Air Transport Infrastructure

The Roles of the Public and Private Sectors

Infrastructure Economics and Finance Network

The World Bank

Acknowledgement

This note was prepared by Ellis Juan and Doug Andrew, Infrastructure Economics and Finance department, with the assistance and support of Maryvonne Plessis-Fraissard, Charles E Schlumberger and colleagues, Transport and Urban Development department. Monika Kosior managed the editing and production.

Contents

Abstract

A well functioning air transport sector offers significant economic development benefits, particularly for landlocked, isolated, and low-population-density countries. Often, however, the sector has performance and fiscal risks that need to be carefully managed by governments. A contributor to development and poverty alleviation, the sector has the potential to be fully financially self-sustaining, and the government role can be focused primarily on safety and security regulation along with competition policy (and economic regulation, if any). There is substantial government involvement in existing air transport infrastructure (ATI), yet commercial approaches are available. There could be situations in transition economies, in post-conflict countries, and in relatively small markets in which there are problems in ATI provision. In these situations carefully targeted government intervention and World Bank Group (Bank) assistance could aid and facilitate the transition of ATI to an economically efficient, financially self-sustaining state.

This note describes for staff, clients, and other interested parties the Bank's policy toward supporting investment in ATI. It points out that the Bank can help countries develop their ATI by providing several types of financial products, as well as advice, and can therefore respond flexibly, supporting either state or private provision, according to the characteristics of the sector, the circumstances of the country, and the strategies and priorities of the government. This note sets forth principles and an analytical framework designed to help task managers decide which approach is appropriate in the circumstances and whether to support lending for public investment.

1 Introduction

Together with telecommunications, air transport represents the sectors that epitomize globalization in an economic as well as in a sociopolitical sense worldwide. Because of the combination of rapid technological change, falling real unit costs, industry consolidation, the low-cost carrier (LCC) business model, the existence of adequate pricing mechanisms, and consumer willingness to pay for safe, cost-effective services, air transport, compared with other infrastructure sectors such as roads, water, and sanitation, has the opportunity to develop commercially, with minimal fiscal requirements (indeed potentially a positive fiscal contribution from an expanded economy). Government attention could be focused almost entirely on safety, security and, increasingly, environmental issues.

With today's competitiveness standards it is difficult to conceive of a country or region that will be able to integrate into global and national markets without well-functioning communication and air transport systems. Without such systems and the best possible international linkages, national markets will be smaller and some markets may not exist. Because of the complementary nature of infrastructure services with the development of commercial services, it is likely that private investment will be less profitable and there will be less private investment.[1] Economies of scale and scope are forgone and economic development constrained. The interaction between efficient and effective ATI and domestic and regional economies can be significant.

Although there are numerous examples of over- or premature investment in ATI,[2] well-targeted, cost-effective, timely investment with strong linkages in the actual and likely potential downstream markets has significant benefits; for example, the development of Dubai airport, Emirates airline, and local tourism within a broadly "open skies" international aviation policy is striking, whereas elsewhere in the United Arab Emirates there are several significantly underused airports where demand is weak.[3]

The implication is that the development and implementation of the best possible air transport policies will be an important part of a successful economic development and poverty alleviation strategy. Improving the delivery of ATI services is important to economic growth and to the reduction of poverty. The efficiency and effectiveness of a country's air transport system, together with the rest of its transport network, are a crucial part of its investment climate. Improving these services encourages investment by business, which fosters growth and job creation (e.g., one of the factors contributing to the competitiveness of San Jose, Costa Rica, in the manufacturing of microchips for computer hardware was the

[1] Michael Spence, *Re-thinking Growth*, PREM Week Conference World Bank, April 19, 2005.
[2] Montreal's Mirabel airport being a well-known example.
[3] Ras Al Khaimah airport, for example.

existence of and easy access to modern and convenient airport facilities). In poorer countries, where maintaining the transport infrastructure, particularly roads, is a challenge, air transport services that use the physical infrastructure less "intensively" and commercial operators can deliver services to customers, a fully liberalized and commercially structured air transport sector may play a particularly important role.

