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**Impact of Air Transport Liberalization and the role of framing Economic
Mechanism in Airport Regulation and Competition –
Modern Approach towards Regulating Public Utility Industry**

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Abstract

World-wide, air transport demand is growing volatility; accordingly, airports are expanding their capacities to meet the growing passengers demand. During the last two decades, air transport infrastructure (Airport) industry is transforming massively in many countries and playing a magnificent role in the global economy as well in the regional economy. Today, more than 120 airports world-wide are in the hands of private airport management. This is due to liberalization of air transport and framing up of “Open Skies” policies. In the recent scenario, Airport and Air transport diverse confronts to policy makers and regulators. The differences are rose from the cost and market structures through which facilities and services are provided for each sub sectors. “De-regulation” and “Open skies” policies have led to expansion of market through competition and accordingly framing of *regulation for residual regulatory requirements with reference to Price, Quality, pollution and safety standards from private monopolies is a must in the demand driven economy*. The airport industry is undergoing a sweeping transformation in many developed and developing countries from public utility industry to commercial oriented by inducting private sector. In turn, the industry has been subject to an array of economic and structural reforms designed to create competition. These changes have made new regulatory requirements in day to day function of airports to protect consumers’ interest.

Key Words – Public Utility, Liberalization, Economic Mechanism, Airport Pricing and Airport Quality Standard

INTRODUCTION

Public Utility industries (Telecommunication, Electricity, Water, Gas and Transport (Port, Airports, Roads and Railways) endowed with significant structure wedge for nation's growth and development. During the last two decades, we have observed a major wave of utility reforms was gaining a high altitude in both developed and developing economies, encircling privatization, liberalization and new move towards regulation. UK was the first country in the world, who was pioneer in privatizing public utility industry during 1980's under the Thatcher's Government. Airport infrastructure is considered as one of the public utility industry and this was privatized in UK in 1987; later on other countries were processing to adopt this model of airport privatization. Today, globally, there are 120 airports under the management of private sector. It is expected that another 100-120 airports would fall in this category by 2010-2015. Many studies demonstrate that private sector involvement in airport infrastructure would evolve drastically in the years to come. ICAO, IATA, ACI world bodies for civil aviation started enlightening the member countries about the "Private Sector Participation" in civil aviation industry. In order to curb the abuse of market power by private sector in the coming competitive edge of airport industry, certain regulation is required through inducing economic mechanism in airport infrastructure industry to safeguard the consumers as well as shareholders interests. There are currently divergent trends in the regulation of airport industry globally. Traditionally, airports have been regulated by the government based on cost and given the basic objectives of economic welfare and efficiency, but today in global competitive boundary, airport industry is rejuvenated and reengineered for business and commercial transaction. Therefore, the paper argues that the old system is inefficient and resulted in misallocation of resources. Regulation should be reformed by capping prices and quality standards through stringent measures. An independent regulatory authority should be established to oversee certain common standards or norms in pricing structure, quality standards and safety/ security measures in air side and land side management of airport infrastructure. Further, the regulatory authority should be combined with reforms to intensify competition in slot allocation, privatization with cross ownership controls and open skies management.

The paper objective is to focus a broad outlook on regulatory reforms in airport infrastructure industry prevailing in developed and developing economies within the institutional arrangements. Accordingly, this paper is structured in seven parts –

Part-A Air Transport Liberalization and their Impact on Economic Development

Part-B Demand for Air Travel and its Economic Importance

Part-C Overview of Airport Infrastructure industry under public utility concept

Part-D Era of Airport Privatization

Part-E Economic Mechanism in Regulating Airport industry

Part-F Conclusion

A) Air Transport Liberalization / Globalization and their Impact on Economic Development

Air transportation is basically an international transport, which are regulated around the globe. It further asserts that no scheduled international / domestic air services operated without the permission of nation's civil aviation authority. International air services establishes through bilateral agreement between states or nation's. At present, there are 186 member countries of International Civil Aviation Organization (ICAO), an international organization, signed over 3000 bilateral lateral agreements worldwide. The rapid deregulation of the US air transport market from 1977 gave impetus for international reforms for both cargo and passenger's air services. Considerable progress has been made since that time in liberalizing international air transport. Some of the changes have come through renegotiations of bilateral agreements to remove many barriers to competition. In recent years many of the world's long standing and restrictive bilateral agreements have been replaced by more liberal open skies agreements. This liberalization has been successful because it produced public benefits, which are not possible under restrictive regulations. Liberalization provides airlines/ airports with the opportunities and incentives to become more efficient. Further it helped to provide airlines/ airports with new business opportunities in strengthening the existing operations. This freedom should compete and grow in the heart of every aviation agreement worldwide. The "Open Skies" Policy of US has become effective and reflected a new approach to international markets. From the 1990s it allowed the US and many other trading country partners to sign a liberal model bilateral accord, which has led to a common framework of agreements. The US "Open Skies" Policy is a conspicuous example of bilateral negotiations. There are two recent examples of such liberalization has taken place in air transport services in the major two regions, viz. European and Asia Pacific. European region air transport market represents a major achievement in creating a liberal regional market for air services. Asia Pacific region is the recent herald of free trade areas in air services, which was concluded a new multilateral agreement with Asia Pacific Economic Cooperation (APEC) countries in November'2000. Western Hemisphere nations have also pledged to create the Free Trade of the Americas (FTAA) by 2005. Many national governments are actively seeking more open markets for their carriers. OECD has become the active advocates of air transport liberalization.

Air transportation is a direct donor to a vibrant economy and leading as a trade catalyst around the planet. There is growing international momentum for greater liberalization of air services; strategically in a new global context. The globalization and integration / regionalization of international economies and fundamental changes in the airline industry are challenging the traditional approach to regulate. International global alliances continue to grow, expand and integrate functions. For example, The Star Alliance now consists of 15 airlines serving over 130 countries worldwide, with a 25 per cent share of global air revenues. Secondly, the increasing consolidation of the airline industry including the American Airlines/ TWA (2001), Air France/KLM (2004) and Japan Air System (JAS)/ Japan Airlines (2004) for the mergers. Thirdly, increasing demands for further liberalization by airports, foreign cargo/ courier companies, industry observers, international aviation organizations, trade and tourism sectors, media commentators and academics. Fourthly, United States (US) – European Union (EU) negotiations on an expanded air agreement for integrated regional aviation areas. These are the

