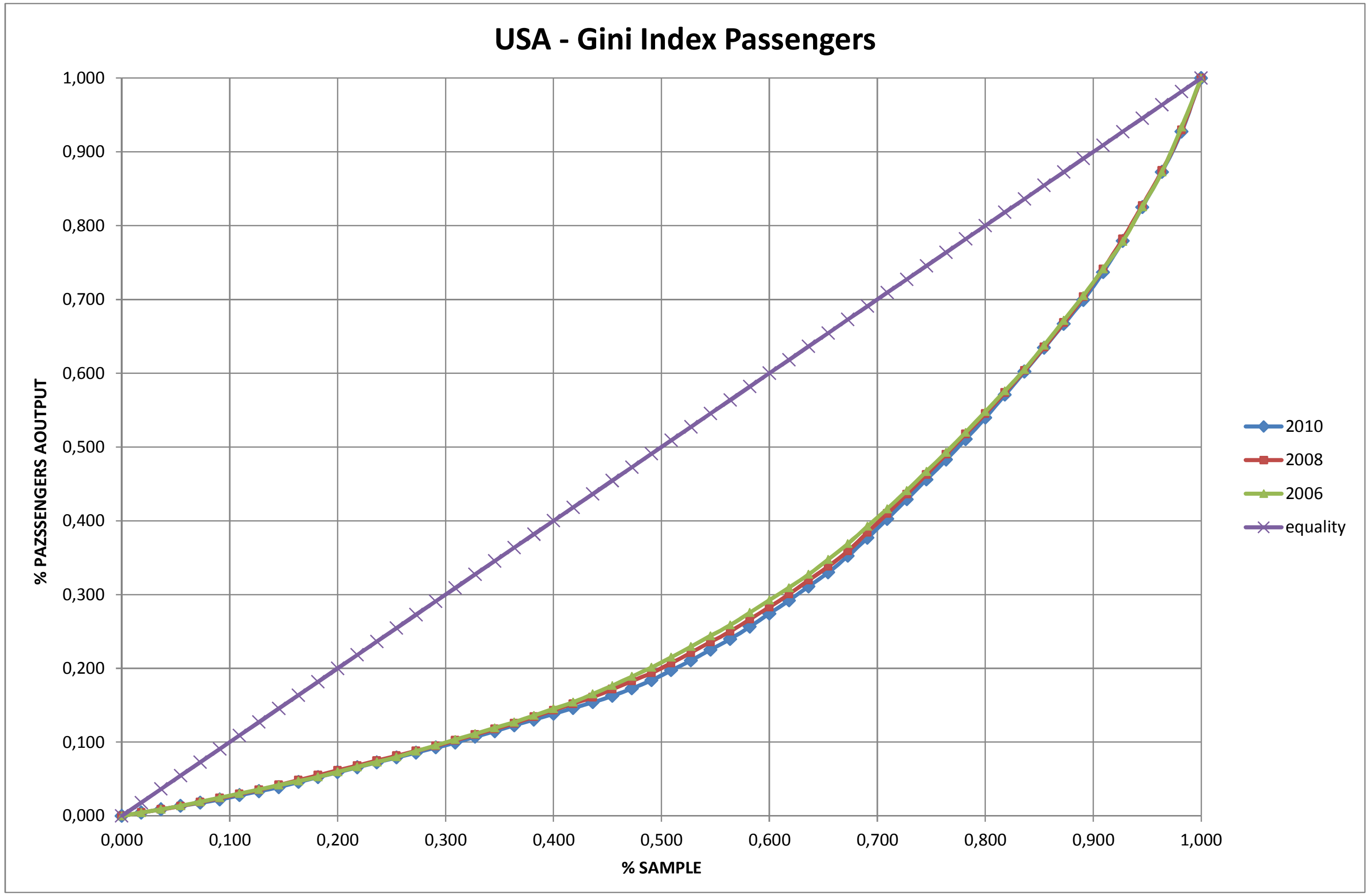


Fig. 60: Lorenz curve USA Passengers

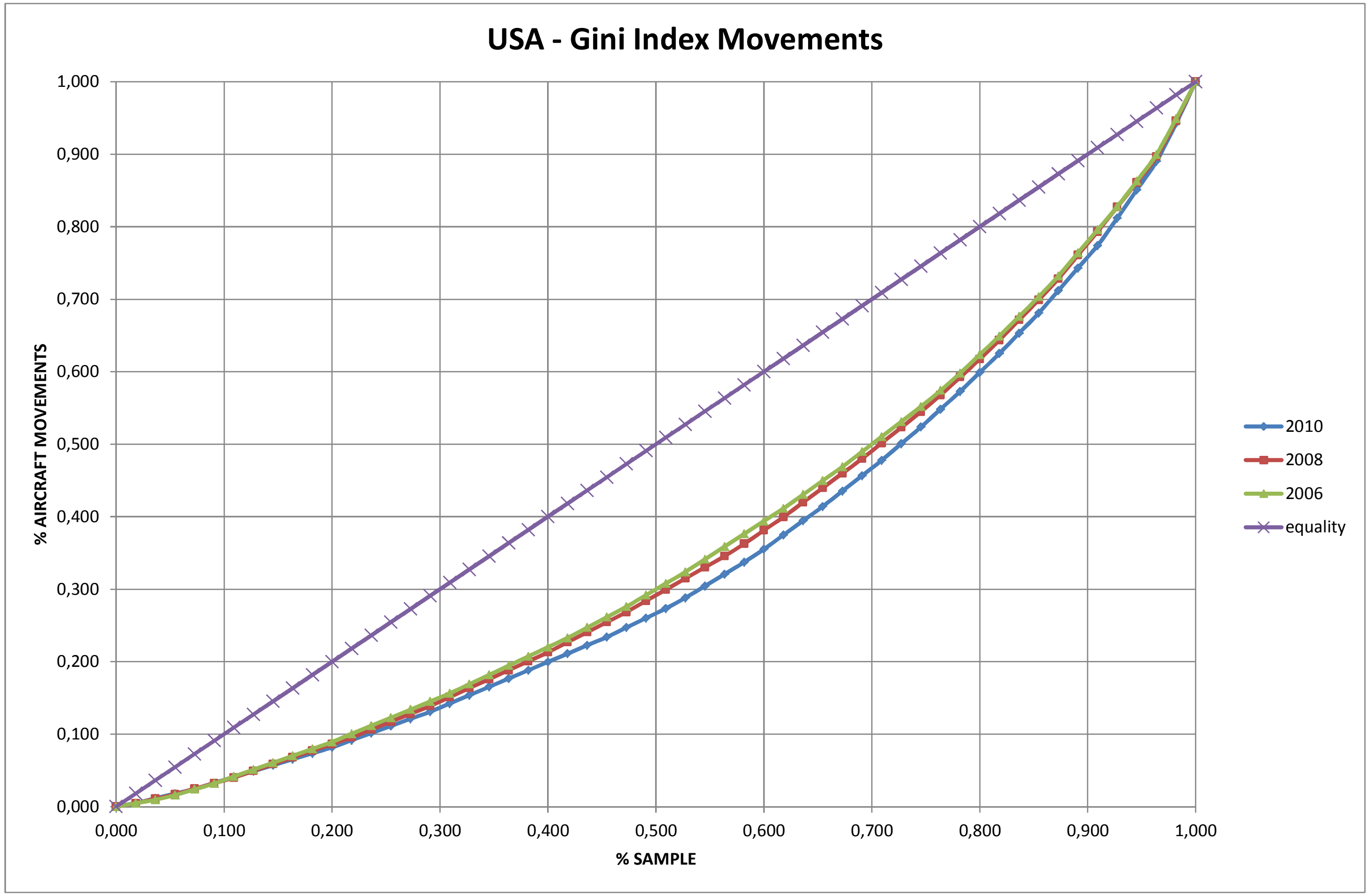


Fig. 61: Lorenz curve USA Movements

2010	2009	2008	2007	2006	equality		PAX
0,420	0,417	0,411	0,405	0,405	3,68%	GINI	
2010	2009	2008	2007	2006	equality		MOV
0,324	0,319	0,297	0,284	0,286	13,39%	GINI	

Table 122: Gini Index for USA – time series

The numerical value of the Gini index is reported in Table 122 and the % variation refers to 2010 on 2006.

From Table 121, fig. 60 (with reference to passengers) and fig. 61 (with reference to aircraft movements) it is possible to understand that Atlanta airport (the biggest of the world) accounts for approximately 6% of the total movements and for 7% of the total passengers traffic taken into consideration by the sample. It is necessary to bear in mind that the sample takes into consideration approximately 90% of the USA passenger traffic output and 89% of the traffic movements. That is to say that in USA there are other small secondary airports (with traffic output lower than 5 million passengers/year) that handle 11% of the aircraft movements but only 10% of the passengers. In terms of movements, the 51% of the sample is handled by the airport from 1st to 16th; airports ranked from 1st to 13th handle the 52% of the total passengers output of the group. In terms of movements, airports ranking from 1st to 43rd account for 90% of the total traffic, while the 90% of the passenger output is handled by airport ranked from 1st to 38th. In general passengers are more concentrated than movements suggesting higher load factors or the usage of bigger aircrafts by airlines. USA is the other country in which Gini index for both passengers and movements registered an increase from 2006 to 2010. The substantial change in passenger's figures is evident from fig. 60 for X-axis values ranging from 0,4 to 0,7. In general passengers decreased, therefore the increase in concentration means that the secondary airports lost a higher share of traffic if compared with bigger airports. Likewise, in terms of movement, the changing is evident for X-axis values ranging from 0,3 to 0,95 in fig. 61. Again, from 2006 and 2010 USA airports registered a substantial loss in aircraft movements; that is to say that the same phenomena that led to a higher concentration in terms of passengers are valid and more evident also for aircraft movements. Geographically speaking, almost the 21% of the USA passengers' traffic is concentrated in an area centered in Atlanta and gathering 16 airports; the mean radius is of approximately 740 km.