Recent thinking about the role of aviation in national comparative advantage has been stimulated by the observation that a surprisingly high proportion of Chinese exports to the United States are air freighted, well over 20 percent. The intuition is that air transport actually gives a comparative advantage to distant countries in the production of high value added goods, whereas neighboring countries (Mexico in the case of the United States), by using cheaper land transport, have a comparative advantage in lower-value goods.

Concerns about the adverse environmental effects of growth in aviation outputs (e.g., noise levels, global "green house" gas emissions, and other local emissions) are increasing in developed countries and are likely to become an issue in fast-growing developing countries (e.g., Mexico's DF airport). These concerns need to be addressed in the context of the development of governments' overall environmental policies and policies to address urban emissions as airports and cities grow together.

Trends

Historically, the demand for air travel has outperformed economic growth. The general view is that this out-performance is likely to continue. In addition, as developing countries bring their policies, regulation, airlines, and infrastructure into line with best practice there is likely to be out-performance of the underlying trend for a significant period. Access to the LCC business model innovation will be important for countries to receive the full benefits from aviation.[4] After the September 11, 2001 terrorist attacks, security concerns as well as broader safety issues have faced market participants with a new level of requirements in relation to adequate infrastructure and increased ability to be able to rapidly respond in the event of emergencies.[5] The airline industry has also been experiencing its own changes and adaptations, and new larger size aircraft as well as increased frequencies resulting from increased use of smaller commuter (so-called regional jets) aircraft will demand new transformations in and better performance from the air transport infrastructure.[6]

The private sector has a very important presence in the air transport industry, dominating the aircraft manufacturing sector today as well as the airline sector. The commercial aircraft market has resulted in a wide range of technologies being available internationally to aircraft opera-

[4] It is widely considered that LCCs operate with costs as low as 6c per passenger-kilometer. Privately owned so-called legacy carriers can have costs almost twice as high. *NY Times*, February 5, 2005, p.B1. The scope for cost and price reduction is thus substantial.

[5] The threat of land-to-air missiles to commercial aircraft alone could have a significant impact in the cost of additional safety equipment for the airline industry. Most likely these amounts will not be fully absorbed by airline companies and end users. Some type of government intervention may occur.

[6] The new Airbus A-380 can carry more than 550 passengers, long-haul. The aircraft will represent a serious challenge to ATI providers where airlines wish to operate the aircraft: runways and taxiways may have to be strengthened and widened, airport terminals receiving more than 500 passengers at the same time will require adaptations to the terminals, air bridges, and their immigration, baggage, and customs areas.

tors: from small commuter aircraft through to the new A-380. There is similar specialization of freight capabilities. One result is that technically efficient aircraft exist that can serve smaller markets. Challenges of serving these smaller markets are now more related to the existence of adequate infrastructure, commercial viability, and economic and political conditions.

There will be pressure from airlines for government air navigation services to provide better and safe services to airlines (e.g., direct routings and efficient flight profiles) by the greater use of satellite- and aircraft-based information.

Environmental concerns, both local and global, will be an increasing policy challenge for governments. Likewise, security concerns are likely to be a continuing issue that, along with safety regulation, will require sound management and resourcing to meet domestic and international requirements.

II Sector Structure

Airlines

Micro-economic reform (de-regulation) is often thought to have commenced with the removal of economic regulation of airlines in the United States in the 1970s. Economic regulation usually means entry and price regulation. Theory validated by experience suggested that the markets for services provided by airlines were potentially competitive or "contestable" because of the relatively low entry or sunk costs, as aircraft and key skilled staff could be rapidly redeployed elsewhere.[7]

In contrast to the general situation in the rest of the world at that time, U.S. airlines were privately owned. The LCC business model emerged during the de-regulation process and is often cited as the leading illustration of the benefits of deregulation, for instance, the rapid spread of LCC services to new members of the European Union (EU), for example Prague, Tallin, and Riga. In a deregulated aviation market there is usually considerable pressure on incumbent airlines from new entrants. The U.S. reform experience is the most studied: air fares are estimated to be 24 percent lower as a result of deregulation.[8]

In terms of airline economics it is unclear whether the LCC model will ultimately replace the incumbent higher-cost airlines or whether the "point-to-point" model will come to replace the "hub and spoke" model that developed in the U.S. In any event, because of increased competition, it has become more challenging to own an airline and arguably more risky. There are increased risks to investment in ATI also from this process.