recent improvements and developments in today's air transport industry scenario. Therefore, in recent aviation economic state of affairs many influential forces are changing the competitive dynamic of aviation industry and resulting in expansion of trade and regional economic amalgamation to create incredible demand for aviation trade services. Civil Aviation industry is helping to drive the demand by making it possible to accomplish exchanges across globe. Apart from these changes, civil aviation sector played a most significant and facilitating role in liberalization and globalization to achieve consolidation in the economies of scope and scale. Aviation industry has brought consolidation through creating and increasing the efficiency, technological innovation and to meet consumer's needs for low cost and dependable travel. The regime of governing air transport industry has begun to adapt the new imperatives by changing its framework from primarily national perspective toward a more global perspective and formed an interconnected world economy with well progressed manner both quantitatively and qualitatively. From these, it not only increased the international flows, but technology has eroded borden, corporations have become multinationals, production is coordinated across national boundaries and consequently governments have increasingly integrated the economies globally. Liberalization and Globalization have played a radical role in the development of air transport industry since 1990's and formed various new structural and economic reforms in airlines, air traffic control and airport developments worldwide.

B) Demand for Air Travel and its Economic Importance:

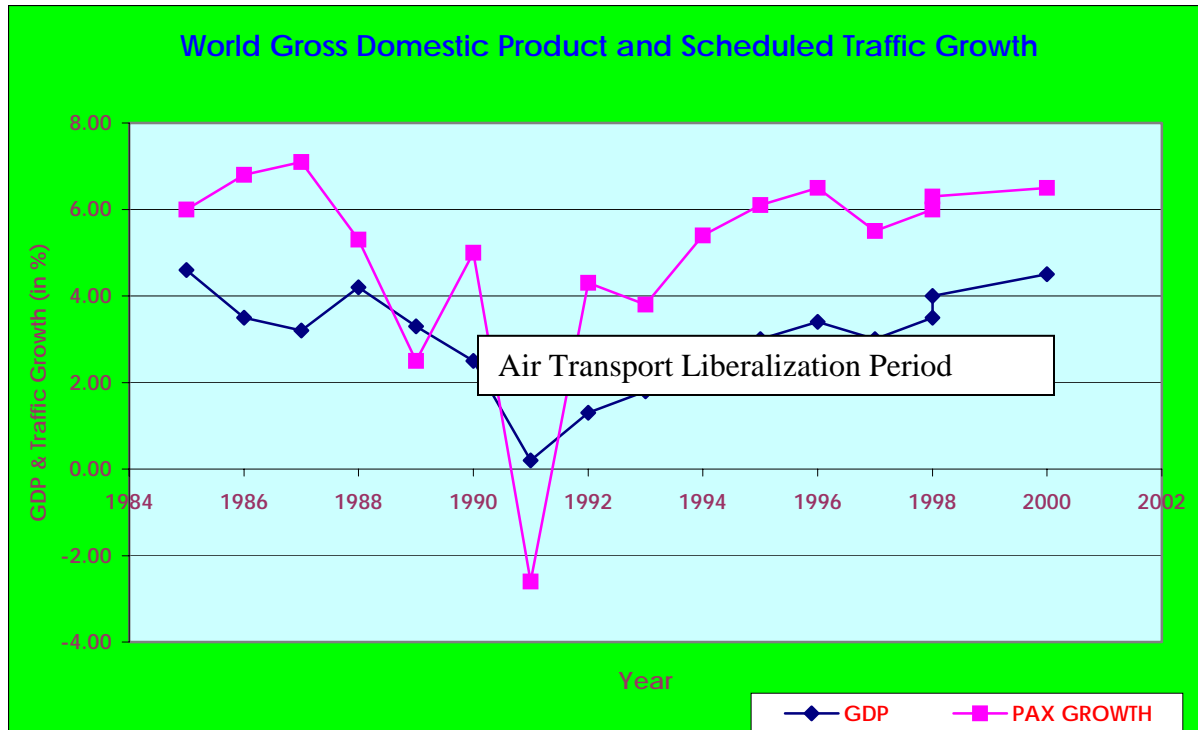
Air transport sector has experienced rapid expansion as the world economy has growing and the technology of air transport has developed to its present state. The impact has been a steady decline in costs and fares, which further stimulated traffic growth. The output of an industry has increased by two times higher than the GDP. As a result, growth in world air traffic have been much higher than world economic growth, economic theory and analytical studies indicates there's a high correlation between these two. Some of the major factors findings in the air traffic growth study are –

- Improvements in service offerings as routes, frequencies and infrastructure are added, stimulation from reductions in airfares as cost decline and increasing trade and the globalization of business (Boeing 2003)
- Population and income distribution (Vedantham and Oppenheimer, 1998)
- Travel behaviour, including travel time budgets and travel costs (Zahavi, 1981; Schafer and Victor, 1997)
- Changes in technology and regulatory environment have also made great effects on the growth of air travel demand.

The available evidence demonstrates a close relationship between economic development and air transport activity. Further there are two key elements which influence air transport growth, namely GDP and real price (fares). Over the past four decades there appears to have been a change in the balance of importance between GDP and real price factors. During 1960-1990 some 80% of the traffic growth was explained by GDP growth, with 20% due to price reduction. In 1990's this appears to be nearer 60% and 40% respectively. After 1990 price reduction has become more important, since then average world GDP growth rates have started softened. The Air transport activity can be further demonstrated by comparing per capita GDP

with per capita demand for air travel. The per capita demand for air travel is increasing due to increase in the per capita income, which in turn it increases the personal disposable income on air travel through low frill airlines operation in the air transport market, therefore people are substituting rail / road mode to air mode. Air traffic is roughly growing two times of GDP growth in developed economies and 1.5 times of GDP growth in developing economies. An increase in aviation activity provides a useful indicator to identify the national economy is flourishing or not. We can see the close relationship between GDP growth and air traffic growth from 1985 to 2000 during post liberalization in Figure – 1

Figure –1



(Source: International Monetary Fund and International Civil Aviation Organization)

Economic Importance

Growth in air transport drives economic progress and in turn benefits from it. Air transportation acts as an important catalyst for economic growth and this has been demonstrated by the effects of the 1995 US – Canada “Open Skies” agreement. From above the analysis of global economic performance, the world economic growth rate touched 4.0%, which impacted aviation sector to grow 6.5% during the same period and economic prosperity was also achieved to benefit the community as a whole. Let us pinpoint the economic benefits of air transportation to the global economy one by one under the following.