There are 9 airports out of the 55 taken into consideration at which the top 3 carriers taken together gather more than 70% of the daily traffic.

In terms of airlines' presence at airports, the top5 airlines which contribute to reach the 80% of the daily movements are the low cost carriers Southwest Airlines and American Airlines, the freight carriers Delta Air Lines and Sky West Airlines and the legacy carrier US Airways. In terms of DI, Southwest Airlines is by far the dominant airline with more than 240 points, followed by Delta Air Lines with 98 points (freight is a relevant component of US air traffic), SkyWest and Us Airways with less than 40 points.

	2010	2009	2008	2007	2006
PAX GROUP	1.234.484.472	1.204.559.579	1.266.625.529	1.308.057.060	1.272.315.771
% ON PAX GROUP	89,95%	87,80%	90,65%	89,95%	88,47%
% 2010 on 2006	-2,97%				
PAX < 1000 km	292.616.894	288.407.801	303.176.970	310.051.834	294.043.491
% ON PAX GROUP	21,32%	21,02%	21,70%	21,32%	20,45%
% 2010 on 2006	-0,49%				
PAX/kmq GROUP	135	132	139	143	139
PAX/kmq < 1000 km	169	167	176	179	170
MEAN RADIUS	1704				
MEAN RADIUS < 1000 km	742				

Table 123: USA traffic composition

AIRLINE	TOTAL POINTS	FREQUENCY	DOMINANCE
Southwest Airlines	342	39	242,51
Delta Air Lines	174	31	98,07
SkyWest Airlines	114	18	37,31
US Airways	100	20	36,36
American Airlines	98	20	35,64
American Eagle	64	11	12,80
ExpressJet Airlines	64	10	11,64
Pinnacle Airlines	58	11	11,60
JetBlue Airways	62	8	9,02
AirTran Airways	56	8	8,15
United Airlines	44	8	6,40
Republic Airlines	38	8	5,53
Continental Airlines	38	6	4,15
Alaska Airlines	30	6	3,27
Air Wisconsin Airlines	26	5	2,36
Horizon Air	28	4	2,04
Chautauqua Airlines	22	4	1,60
Colgan Air	20	4	1,45
FedEx - Federall Express	26	3	1,42
Ameriflight	18	4	1,31
Mesa Airlines	18	4	1,31
Shuttle America	18	4	1,31
Atlantic Southeast Airlines	18	3	0,98
Comair	18	3	0,98
Trans States Airlines	14	3	0,76
Cape Air	14	2	0,51
CommutAir	12	2	0,44
Executive Airlines	12	2	0,44
American Eagle Airlines	10	2	0,36
Compass Airlines	8	2	0,29
Frontier Airlines	8	2	0,29
Spirit Airlines	8	2	0,29
Piedmont Airlines	10	1	0,18
Great Lakes Aviation	4	2	0,15
PSA Airlines	8	1	0,15
SeaPort Airlines	8	1	0,15
Allegiant Air	6	1	0,11
ABX Air	4	1	0,07
Amiyi Airlines	4	1	0,07
Midwest Airlines/Frontier Airlines/US airways express	4	1	0,07
Pacific Wings	4	1	0,07
Turkish Airlines	4	1	0,07
Virgin America	4	1	0,07
Westair Industries, Inc.	4	1	0,07
IBC Airways	2	1	0,04
Porter Airlines	2	1	0,04
UPS	2	1	0,04

Table 124: Dominance Index at USA airports

5.2 – A Game theory plot

In these paragraphs possible applications of games the games theory is presented, without being solved as complicated hypothesis on costs have to be made.

The game is built on the basis of the one presented by C. Bardot (2008) and it refers to the possible interactions between airport and airlines as the characteristics and the conditions under which the two firms operate vary. First of all, airports might be in competition if they have partially overlapping catchment areas and they address the same passenger target. This might happen at large cities served by more than one airport or at borders between two countries. We take into consideration a passenger determined to go from A to N. He can choose to go to N either departing from one airport or from the other according to the total price. That is to say that the passengers will choose the airport which permits him to minimize the sum between travel time, waiting time at the airport (which depends on the scheduled timetable) and travel fare. So, the competition is between two airports taken together with their respective airline which might take the passenger to N.