In international air markets the trend is also toward deregulation, although more slowly and more unevenly. Among developing countries Chile pioneered that trend in aviation. More recently, aviation markets in EU accession countries have grown rapidly as they prepared to join and then joined the deregulated EU market. It is noteworthy that India and the United States have recently signed a bilateral open skies agreement which results in the removal of all government-imposed economic restrictions on airlines from either country serving the India-U.S. air markets. Implementation of "open skies" style arrangements has resulted in market expansion, price reductions, and substantial efficiency gains.[9] An analogy can be drawn with the benefits from the liberalization of the international maritime mar-

[7] William J. Baumol, John C Panzar, and Robert D Willig, *Contestable Markets and the Theory of Industrial Structure*, 1982.

[8] Cliff Winston and Steve Morrison, *The Remaining Role for Government Policy in the Deregulated Airline Industry* (Washington, D.C.: Brookings Institution, 2003).

[9] The Brattle Group, *The Economic Impact of an EU-US Open Aviation Area*, December 2002. www. brattle.com

ket, in which unit costs have fallen substantially as increased competition allowed the cost savings from more efficient technologies to be passed on to customers. Many developing countries remain cautious about liberalization despite the growing evidence. Guarantee of services remains their concern. Phased liberalization is an option that many governments prefer. Regional groupings to facilitate liberalization are an option, but implementation experience is somewhat limited in developing countries to date.

As part of regulatory reform processes, some governments have transferred ownership of their airlines to the private sector.[10] From an economic development perspective, experience shows that the private sector is well placed to provide airline services to customers provided the regulatory environment allows that to happen and there is an adequate safety and security regime in place. The removal of economic regulation and its replacement with general competition law is important. Most of the airline sector today is in the hands of the private sector (ownership), and the case for state-owned airlines is presented as the exception to the rule in this very competitive and risky market.

A number of developing countries continue to struggle with the periodic fiscal demands and ongoing fiscal risks from poorly performing state-owned airlines often protected from competition by regulation. International requirements are that airlines, permitted by a country to be able to provide international services to/from it, be "owned and controlled" by nationals of that country. These requirements can cause difficulties for smaller countries and for countries with underdeveloped capital markets. Many governments are concerned that without a "national" carrier, insufficient and less reliable services will be provided by commercially focused airlines. Governments need to balance any costs arising from that risk versus the costs to the economy from regulatory protections, the costs to taxpayers from ownership risk, or the costs to both the economy and taxpayers. Experience suggests

Box 1:
An Illustration: Latvia and Armenia

LCCs with their lower cost structures have developed and operate in the United States and Europe: they are the exception rather than the rule in developing countries. LCCs may not be viable in markets regulated by bilateral air service agreements that regulate international air services outside the United States, Europe, and the Antipodes. That is probably because of the high transaction costs and risks generally imposed by these agreements. Latvia, in contrast with Armenia, adopted an open skies policy in the early 1990s for negotiating bilateral agreements. Latvia required the local carrier airBaltic to adjust to this regime, noting that other airlines will also provide services as agreements became less restrictive. Yet LCC entry, and adjustment by airBaltic to LCC entry, occurred only when Latvia joined the single European air market just before full EU accession. Armenia, concerned about ongoing service provision, signed an agreement to establish a private airline that had exclusive rights within a restrictive international regime in return for annual payments to the government. International linkages are poor compared with Latvia, and there is little prospect of LCC entry.