- The World Bank estimated that the World Gross Domestic Product (GDP) in 2001 was more than \$ 31 trillion US dollars, of which \$1.4 trillion US dollars or 5.0 percent of that World GDP is attributed through aviation’s impact on the global economy.

- ❑ The total economic impact of aviation on gross world output amounted to US \$ 1400 billion, which comprised US \$ 350 billion in direct impact, US \$ 400 billion in indirect impact and US \$ 650 billion in induced impact in 2001.
- ❑ Aviation Industry generated 28 million jobs directly and indirectly worldwide.
- ❑ Over 60 million tonnes of freight were transported by air during the same period, which represented approximately 40 percent of the world's manufactured exports.
- ❑ An annual turnover of US \$ 307 billion was generated by airlines in 1998, a figure higher than the Gross National Product (GNP) of many national economies.
- ❑ The world airlines have a total fleet of 18,000 aircraft operating over a route of 15,000 million kilometers and serving nearly 10,000 airports worldwide.
- ❑ Air Transport Action Group (ATAG) projected; aviation economic impact could exceed US \$ 1800 billion and generate 31 million employment opportunities by 2010¹.
- ❑ Air transport is at the heart of the travel and tourism industry, now the world's largest industry.
- ❑ In 1999, travel and tourism supported approximately 192 million jobs, or 1 out of every 12 workers in the world. According to figures compiled by the World Travel and Tourism Council (WTTC) for the year 1999 had around 625 million customers generating an annual gross output of US \$ 3550 billion, about 12% of the world's total GDP². By 2010, the level of tourism employment is projected to rise to over 250 million jobs with an expected annual gross output of around US \$ 6800 billion.³

By seeing the demand for air travel and its economic importance, we derive a conclusion that aviation industry is having a great impact on national, regional, and global level. In order to sustain this impact, aviation infrastructure (Airport) should be sound enough to tackle the air traffic demand in building and expanding the terminal infrastructure for passengers and cargo. Therefore, the government authorities should take utmost attention in developing aviation infrastructure (Airport) to support the growth of an economy.

C) Overview of Airport Infrastructure Industry under Public Utility Concept:

Globalization of the economy relies progressively more on air transport with airports performing as the main technical support. Airport is acting as a “Multi-Modal Business Centre” in the growing economies, especially in developed and developing economies. Today most of the developing economies are considering “*Airport as a powerful engine of Regional and National economic development*”. It is recognized as major centre for Business, Commercial and Industrial activity, which can derive the Economies of Entire Regions. Further, it also acts as a hub for future growth of urbanization with integrated transport and information technology to stimulate trade and tourism growth in the region. The most important economic impact is generating employment opportunities to thousands of people directly and indirectly in many of the developing economies. Airport is transforming from non-profit government owned entities to global commercial enterprises and become more dynamic places, since the management model transformed from non-profit to money-making arena. Today more than

¹ Air Transport Action Group (ATAG) Economic Report '2001

² World Travel and Tourism Council Report' 2000

³ World Tourism Organization Report'2001

10,000 airports are providing air traffic services to 3.2 billion passengers and more than 60.0 million tonnes of cargo per annum globally.

Airport under Public Utility Concept:

Airport industry provides services to the airlines, passengers, traders (Exporters & Importers), Concessionaires (Retail- Outlets, Restaurants, Snack bar counters, TRA Stalls etc...) and Visitors. Therefore airport services come under the public utility concept. It is an essential services provider to the travelling public. To define public utility as “ the test for a public utility is whether it has held itself out as ready, able and willing to serve the public. The term implies a public use of an article, product or service carrying with it the duty of the producer or manufacturer, or one attempting to furnish the service to the public and treat all persons alike without discrimination”. The utility concept further enters in the airport slot allocations. Here the slots for various airlines should be allocated indiscriminately without any prejudices. This is the recent issues in the airport utility concept. Since, airports worldwide are shifting to private sector management; hence airport service utilities should be properly regulated in order to satisfy the customers as well as the shareholders.

D) Era of Airport Privatization:

Airports are conventionally owned by governments, national or local governments. Today, airport Privatization is outlined in the national air transport policies of many countries. Starting with the privatization of three airports in the London (Heathrow, Gatwick and Stansted) and four other airports in the UK to BAA Plc in 1987 under the Ms Thatcher Government, soon after several airports around the globe have already been or in the course of being privatized. Privatization may take in different form from minor divestures of airport companies by public shareholders (Example Hamburg Airport, Malaysia Airports Behard) to a complete sale off of public airports to private investors (Example Australia and BAA). The worldwide trend towards airport privatization presents a thought-provoking and vivacious opportunity for the travelling public, governments, operators and investors. Several Latin American airports are already in the private hands. Major airports in Argentina, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay and Venezuela are already listed for privatization over the next two years. Smaller airports in Central America and the Caribbean are also in the line of privatization. In Europe, significant numbers of airports have been privatized and opportunities are imminent in Germany, Portugal and elsewhere. Governments in Southeast Asia, Africa, and South Asia are also developing airport privatization plans.

The one of the key purpose of airport privatization is capital scarcity. Since airport industry is capital based industry and it requires massive capital to maintain and facilitate. Expenditure on airport infrastructure leap dramatically since 1994 and expected to expand further as a result of considerable influx of private money induced in aviation sector to overcome the scarce capacity. The total investment on airport development projects globally estimated to be around US \$ 425 billion (Jane’s Report, 2000). This vast majority of high investment is a reflection of massive air traffic growth, which created a scarce capacity holding, and this has made new building programmes worldwide. This high level of investment is being caused by above average to / from and within the Asia Pacific region. The region as a whole could account

35 per cent of the total projected investment. Europe is baffling against environmental issues, which are the main constraints for growth in the aviation infrastructure. Russian states are struggling to reverse sharply falling traffic trends and relying principally on loans and gifts from donor agencies merely to keep their infrastructure from further deterioration. African region are also continues to struggle to keep its infrastructural operational. The growth of aviation sector in the middle-east region is more affluent and accounts 10 per cent of the world traffic, which unlikely to change much in the coming years.