There are two airlines and two airports, so that it is a situation of "successive duopolies". Each airline operates uniquely in one of the airports. Let B and D stand for the airports (and their variables' subscripts) and A1 and A2 for the airlines (and the numbers 1,2 for their variables' subscripts). A1 operates in airport B and A2 in airport D. Airlines sell tickets directly to passengers, at prices p1 and p2, and have demands of y1 and y2, respectively. Airports sell slots and other services to airlines, for which they pay the prices Pb and Pd, respectively in airports B and D. In order to get uniform variables Pb and Pd are prices by passenger.

Consumers will choose either A1+B or A2+D. Airports have location differentiation but flights are first assumed as homogenous services, both airlines A1 and A2 having identical quality. Besides, A1 and A2 are supposed to have an important share in, respectively, airports B and D. Furthermore, we admit that there are no transaction costs of colluding and no discount rate.

As we have seen before, airport and airline are not two separated entities: in the paragraph 5.1 market concentration has been taken into consideration as the more market share an airline has, the more powerful it is towards the airport management body. Vertical interaction between airport and airline may take several forms and each form might take to different results in terms of competition.

Three possible options appear feasible:

- the two airlines operating each one from a different airport have the same cost structure;
- the two airlines have the same cost structure but one of the two offers flights at a higher frequency, that is to say it has more market power. It is foreseeable than that the airline and the airport would try and find an agreement aiming at maximizing the joint revenue;
- the two airlines have a different cost structure, that is one airport is a hub and the airline is a legacy carrier while the second airport is a secondary airport and the airline is a low cost carrier.

What airport and airline would decide to do may be depicted with a sequential two-stage game: in the first stage airports sets prices and in the second stage airlines compete with reference to these prices as well. There are four possible outcomes: one of competition without any collusion, one of a two sided collusion and two mixed (one-sided collusion).

In the first case, the game is under market and quality symmetry and airlines prefer not to collude as, if only one colludes its revenues would fall. If both airlines and airports collude both revenues would fall.

In the second case, one airline operates on two markets; at one market it act as a monopolist and at the other it is in competition with the other airline.

The airlines provide the same service and experiment the same costs. If the more powerful airline colludes with the airport, the joint profit is bigger as bigger is the market share and lower are the prices. If the less powerful airline does not collude, its revenue will decrease so it is forced to collude as well.

In the third case, airline costs are different as one airline is a legacy carrier and the other is a low cost which operates from a secondary airport with lower charges. Again each airline operates from its airport but the low cost airline offers the flight at a lower price. But the quality offered by the low cost airline is lower and Bardot decided to assume the loss in quality as a longer distance to cover. In this case the relative differences are important: if the cost difference between the LCC and the FSC is large enough, or exceeds a weighed sum of their inverse measures of quality, both airlines and airports are interested in collusion. If the cost difference is smaller the two airlines will revert to the first case.

Conclusions

Since the advent of the liberalization process, both the airport and the airline the market have witnessed substantial changes. The greatest improvement in airport management has been the adoption of more commercial-oriented and efficient policies. Before the advent of liberalization, airports were mere infrastructural providers, often dependant only on public financings and focused on the fulfilments of the national carrier’s needs. The new point of view envisages a complex business, capable of self-financing and of responding to the customers’ needs. The shift from 100% public ownership to some forms of private ownership has not been even worldwide; therefore there are countries in which the private investors’ involvement is welcome and others in which the word “privatization” is still perceived as synonymous of higher taxes and lower services. Nevertheless the recent economic downturns are forcing governments to divest part of their assets (among those also participation at airports) or to put a hold at massive airport financing. In chapter 1 the forms of airport ownership and management in force on a worldwide basis have been investigated in order to highlight strengths and weak points. As airport economy is becoming an urgent issue, traditional forms of regulations as well as the characteristics of the commercial management have been investigated: as profitable airports are considered a desirable investment, management bodies are shifting their economic focus also on non-aeronautical revenues in order to finance infrastructure development without relying on government financing. Restaurants, shops, parking garages, leasing terminal space but also facilities like congress centres and participation/sponsorships in welfare projects are all viable ways to improve the airports' economic status.