[10] Ownership and control requirements in international aviation agreements are a problem, particularly for smaller countries, although many countries have found ways to reform their airlines without causing difficulties in regard to these rules.

that in a liberalized environment airlines will quickly enter to serve viable markets and will continue to serve them while the markets are viable. As in any market there will be "exits" also, sometimes associated with commercial failures of airlines. Clearly airlines with the most efficient cost structure, for example, the LCCs, will be able to serve smaller markets and will be better able to handle volatility in those markets. This suggests the importance of governments having regulatory regimes that would be conducive to the entry of LCCs. Open skies arrangements would seem to be a necessary condition for that.

For purposes of this note air transport infrastructure, defined as the facilities and oversight required to provide efficient and on-time air transport services to the public, will be organized as shown in Table 1.

Table 1:
Air Transport Infrastructure, Organization

Type of infrastructure	Characteristics of the service provision and functions
Airport infrastructure:	
Airside services. The airfield, gates, air bridges, and all facilities associated with the movement of aircraft. All facilities considered beyond the passenger security areas (runways, taxiways, aprons, etc.).	Services provided on a monopolistic mode by nature. Guaranteed cost-related pricing allows commercial service provision. Pricing mechanisms usually do not incorporate competitive factors (i.e., landing charges, airport passenger charges, etc.) although they could be the subject of contracts with airlines. Competition between airports is a relevant factor as is competition law.
Landside services. Facilities associated with the movement of passengers and baggage to and from aircraft. Airport facilities dedicated to serve passengers into and inside the terminal areas (i.e., passenger services, food and beverage concessions, duty free, car parking, etc.)	Services can be provided on a competitive basis so that airlines and passengers can usually find competing providers. Pricing mechanisms tend to incorporate some type of competitive factor, however, highly influenced by the airport (i.e., owner, concessionaire, etc.). Separate ownership of terminals has occurred, including by airlines. Well-run services can contribute to the efficient recovery of airport fixed costs.
Security and safety services. Facilities associated with the provision of police, security, customs, immigration, fire and rescue services. To allow the full range of international connections on a continuing basis these services will need to	Services provided directly by the relevant municipal, regional, or federal government agency or provided as a result of regulation, for example, airport-run or contracted security services

(*continued on next page*)

Table 1:
Air Transport Infrastructure, Organization

Type of infrastructure	Characteristics of the service provision and functions
be certified as meeting evolving international best-practice standards. Services provided by countries will be subject to audit by the U.S. government if direct U.S. services are to continue or are planned. Meeting International Civil Aviation Organisation (ICAO) recommended practices and addressing issues arising from ICAO audits will become an increasing challenge for all countries.	
Surface access. Road and rail services	Transport infrastructure services are often (local) government provided but with airports being expected to make increasing contributions often via public-private partnerships.
Air navigation infrastructure (air traffic control)	
Air navigation services (ANS). ANS encompass all activities necessary to safely separate air traffic and efficiently provide air traffic services for a particular country's airspace. ANS will include the provision of air traffic control services, en route navigational services, flight information services, and the necessary support-related services.	The core services, given their nature, are provided on a statutory monopoly mode. International agreements require a cost-recovery, nondiscriminatory approach to charging. The pricing mechanism usually does not incorporate a competitive factor (i.e., over-flight and approach charges). With reduced telecommunication costs services can be provided remotely in many cases. That allows more cost-effective regional provision of services, for example, as well as potentially "competition for the market." There is evidence of possible significant economies of scale.[11]

(*continued on next page*)

[11] Eurocontrol Performance Review Commission.

Table 1:
Air Transport Infrastructure, Organization

Type of infrastructure	Characteristics of the service provision and functions
Safety oversight *Services and activities related to the adequate achievement and safeguarding of technical standards in safety and security by all entities responsible for the provision of air transport services* (i.e., aircraft registration and inspection, pilot training and qualifications, air operator certification, airport infrastructure standards, air traffic controllers certification, air navigation equipment, etc.). Given the global nature of the air transport industry, technical standards tend to be international with countries obliged to meet the standards. Countries will have to meet ICAO Standards and Recommended Practices (SARPS) and the U.S. FAA's International Aviation Safety Assessments (IASA) to maintain full international connectivity. Unless the ATI meets evolving international standards, international linkages will become increasingly limited.	These oversight services and the safeguarding of international standards and recommendations are provided by the relevant government agency (ies) responsible for the technical regulation of the sector (i.e., civil aviation authority, ministry of transport, etc.). Provided the key national accountabilities are clearly established, the necessary skilled technical support for the effective delivery of the accountabilities can be contracted for internationally. Well-established global agencies such as ICAO perform the role of international oversight of air transport activities plus they contribute with the setting and maintenance of international benchmarks for air safety and security standards.