Table -1

**Global Estimated Investment in Airport Expansion & Improvement
(US \$ in Billion)**

| Regions | Investment | Percentage |
|-------------------------------|-------------------|-------------------|
| Africa | 005.0 | 01.2 |
| Asia-Pacific | 150.0 | 35.0 |
| Europe | 080.0 | 18.8 |
| Latin America & the Caribbean | 075.0 | 17.6 |
| Middle-East | 010.0 | 02.4 |
| North America | 100.0 | 23.5 |
| Total | 425.0 | 100.0 |

(Source – Jane’s Information group, May 1999 Edition)

Table-1 reveals that the total airport investment for expansion and improvement will add a cost of US \$ 425 billion. Asia Pacific region is at the top of investing in airport expansion and improvement with a total cost of US \$ 150 billion accounting 35.3 per cent of the total world airport expansion / improvement investments up to 2010. The reason for more outlay at this region because the air travels at this region is growing dramatically at the rate of 7.5 per cent annum, which is more than the world average growth of 4.5 per cent in the air traffic. North America and Latin America both accounts 41 per cent in airport expansion and improvements investment costs, which is totaling to US \$ 175 billion. America’s major airports contribute 40 per cent of the world air traffic and it predicts that the air travel will soar at an average growth rate of 4 per cent per annum. To meet the terminal scarce capacity holding of airport infrastructure the authorities estimated and allocated the investments to meet the air traffic demand through terminal expansion and improvements worldwide. European region is also expanding and improving the airport infrastructure to meet the future demand at a cost of US \$ 80 billion that is 18.8 per cent from 1999 to 2010 period. The remaining regions Africa, Russia and Middle East are accounted only marginal investment in airport expansion and improvement accounting US \$ 5 billion each and US \$ 10 billion which in term of per cent 1.2 (Africa & Russia) and 2.4 per cent during the period of 1999 to 2010.

Airports are usually regarded as uncontestable monopolies by having a captive market; which is typically accompanied by some form of price regulation in order to avoid from abusing market power. The regulation is premeditated in number of forms ranging from strict

rate of return to price cap regulation (with various sliding scale mechanisms in between)⁴. Against this mixture, the question arises what determines the “best” device for the institutional setting within which privatized airport operates. Here the economic mechanism operates in the airport industry in order to overcome the abuse of market power from private operators. The paper is highlighting the price, safety/security and quality regulation of airports (Private Airports), are analyzed under the economic mechanism principle.

E) Economic Mechanism in Regulating Airport Industry:

The basic objective of the economic theory is to satisfy the choice with scarce resources. Economic mechanism works under this principle to achieve the wants and needs with efficient production and distribution in the market. Therefore market plays a key role in coordinating the economic mechanism through three principles Price, Profit and Distribution. When we talk about airport economics, market network is the focal function in determining the demand and supply through their resources to satisfy human want. Based on this principle, airport regulation can be achieved with proper institutional settings. Modernizing the frame work for utility regulation would result a fair deal to consumers. The strategic objective of regulatory framework leads to ensure fairness and efficiency. The economic mechanism in regulating airport industry would focus a paramount importance on three aspects, viz.-

- To secure a fair deal to airport users in providing essential services.
- To create a climate in which the industry can innovate and improve efficiency and become increasingly competitive, where appropriate by ensuring regulation is transparent and accountable.
- To create regulatory framework which is heading towards next decade, in a world where competition is growing convergence issues are increasingly arising and multi-utility companies are emerging in the aviation industry. Overall these developments offer new opportunities and benefits to consumers and also present new challenges for regulation in safeguarding the consumer’s interest.

The paper throws light on the role of economic mechanism in airport regulation and competition through various analyses namely –

- Economic Features of Airport Infrastructure
- Central Economic Problem
- Interaction of Supply and Demand in Airport Production Unit (Slot Allocation)
- Is Regulation and Competition important in the Airport Industry?
- Global Challenge in Aviation Industry Environment
- Sources of Market
- Economic Regulation – Price Cap , Rate of Return

⁴ New Athens Airport serve as an example for the application of rate of return regulation, the BAA Airports in the UK are regulated by price cap mechanism and the air side charges of Vienna Airport are subject to sliding scale mechanism.

Economic features of Airport Infrastructure

Airports are complex and multi-product enterprises. Airport comprises of different processing production units, namely one or more runways, a set of aircraft parking bays (Aprons) and taxiways, a terminal building for passengers and freighter and an air traffic control. Each unit develops specific activities and combines to allow the interchange between air and land transport modes. The important feature of airport production is services to the airport consumers. There are five important consumers who use the airport infrastructure, namely – Airlines, Passengers, Traders (Exporters & Importers), Concessionaires and Visitors. Airport activities are classified into three distinct groups – Operational services and facilities, Handling services and Commercial services. These activities are unique and require specialization of labour to produce the world class services to the user communities. The ownership pattern of airport industry traditionally it was and is operated by central government. Airport infrastructure was commonly believed to be a public utility. Today the scenario is changed from public utility to a business centre. This is true in the global economy, airport act as an important factor in determining economic growth and development of the region. However, in the present globalize era, airports are bubbling with public budget constraints and efficiency concerns, a reconsideration of this type of model necessitate the airport industry to go in for private sector involvements in airports in order to meet the growing demand in the air traffic on one side and providing quality services to the consumers for their prices through efficient specialized skill of manpower resources.

Central Economic Problem

The central airport economic problem is how to deal with airport scarce resources. In airport infrastructure industry, the decision on what and type of service should be produced, how it should be produced, who should produce it, and for whom it should be produced are all parts of this problem. Airport infrastructure industry is currently playing an important role in the country's infrastructure development. This shows evidence that airport has a direct impact on country's economic growth and development. The basic output of an airport industry is service to the traveling public. Airport is a monopoly market, which has no direct competition between other airports. The nature of imperfect competition market in the supply of airport services depends on the access of competing sites rather than of monopoly. Therefore, in the airport industry there is a trade-off between imperfect (Monopolistic) competition and economic regulation. Nevertheless, there are opportunities for substitutes between airports and other modes of transportation and international air service agreements, which can sometime restrict the ability of airports to exploit their market power. (For instance, Railways & Road Transport modes). Apart from these constrain, the other factors like feature of market, historical, geographical conditions has also play as a proxy in judging the market power due to the price competition in a spatial market.