A sample of twelve representative countries has been chosen in order to investigate the situation of air transport market worldwide. Countries with a mature airport system (USA, Australia, Canada, UK, Spain, France, Germany, Italy) together with emerging countries (Brazil, China, India, Turkey) are included in the sample. Regulation and ownership have been examined together with the effects of recent juridical innovations on competition. A deep digression has been reserved to Italy and to European countries as well. The long term trend foresees a strong traffic demand on 2030, so IATA and regulators are urging governments and managing bodies to take actions to cope with it, avoiding a capacity collapse. Nevertheless, the short term trend highlights a market contraction due to the economic crisis, exacerbated by terrorism, natural disasters and high fuel prices. Airline profits are being undermined and a relevant number of airlines worldwide filed for bankruptcy (recent examples are Alitalia, Malev, Spanair, Air Japan and American Airlines). Air traffic demand is predicted to grow in the long term; nevertheless recently the trend is a slight contraction of the market. Most airports worldwide have experimented sharp reductions of both passengers and aircraft movements. Airlines competition led to the emerging of the low cost method and to the re-organization of the national carriers in order to cope with competition: over time, network airlines have decided to cut their costs adopting some of the low cost carriers' strategies while low cost carriers have adopted simple hubbing models and have been continuously increasing the number of major airport served. That's why some researchers thinks that with new steps to be taken in market deregulation and liberalization (for example, no more restriction on the airlines' ownership) the existing distinction between low cost and legacy carrier airlines will be overcome.

The response to this uncertain and volatile scenario seems to be stability: airlines are merging in order to create mega-carriers with an established and resilient network, phenomena of vertical integration between airports and airlines (buyout of airport operator's shares, partnership for ad-hoc infrastructure development) are becoming common, shared knowledge between airport operators to keep a negotiating power over airlines through the establishment of airport groups are notable exempla. Similar trends are traceable also in other fields or air transport, like ground handling.

Updated traffic data at the sample of airports taken into consideration have been collected in order to derive some useful informations: n° of carriers operating, service provided, market share on the basis of the daily traffic movements and concentration indexes as well as dominance indexes (which combines market share at airports with market share in a target nation system). The traffic distribution at airports has been analysed with the HHI with the aim of highlighting those airports with a concentration higher than 0,25 (according to US normative); the airport system has been analysed through the use of both the Gini concentration index and the Dominance Index.

High values of the Gini index show an higher concentration thus meaning that few big airports handle most of the traffic; on the other hand lower values of the index stand for even traffic distribution among a higher number of airports.

Passengers and movements traffic trend x country 2010 - 2006								
Data		Passengers						
Country	N° airports	Pax 2010	% tot pax	Pax 2006	% tot pax	Δ 2010-2006	Δ% 2010-2006	Gini
USA	55	1.234.484.472	89,95%	1.272.315.771	88,47%	-37.831.299	-2,97%	up
China	33	561.371.626	91,28%	362.911.649	92,72%	198.459.977	54,69%	down
UK	10	181.807.542	82,16%	189.729.411	82,27%	-7.921.869	-4,18%	down
Germany	10	170.201.388	89,26%	159.654.752	91,64%	10.546.636	6,61%	constant
Spain	10	153.398.950	79,57%	154.374.428	79,76%	-975.478	-0,63%	up
France	10	125.565.399	90,17%	122.845.248	91,23%	2.720.151	2,21%	down
Brasil	12	120.726.471	77,71%	80.903.692	79,17%	39.822.779	49,22%	down
Australia	10	118.233.486	87,55%	97.991.824	87,43%	20.241.662	20,66%	constant
Italy	10	103.604.532	74,58%	96.029.111	78,14%	7.575.421	7,89%	down
Turkey*	10	93.581.123	91,12%	78.230.893	91,81%	15.350.230	19,62%	down
Canada	10	91.736.175	83,91%	87.112.069	85,68%	4.624.106	5,31%	constant

Passengers and movements traffic trend x country 2010 - 2006								
Data		Aircraft movements						
Country	N° airports	Mov 2010	% tot mov	mov 2006	% tot mov	Δ 2010-2006	Δ% 2010-2006	Gini
USA	55	16.706.858	61,24%	19.100.354	62,71%	-2.393.496	-12,53%	up
China	33	4.546.713	88,88%	3.258.668	89,85%	1.288.045	39,53%	down
UK	10	1.469.163	65,74%	1.631.546	67,56%	-162.383	-9,95%	constant
Germany	10	1.722.461	87,97%	1.786.551	89,99%	-64.090	-3,59%	down
Spain	10	1.402.697	66,18%	1.530.463	66,01%	-127.766	-8,35%	up
France	10	1.279.786	79,83%	1.306.622	75,56%	-26.836	-2,05%	down
Brasil	12	1.474.225	55,66%	1.060.602	55,28%	413.623	39,00%	down
Australia	10	996.544	72,46%	861.005	71,16%	135.539	15,74%	down
Italy	10	1.022.343	71,33%	1.054.875	74,29%	-32.532	-3,08%	down
Turkey*	10	790.714	65,18%	689.393	64,67%	101.321	14,70%	down
Canada	10	1.298.476	57,25%	1.217.953	57,53%	80.523	6,61%	constant