Source: *Airport Infrastructure: The Emerging Role of the Private Sector* (World Bank, CFS Series, Ellis J. Juan): 1995; "Financing Air Navigation Infrastructure in Emerging Markets," *Air Finance Journal*, Fall 2001, Ellis J. Juan.

III The Roles of the Public and Private Sectors

The bulk of the air transport infrastructure (airports and air navigational services) has been created by the public sector, in contrast, say, to the early development of railways in the United States and the United Kingdom. In the United States the airports, as well as ANS, are overwhelmingly (local) government owned.[12] The transfer of the major U.K. airports to privately owned BAA by means of a divestiture in 1986 was the first major example of air transport infrastructure moving to the private sector. Private sector participation has increased substantially during the past 20 years in the airport sector through a range of different schemes and models (i.e., Build-Operate-Transfer arrangements (BOTs), concessions, management contracts, divestitures, public-private partnerships (PPPs), etc.). The public sector still dominates and controls ownership in the ANS sector. However, governments are increasingly setting up their ANS as more commercially oriented and autonomous state-owned entities, legally separate from the government, albeit with differing degrees of autonomy, commercial freedoms, and accountabilities, for example, Armenia and South Africa. This allows a closer linkage between the willingness of airlines to pay for cost-effective valued services and the service provider.

More generally, air transport infrastructure services can be and usually are priced with customers (mainly airlines) being willing to pay for cost-effective services they need and value. Sound pricing generates an income stream, albeit subject to demand volatility, that can be used to pay for the appropriate maintenance, operation, and development of the infrastructure. The income stream also allows for debt and potentially equity finance to be raised to finance development. That illustrates the importance of pricing flexibility for ATI service providers. They need to be assured that they can levy at least cost-related charges on average and have the ability to price discriminate subject only to the limits imposed by competition law.[13] Formal control of prices has costs and should be imposed only if the benefits to the economy exceed those costs.

There may be problems of rundown facilities, overbuilt facilities, and inadequately skilled staff alongside overstaffing that need to be addressed in transforming ATI to deliver value-for-money services on a financially self-sustaining basis. Transition assistance and funding may be

[12] Although airlines often have long-term leases on terminals at major airports.

[13] Price discrimination is widely accepted as an efficient means of recovering fixed costs while minimizing the loss of output.

needed and may be a profitable economic and government financial investment.

Where the infrastructure remains government owned, there is also the issue of whether government financial, budgetary, and employment policies operate to deliver financial resources to socially profitable, cost-effective uses in the infrastructure area. There are always competing demands for the usually limited revenue available to governments, including revenue generated by user fees from ATI. As a result some otherwise sound aviation infrastructure projects may not be funded.[14]

Safety and Security Safeguards (technical regulation)

Safety and security safeguards are not only a core government responsibility but also required by international treaties and law. Full compliance with international rules and recommended best practice is demanding for smaller and developing countries, yet there is considerable pressure and expectation to ensure quality operation of necessary regulatory services to ensure continued international aviation connectivity.

In contrast to other markets in which regulatory compliance is often an issue and as with aviation infrastructure, customers (airlines) are often willing to pay for such regulatory services if they are effectively and efficiently provided. Although the charges for the services have tax-like properties, being mandatory, such user charges potentially allow regulatory agencies to be operated on a cost-recovery basis with more autonomy than core government agencies. Subject to satisfactory accountability arrangements, that could better allow the aviation regulatory agencies to hire and retain the necessary core specialized technical staff to ensure the provision of regulatory and civil aviation oversight capabilities and competencies. Governments of smaller countries may be able to contract with international service providers to supply the necessary technical skills although governments must remain accountable for ultimate performance. As with air transport infrastructure there may be transitional, budgetary, and employment issues that need to be addressed to allow the services to be restructured so they can be delivered efficiently, effectively, and sustainably.