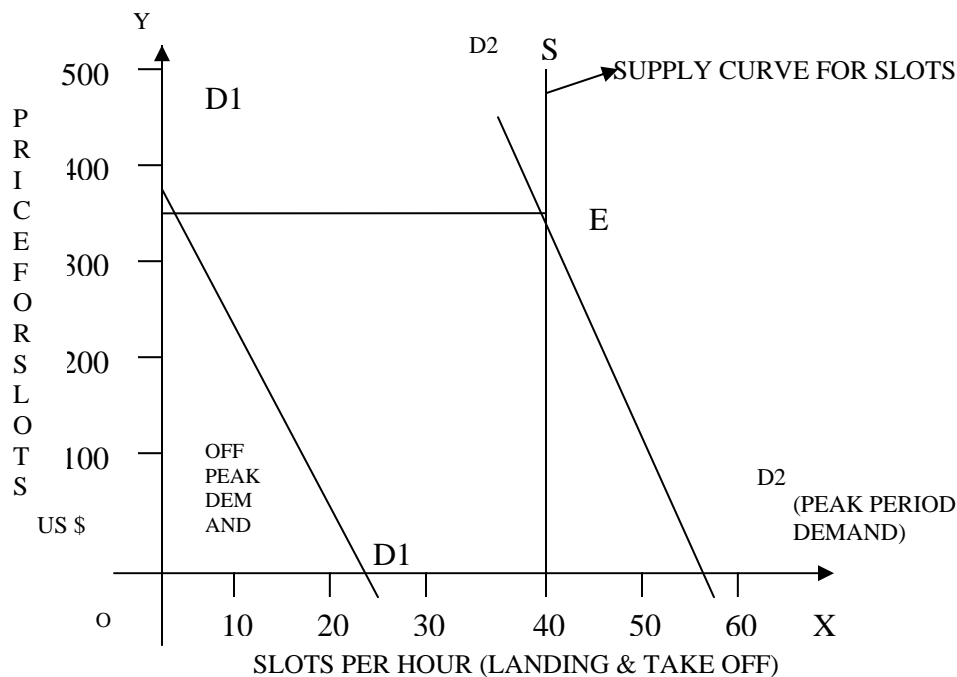
Interaction of Supply and Demand in Airport Business

There are two economic factors in determining airport business that is supply and demand factors. Supply factor includes government policy, bilateral trade agreement (Air services for international destination), airline seating capacity (Smaller or Larger aircraft), airport

infrastructure – runways, terminal capacity for passengers and freight or in general airlines operation. On the other hand demand for air transport depends upon the GNP (Gross National Product), PCI (Per-Capita Income), Rise in Personal Disposable income, Price of aviation fuel etc. Let us analyze the interaction of supply and demand in airport industry, with special reference to airport congestion through market vs. non-market rationing.

By looking at the two markets that have to deal with surpluses, we turn to one that faces a shortage. This is the market for landing rights at congested airports. In the recent years airport congestion is impacting delay in airlines movement and also creating congestion in the terminal building. Therefore airport authorities should give importance to the development of runways and parking bays in the airside movement. To overcome this problem, peak hour pricing is laid out by the western airports and major developed large-scale airports based on the supply and demand. Suppose an airport has 40 take-off and landing “Slots” per hour. The supply curve for slots in a given hour is vertical, because at least in the short-run, there is no safe way to let more planes land and take-off. In the long run, runway expansion or improved air traffic control could increase the number of slots. The number of slots that airlines would like to use that is the number of take-off and landings they would like to schedule per hour depends both on the time of day and costs of slots. Now we can see the market for non-market rationing through graphical representation.

Figure – 2



D1 is the demand curve for off peak period

D2 is the demand curve for peak period

S is the supply curve for slots (Landing & Take-off) remains fixed

E is the equilibrium where supply (S) and demand (D2) equals

In the above diagram, Y axis represents price of slots and X axis represents slots per hour in airport. Vertical line of Y axis represents supply curve for slots, which is constant due to the limitation of landing and take-off. Demand curve D1 shows the demand at off-peak hour and there is not enough demand to raise the price of slots above zero, since it is off peak time and there's no demand for a particular period. On the other hand, demand curve D2 shows demand at peak period and the price of slots would be bid up until the quantity demanded was equal to supply. Under this situation, people who wanted to fly at peak hours would have to pay more in order to cover the airlines cost of buying a slot. In this case additional surcharge is added in the traveling passengers according to the price of slots during the peak hours. Assume if it is US \$ 400; the additional charge for each passenger would be \$ 4 for a ticket on a plane with 100 seats as better than waiting in line on the runway or flying at a less convenient time. People who didn't care as much about their departure time can take advantage of lower fares for off-peak hours.

Is Regulation and Competition important in the airport industry?

The important objective for regulating utility industries, such as airport is to curb market power. In the present scenario of dynamic airport industry, competition has started playing a main role in the developed economies airport infrastructure industry and broken the monopoly market after the first airport privatization took of in 1987 in Britain. Thereafter many regions world wide started slowly following the model of airport privatization. Today, airport industry is in the line of competition in the western economies. Competition is very essential in the modern globalize economy to compete with world class standards. Moreover, it is has been accepted as being good for the economy because it encourages to be cost-efficient, drives to fall in prices and leads to mounting output. Therefore, it is a paradoxical for single firms with no direct competitors, which can results in even lowering the unit costs than productions by the many. This can apply only when the economies of scale results in falling average cost of production over the entire range of output by the single firm, then it is said not only potentially cost efficient, but it is the sustainable industry structure.

When the single firm doesn't face any direct competition, then it has an incentive to restrict output, mount in prices and attain a level of profit in glut to provide a satisfactory return on capital. To trounce this situation in any utility industry, regulation is immense of important in the monopolistic competition market industry. The main goal of economic regulation is to prevent this happenings (restrict output, rise in prices, excess profit) and try to encourage the "natural monopolist" to be cost efficient and to increase output to a level that maximizes economic welfare. The best form of economic regulation is try to achieve by providing the monopoly firm with incentives and as (Train, 1991) reminded us, the central issue of regulatory economics is the design of such incentive mechanism.

The regulator should have perfect knowledge about the firm, to produce a particular level of output from a particular set of inputs and sell this output at a particular price. If the regulator doesn't have complete information, and has a partial insight into the firms with less information about character of the market would lead to distortion and unnecessary costs, example for this is "PRICE CAP" form of regulation (UK Airports) helps to encourage the

degrading of products or service quality (Rovizzi & Thomson, 1992)⁵. This, in turn can guide to further regulatory intervention, to complex regulation and to increased regulatory risk that has the effect of increasing the cost of capital⁶. From this above experiences, we can get at the end of the day; there is a trade-off between living with imperfect regulation or with imperfect markets. Economic Regulation is not alone for imperfect market but for imperfect economic mechanism. Moreover, once economic regulation has been introduced in a particular sector (Airport), this has to be re-examined from time to time in the light of changing conditions⁷.