CONCENTRATION AT AIRPORTS 2010												
Country	% 1st airport		% 1st-2nd airport		% 1st-3rd airport		% 1st-4th airport		% 1st-5th airport		total	
	pax	mov	pax	mov	pax	mov	pax	mov	pax	mov	pax	mov
Australia	27%	21%	47%	36%	62%	48%	70%	55%	76%	60%	100%	100%
Brasil	17%	9%	27%	17%	36%	24%	44%	28%	49%	33%	100%	100%
Canada	28%	17%	43%	26%	54%	34%	66%	41%	71%	45%	100%	100%
China	12%	10%	20%	16%	27%	23%	33%	29%	38%	33%	100%	100%
France	42%	31%	60%	44%	67%	53%	72%	61%	78%	67%	100%	100%
Germany	28%	23%	46%	42%	56%	52%	64%	60%	71%	67%	100%	100%
India*	23%	17%	46%	34%	58%	43%	69%	51%	77%	57%	100%	100%
Italy	26%	23%	39%	36%	45%	43%	51%	48%	56%	52%	100%	100%
Spain	26%	20%	41%	34%	52%	42%	58%	47%	63%	52%	100%	100%
Turkey	31%	24%	53%	36%	64%	45%	71%	51%	78%	56%	100%	100%
UK	30%	21%	44%	32%	53%	39%	62%	46%	66%	51%	100%	100%
USA	7%	3%	11%	7%	16%	9%	20%	12%	24%	14%	100%	100%

Table 125: Concentration Index

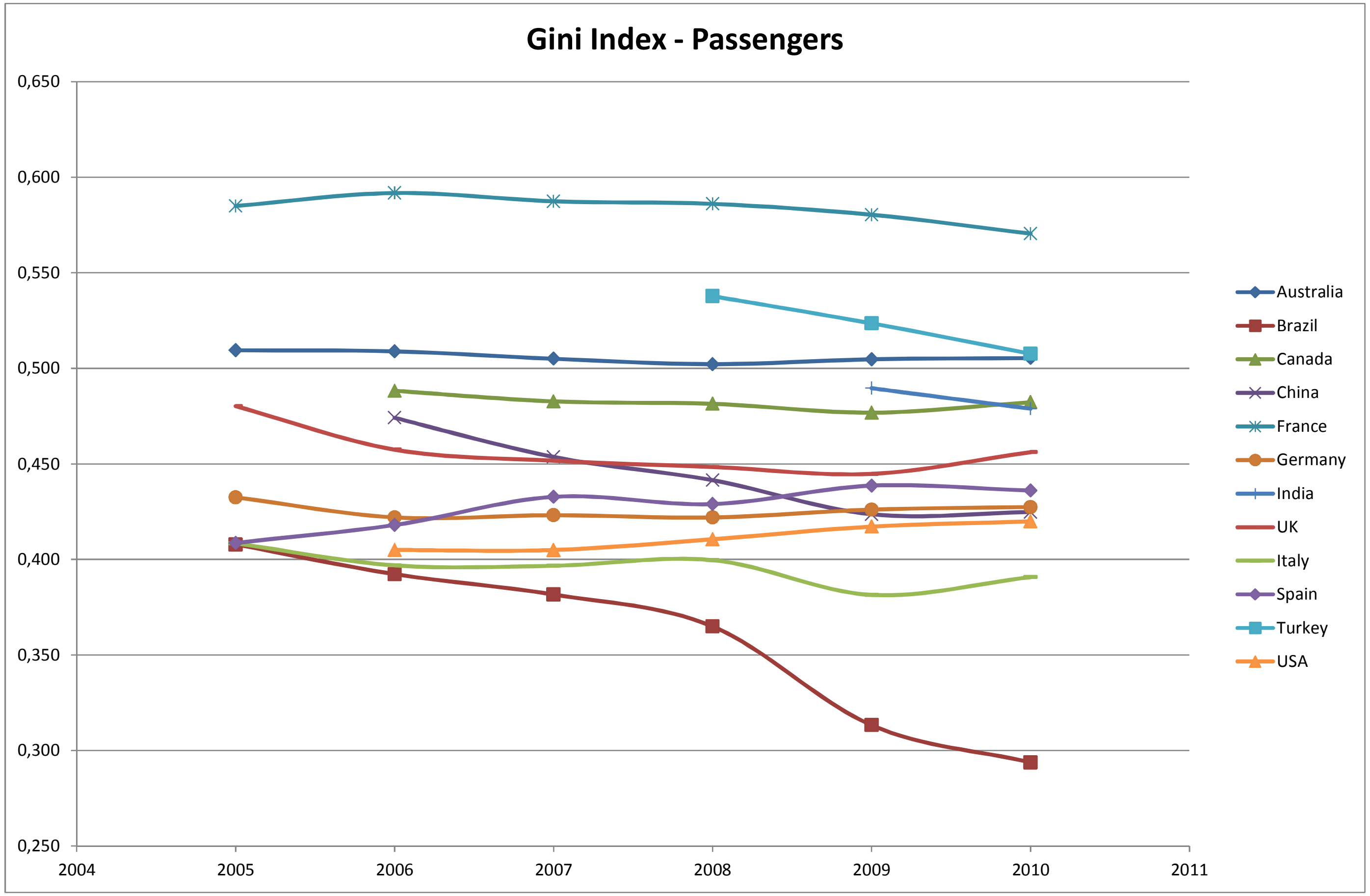


Fig. 62: Gini Index Passengers total

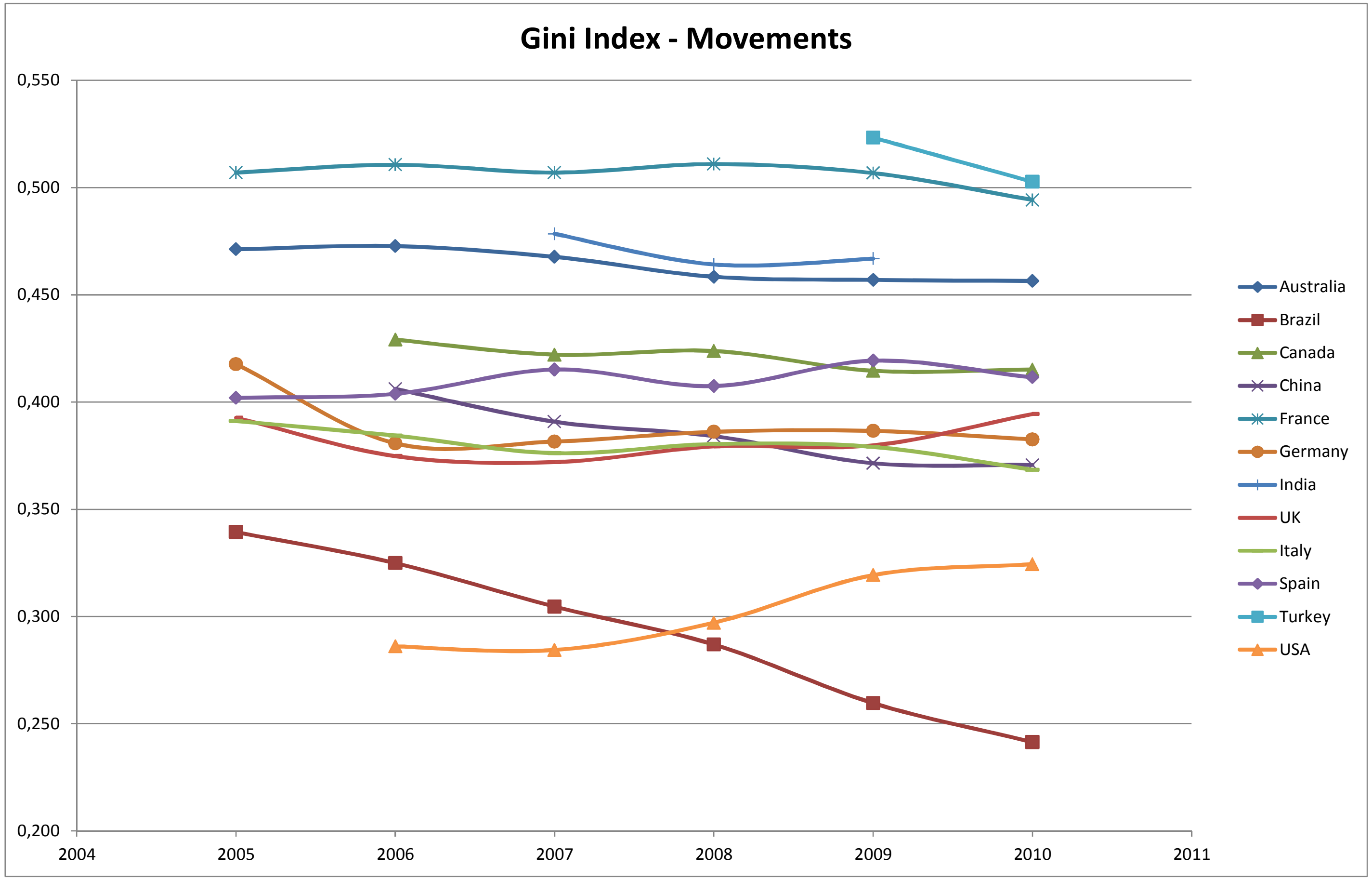
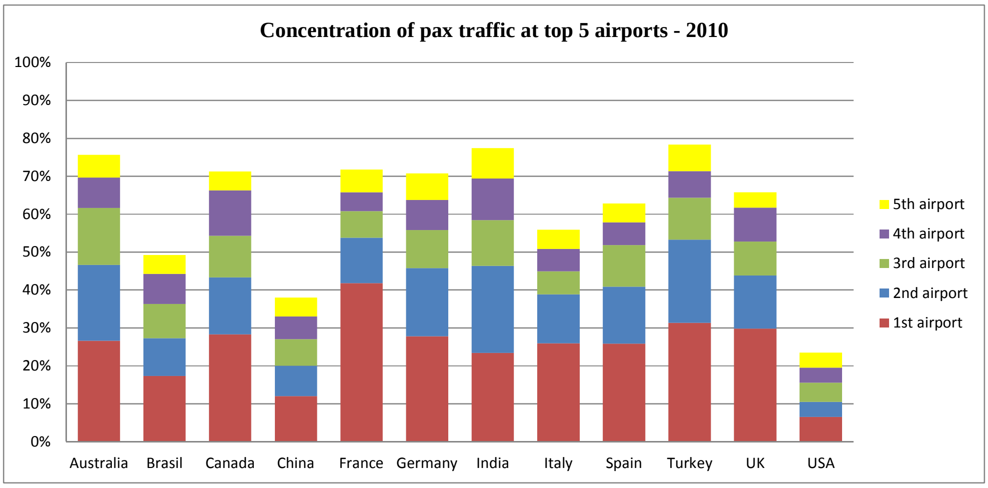