Global Change in Aviation Industry Environment

International scheduled airlines services operating on international routes are largely controlled through a system of bilateral air service agreements established after Chicago Convention of 1944, that is Bermuda Agreement between the UK and the US⁸. This bilateral agreement impacted in stifling route innovation, ban on price competition and encouraged in sharing of markets which resulted in pooling of revenues. The bilateral agreements mean that services cannot be competed away from gateway airports specified in the agreements. This has encouraged a content attitude by many airport managers. As Barrett (2000) has commented, the world of non-competing airlines has mirrored by a world of non-competing airports. The reformation of aviation world took off in 1987 and brought two factors to change in the air transport scenario. The most important factors are –

- Deregulation
- Airport Commercialization

Deregulation of Airline Industry

Deregulation was initiated in the US domestic market and brought a reformation in the airline industry under the leadership of Alfred Khan in 1987. He was called as a father of airline deregulation. This has opened up the market potential and actual competition between airlines and between airline alliances (Button, 1991). Competition between airline alliances focused on connecting services through hub airports and resulted de-facto to increase competition between such airports. In parallel with this, the other airports have also become a part of the competitive strategy of airlines, particularly since the advent of low-cost carrier competition. As a result of airline competition, especially economy fares have fallen and as

⁵ An unregulated monopolist might find it profitable either to oversupply or to under-supply quality, depending upon demand conditions. Once the firm is subject to a binding price-cap, it will always be profitable to set quality below the efficient level.

⁶ UK telecoms regulator has noted recently: "Setting a network charge cap is Extremely difficult in the current climate and the risk of serious error is significant". OFTEL Price Control Review, October, 2000.

⁷ The legislation regulating Australian airports explicitly allows for this.

⁸ A review of Bermuda Agreement found in Mackenzie (1991).

Barrett (2000) has pointed out, this has tended to increase the importance of airport costs in the average fare⁹.

Airport Commercialization

Commercialization of airports industry was initiated with the advent of first factor i.e., deregulation of airlines. This has given birth to airport industry to think in terms of commercialization in airports. Traditionally, airports were operated as a public service organization under the direct control of governmental administration. But today, thanks to the globalization policy, which has given a new shape and restructured airport infrastructure industry as public enterprises. Further, airports started sharing private capital (Private investments) in the airport development. This in turn, has led to much more competitive outlook in airport management to attract the now competing airlines.

Sources of Market Power

The sources of market power in airport business can be seen through two sources, namely –

1. Economies of scale influencing airport market power
2. Agglomeration Economies in airport business

1. Economies of scale – Influencing Airport Market Power

The conventional theory views airport industry as an example of natural monopoly industry not capable of sustaining competition and thus requires regulation. This vision arises in assuming that if airport capacity is increased then long run average costs fall¹⁰. However, the evidence for this is ambiguous. Kunz (1999) has pointed out that several terminal operators at a single airport indicates there is no significant scale economies at the same time as Doganis (1992) suggests that the airports experience economies of scale, it is probably only for small / medium sized airports. As for large scale airports, the average cost of expanding capacity is increasing, rather than decreasing, as one can normally expect to find in a natural monopoly industry¹¹. This is because of high expensive in designing, building and operating facilities which co-ordinate (spatially and functionally) activities across an expanding area¹². Airports are the best illustration for the theory of Law of Diminishing Returns, with the fixed factor land. The argument was made some time ago (Starkie & Thompson, 1985) but econometric evidence is now beginning to support this hypothesis. Pels (2000) found that a large number of European airports (Rome, Frankfurt, Munich, Zurich) were all operating under decreasing returns to scale,

⁹ Airline competition has had a greater impact on economy fares, particularly those carrying restrictions, on the other hand there is some evidence that low-cost carriers are beginning to eat into the business market because business travelers appear to be becoming more cost conscious. (see Mason, 2000)

¹⁰ This view is expressed, in the UK DTI's March 1998, Green Paper on Utility reform.

¹¹ There are significant economies of density and utilization because of lumpy investments, although the extent of the indivisibilities in the airport industry has probably been exaggerated.

¹² The complexity in traffic flow of passengers at multi-terminal airport (London Heathrow) is an example.

whilst others (Amsterdam, Brussels, Manchester, Paris Orly and Stockholm) has also showed partial corroboration under decreasing return to scale in which airport operates¹³.

If there are diseconomies of scale in the airport business and the incumbent airport is large and operating at near capacity, there should be no barriers to prevent competitive entry. In this circumstances, where there are decreasing return to scale, the entrant can enter at a lower level of average cost than the large incumbent compete effectively and eventually drive the incumbent from the market or to operate at a reduced scale. But if this were the case, then *ceteris paribus*, we would expect to see no large scale, congested airports, only airports of a moderate size operating close to their optimal scale of output. This is clearly not the situation and therefore, there must be barriers other than returns to scale that prevent entry difficult. One such barrier is gaining access to a factor-input is land, essential for the establishment of a new airport. As existing airports grow and become large scale, they attract complementary activities (like Petrol outlets, Hotels, Motels, Airfreight Export & Import distribution centres, Leisure industries etc.) and these in turn, attract resident workforce with its supporting urban infrastructure. This pushes up the opportunity cost of land in the vicinity of the existing airport and consequently, the costs of land assembly for new runways and terminals. It also means that there are increasing costs of noise, air pollution and congestion, which on the whole, are not borne by the incumbent airport business. Although, for these reasons, the cost of entry into the airport business is increasing overtime, innovation and developments in technology are helping to counteract this cost trend. From this analysis, external factors are the main causes in measuring airport economies of scale.

Agglomeration Economies in Airport Business

The second important source of market power in the airport business is the agglomeration economies associated with network externalities. Both airlines and passengers gain from a concentration of air services that feed traffic to and from each other. A flight from hub airport A to airport B can also carry passengers who have transferred from in-bound flights coming from airports C to Z. Airlines gain from concentrating services at a transfer point because it permits the use of larger and more economical aircraft (albeit over shorter and less economical average stage-lengths). Passengers gain from increased frequency and network scope and thus, from a greater range of choices (Trethaway & Oum, 1992), although this is offset to some extent by more indirect routings¹⁴. The significance of these agglomeration economies / network externalities is that they tie the individual airline to the hub airport and make it more difficult for rival airports to attract airlines and passenger through price competition. However, as we have noted, airline alliances do compete with each other over their respective hubs with the result that there is degree of competition between the hub airports. Finally we can note that in addition to the entrant airport having to sink costs on entry, this is true also for those airlines that

¹³ This has implication for the regulatory approach. It suggests, for example, if price in excess of average costs are not necessarily inappropriate, even in the absence of runway or terminal congestion. And it also suggests that basing regulated prices on normal or reasonable rates of return could also lead to inefficiently low prices (Starkie, 2000a). But the latter has been the usual practice in the case of the regulated British utilities; it perhaps indicates the distortions that regulation can introduce. In this instance, the effect could be to reduce incentives to expand capacity.

¹⁴ Studies in the US market have shown that on balance passengers have gained – Morrison & Winston (1986)

move their operating base. This factor also gives the incumbent airport an added advantage and thus increases its market power.

Opportunities for airport substitution

Airport market power is based on connecting services and this is explained by agglomeration economies associated with its network of air services, the more the network, the more dominant the airport. It is most dominant when it is acting as a major hub and many passenger are transferring between flights (either as on-line passengers or as interline passengers).¹⁵ However, even in this context of highly networked air services, an airport's ability to set prices is constrained. This is because of hub airports and their airlines compete with each other for long-haul transfer traffic. In Europe, London, Amsterdam, Paris and Frankfurt are the chief competing hubs and transfer traffic can account for a sizeable proportion of their total traffics. In Asia, Singapore and Thailand is the major competing hubs. The market power of a hub airport might also be limited if it is dominated by one airline and if there is the possibility that such an airline could de-camp all or part of its operations to a choice (proximate) site. This might be able to do without too serious impact on its traffic volumes¹⁶. Therefore, its protection lies in its size and significant collection. A change in strategy following a decision to place a less emphasis on low-yield transfer traffic, has led to a further reshuffling of routes between the two airports. But in this case, the two airports are under the same ownership and each is very congested, so the room for plan is very limited. Assume if Mumbai and Delhi were not in common ownership, and at least one of them has spare capacity, then major airlines might have a greater opportunity in substituting airports and consequently might have significant countervailing power.

Modernizing the framework for utility regulation would result a fair deal to consumers. The strategic objective of regulatory framework leads to ensure fairness and efficiency. The economic mechanism in regulating airport industry would concentrate a paramount importance on three aspects, viz-

1. Securing a fair deal to all consumers (Airport Users) in the provision of essential services.
2. To create a climate in which the industries can innovate and improve efficiency and become increasingly competitive, where appropriate by ensuring regulation is transparent and accountable.
3. To create a regulatory framework which is heading towards next decade, in a world where competition is growing, convergence issues are increasingly arising and multi-utility companies are emerging in the aviation industry. Overall these developments offer new benefits to consumers and also present new challenges for regulators in safeguarding the consumer's interest.

¹⁵ In 2000, approximately one-third of traffic at Changi Singapore was transfer traffic of which about one-half was interlining between carriers and half was on-line transfers between aircraft operated by the same carrier (SQ) -

¹⁶ Airports do discriminate in their charges between the transit passengers (Those who fly in and fly out on the same aircraft), domestic passengers and international passengers' flight.

Airport Regulation

The designing of the institutional setting for airport regulation analysis is based on The New Institutional Economics¹⁷. Following Goldberg (1976), the distribution of ownership rights to airports and the design of price regulation can be analyzed as a contract problem. He reveals that regulation may be viewed as a transaction costs saving device for controlling the behaviour of natural monopolies in cases where transaction-specific investments lead to uncontestability of monopoly markets while at the same time locks the sellers investments into that transaction (Williamson, 1976). Therefore, buyer and seller both should be safeguarded. Regulation is a governance structure to protect both the parties' reasonable interests. In the airport sector, airport authorities needs massive investments to invest in aprons, runways and terminals, which are all comes under the sunk to a high degree featured by long working life. Further, expenditure on expansion of major infrastructure facilities would count in the discrete steps. As a result of this, future economic fate of a regulated airport would be based on regulator decisions. On the other side, the social welfare effects of airport regulation depend on the willingness of airport authorities to invest in such facilities. Since airports are uncontestable, the regulator is tied within bilateral relationships with the airport authorities. Hence both sides need to be protected against opportunism by the respective partner.

Airport regulation means that the task of controlling the behaviour of the airport company is not performed by the users of that airport, but by the regulator, who act as a principal for the regulated airport and as an agent for the airport users. Asymmetric information and bonded rationality prevent perfect regulatory outcomes. The primary objective of government is to give priority in framing regulatory authority before privatization takes; this will give a clear master print on economic regulation of airports in revenue generation. For instance, UK's Civil Aviation Authority (CAA) framed a rule that all airports with more than £ 1 million turnover a year are subject to economic regulation which is limited to aeronautical activities. In practice, detailed economic regulation of aeronautical charges is effected only for the three London airports of the BAA Plc (Heathrow, Gatwick, and Stansted) and at Manchester. Additionally, the UK government has reserved the powers to impose condition on the private airport operators as is deemed necessary in order to comply with the international treaty obligations, such as Article 15 of the Chicago Convention and in matters of national security. For further reading please refer (Monopolies & Merger Commission, BAA Plc, A Report on the Economic Regulation of the London Airports Companies (Heathrow Airport Ltd, Gatwick Airport Ltd, Stansted Airport Ltd) Civil Aviation Authority, London, UK, 1996).

Airport Pricing Policy or Method for Fixing Price Regulation in Privatized Airports:

Airport economic regulation is overseen through fixing prices for airport services. Fixing the price for airport services are done through cost based principle. The form of price regulation varies from country to country, with cost based principle so that the airport is expected to achieve financial break even, including a fair rate of return on the capital invested in the airport. There are two types of fixing prices, namely

¹⁷ See Richter and Furubotn

- Rate of return
- Price Cap

Rate of Regulation: Rate of Return (ROR) Regulation may have adverse implications for airport behaviour, leading to inefficient capital investments and lack of managerial constrain to reduce costs and improve efficiency. Only few airports operate under this regulation globally (New Athens Airports).

Price Cap Regulation: Price cap regulation is designed to allow an airport to benefit from cost reduction by retaining an incentive for the airport to improve efficiency. The price cap regulation has been extensively adopted by countries, including the UK, Australia and Denmark and different public utility industries such as Electric Utilities, Railroads, Telecommunications, etc (CAA, 2001)

Framework for Assessing Airport Pricing Structure – Related Literature

Recently, many great economists, aviation economists, aviation experts have been rethinking the price regulation of airports. Various Studies on airport regulation done by aviation economists like Starkie and Yarrow (2000), Starkie (2001), Tretheway (2001), Gillen and Morrison (2001), Forsyth (1997, 2002), Kunz and Niemeier (2000).