Fig. 63: Gini Index Movements Total



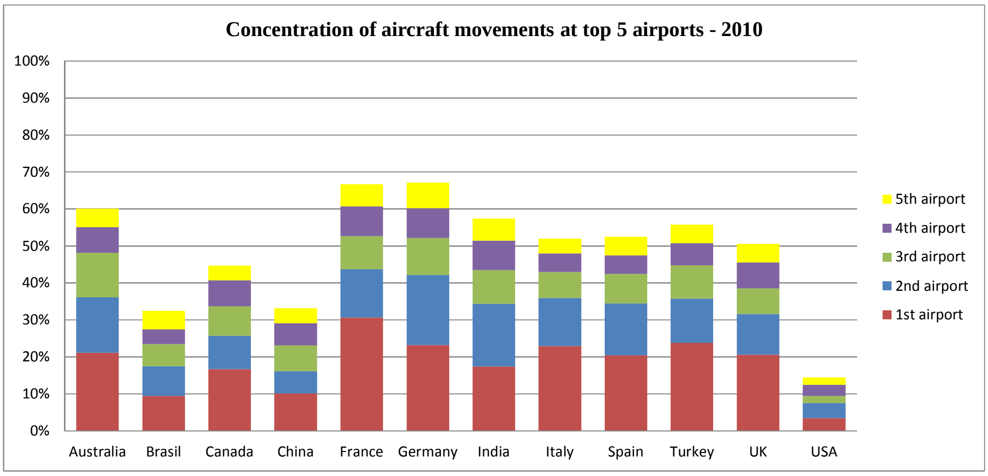


Fig. 64: Concentration Index

Tab. 125 and fig. 62 and 63 show that at growing market, the trend is of a sharp reduction of the Gini index as traffic is entering second airports. At mature markets there is some exempla of concentration growth in USA and Spain explicable with the growth at Madrid or with the fact that traffic decreases faster at secondary airports than at bigger airports (as for Atlanta). In other countries with decreasing Gini index – that is market widening – the explanation lies in the fact that secondary airports are gaining traffic shares faster than the major hub or that are losing traffic at a slower pace, thus the market share in % terms grows.

From fig. 64 it is possible to distinguish the bigger markets (China, USA and Brazil) as the total share handled by top 5 airports is lower; on the other hand, Australia, India and Turkey have still centralized airport systems (both for geographical and political reasons) then top 5 airports handle approximately the 80% of the passengers. With regard to aircraft movements, the highest value of top5 airports' share is traceable at countries whose major airport is (due to either political or economic reasons) the centre of the network.

Finally, the games theory has proven to be a valid support to the study of air traffic market, even by the use of simple Prisoner's dilemma-like games. Unfortunately, scientific literature on the matter is not so vast.

As for Italy, some innovations are needed in order to free the system:

- follow the trend of aggregation of airports managing companies through the mutual purchasing, the creation of actual airport systems, partnership projects
- the passage by the government of a national plan on airports in order to define a national strategy of investment
- a better linkage is needed for our national airport system, for example it would have been a good idea the installation of high speed rail's stops at major airports.