- I. Beesley (1999) study reveals Heathrow Airport on price cap regulation is inappropriate.
- II. Tretheway (2001) points out that the Rate of Return (ROR) regulation leads to be complex, unresponsive and expensive to administer.
- III. Kunz and Niemeier (2000) argue the cost based ROR regulation used in Germany is inefficient and resulted in misallocation of resources.
- IV. Starkie (2001) disclosed that ex-ante regulation for airports might be unnecessary because the airports are unlikely to abuse monopoly power due to the existence of a complementarity's between the demand for aviation services and the demand for concession services.
- V. Oum, Zhang, Zhang (2003) “Study on Alternative Reforms of Economic Regulation and their Efficiency Implications for Airports” examined price cap regulation of airport charges may create distortions in airport capacity decisions, ROR regulation may result in over investment in capacity, owing to the Averch-Johnson effect, airports under the price cap regulation are prone to under investment in airport capacity.

Airport price regulation around the world is done on the single till method and until recently Australia has also used this method. Single Till pricing is based on the total costs of the whole airport, with no distinction between aeronautical and non-aeronautical services. An appropriate rate of return on all assets that are used for the provision of all services at the airports is determined. After the total costs are calculated, prices are then determined as a residual to meet a rate of return for the airport as a whole. Referring the UK CAA has authority to impose

airside and landing charge and has the power to impose price controls in order to prevent abuses, unfair discriminatory pricing and landing rights discrimination. In the areas of landing charges, the CAA has reserve powers and co-shares competition regulation responsibilities with the Office of Fair Trade (OFT).

The Monopolies and Mergers Commission (MMC) is required to investigate report and recommend on the level of and increase in airport charges that could be levied during a five year period. In the light of the MMC's recommendations, the CAA can modify the conditions imposing the price formulae. Price regulation takes in the form of PRICE CAP applied to revenue deriving from airport charges per passengers. CAA stipulates the acceptable level of change in the aeronautical charges in terms of a formula related to the changes in inflation as measured by the Retail Price Index (RPI). This is then known as the RPI – X formula. X is an efficiency factor which allows for the fact that there are economies of scale in airport operations. Therefore the cost of handling each passenger goes down as traffic increases. BAA enjoys a considerable degree of market power.

Price cap regulation according to the RPI-X formula has been a key element in the field of regulatory reform in Great Britain. This system encompasses a pricing structure subject to specified maximum fare increases, expressed in terms of percentage that cannot exceed the difference between the RPI and a given factor X. This index is preferred to an industry specific because it cannot be manipulated by the regulated firm. The time period for this index is 5 years, after which prices are revised. Regulators of fares through an RPI-X mechanism applied to generate revenue from airport charges implies that revenue per passenger should not exceed a given maximum value determined by the following equation:

$$M_t = (1 + (RPI_t - X_t) / 100) Y_{t-1} - K_t$$

Where M_t : is maximum allowable revenue per passenger for year t.

RPI_t = % age of change for the retail price index between years t and t-1

X_t = factor "X" in year t

Y_{t-1} = Revenue per passenger in the year t-1

$$Y_{t-1} = (1 + (RPI_{t-1} - X_{t-1}) / 100) Y_{t-2} + S_{t-1}$$

Where S_{t-1} is the allowable security cost per passenger in the year t-1. It corresponds to 95.0% of the annual equivalent.

K_t = correction factor per passenger applied in year t (whether + ve or – ve value). It can be obtained through the formula

$$K_t = (1 + I / 100)^2 (T_{t-2} - (Q_{t-2} \times M_{t-2}) / Q_{t-2}$$

Where T_{t-2} = Total Revenue coming from airport charges in year t-2

Q_{t-2} = Passenger Volume in year t-2

M_{t-2} = Maximum allowable Revenue per passenger for year t-2

$I = \begin{cases} \text{If } K_t > 0 \Rightarrow I = SR + 3 \% \\ \text{If } K_t < 0 \Rightarrow I = SR \end{cases}$

SR = Specified Rate is the average of discounted rate for public funds expressed as a percentage. This value is published by the Central Bank of the country during 12 months periods, starting at the beginning of period say financial year (April of year t-2 till the end of March year t-1)

This pricing formula was formulated and used by BAA Plc for airport charges which were regulated by the CAA in UK. Later on, this formula was adopted and used by other airports worldwide to determine the airport charges, which opted for privatization.

Quality and Service Regulation in Airport Industry

An airport that faces a regulated price will try to reduce its costs in order to get a higher profit margin. Hence, elements related to quality of service must be closely supervised. In general, quality regulation is needed to overcome the problems of inadequate or incorrect information being available to airport users, both airlines and passengers. This problem is acute where services are provided on a monopoly basis. Regulators, however, face similar asymmetric information problems regarding product quality. In practice, regulators can undertake quality assessments at airports by either understanding quality surveys or by establishing standards and measuring performance. Quality surveys should be conducted on regular basis to assess the airport services and know the satisfaction level of airport customers. An alternative approach should be used for comparison purpose from similar airports to set minimum standards. This would help the airport industry in assessing the quality performance and create benchmark in the airport services. In considering the quality of services as a key part of the quinquennial reviews of airports are under the concerned regulatory authority. The reason for a formal review of quality of airport services arise because airlines are concerned with economic regulation of the form RPI – X, without any relationship between prices and performance standards, this might give airports the incentive to improve profits by lowering standards. Therefore, the quality and service of airports are to be viewed strictly in regulating the airport services to the private operators. The most important outlook on privatization strategy aims at-

- Airport Management to serve the needs of airlines and travellers
- Retail business to generate revenue and enhance the travel experience
- Property to capitalize on their assets and provide services to airport users

Part-F Conclusion

To conclude, Regulation is very important for the public utility goods and services, which are prevailing in the market. Regulator should take care of customer's satisfaction in terms of service quality and pricing system. Airport services is not an exceptional, today the airport services are compared with world class standards, hence, the authorities should take serious view on airport services, if airport is privatized. Today, most of the developed and developing economies airports are in the process of privatization. Hence, before privatization, government should think of creating new regulatory structure for economic mechanism in order to prevent abuse of monopoly power in the air transport market. Price Cap method or single till approach method should be adopted in the developing economies, since this approach enables the pricing policy structure with the combination of Aeronautical and Non-Aeronautical services and fixing the price of airport services. Developing countries should rule out the ROR method, since this may not be suitable for the economy like India, China and other developing countries.

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