Air Navigation Services

Provision of ANS still remains a core public sector responsibility, and the increase of security concerns and threats in this sector seem to indicate that this will remain the position in the coming years. Few governments have considered the introduction of "for profit" private sector participation (PSP) in the ownership of ANS. (see Box 2 for how Canada handled this issue). Indeed the U.K. ANS PPP is probably the only "for-profit" ANS currently.[15] Even there, because the main partners are major U.K. airlines and the government, there are no strong incentives for profit "maximization." ANS outputs are still not sufficiently well specified to be confident that ANS charges accurately reflect the outputs provided. This, together with the statutory monopoly nature of core ANS, supports a cautious approach to reform in this area. However, many of the governments in developed economies have successfully corporatized their ANS systems and moved them into cost-recovery systems indepen-

[14] Projects that have a positive cost-benefit analysis net present value (NPV) and an overall positive government financial NPV.

[15] The German government has recently announced that it intends to sell 75 percent of the shares in its ANS.

Box 2: Canada, the Formation of Nav Canada

On November 1, 1996, Canada's Air Navigation System was sold to a not-for-profit corporation, Nav Canada, for Can$1.5 billion. The board of directors of the corporation is composed of independent members, not government related, although some nominated by end users. After four years of operation Nav Canada has reduced overhead by 20 percent and increased investments by Can$500 million. Nav Canada has considerable freedom in regard to its charging policy. The corporation was recently rated AA by Standard & Poor's (extremely low probability of default on its financial obligations).

dent, to a greater or lesser degree, from government budgets.[16]

The development and efficient management of ANS in emerging economies are often difficult because of the limitations imposed by a centralized public administration and budgetary rules and process. ANS may be institutionally weak with poor technical and business planning and development capacity to cope with growing demand and the pressure of providing cost-effective, safe separation services. Increasing fiscal pressures, coupled with limited functionality of central government institutions, are having an effect on the provision of adequate ANS in emerging markets.

Fiscal pressures and budgetary allocation procedures affecting centralized institutions responsible for providing ANS (i.e. integrated government departments)[17] result in a failure to adopt full cost-recovery systems for ANS charges, as well as independent revenue generation. Often where full cost-recovery charging is in place, the revenue streams are not linked to the appropriate operation and development of the ANS. The Bank can assist the corporatization of ANS in its client countries via the provision of specialized advisory services and by providing financial support to finance investments to upgrade and modernize ANS equipment and skills (see Annex for an example).

There are also important international dimensions to ANS. International agreements require that ANS be provided on a nondiscriminatory cost-recovery basis to avoid "beggar-thy-neighbor" policies. However, ANS unit-costs vary greatly across countries, and there are performance problems. There appear to be significant economies of scale in the provision of en route ANS services. Instead of each country necessarily having its own, often small, air traffic control centers, there would be benefits to ANS systems from different countries "clubbing" together to have services provided from a larger center serving the airlines using the airspace of a number of countries. Examples of that include the

[16] Corporatization is an institutional arrangement in which the responsibilities for the provision of ANS are transferred to a particular corporate structure (the corporation), legally separate from the government, with the objective of operating on a private commercial basis. The commercial basis here defined as the establishment of full cost-recovery systems for the operation of the corporation (no dependence on the public sector budget), and financial autonomy for business development, including some degree of borrowing freedom, subject to satisfactory risk management from a government, public sector, and fiscal management perspective.

[17] In emerging economies most of the ANS are provided by a department or division (civil aviation authority) of a centralized ministry (e.g., transport, defense, public works).

Maastricht center in Europe owned by Germany, Belgium, and the Netherlands, serving those countries' high-altitude airspace. In South-eastern Europe eight countries are working together to create one center to provide high-altitude services for the airspace allocated to all those countries. Governments do not find it easy to implement such reforms: the Bank with other international parties such as ICAO could consider assisting the facilitation of such initiatives in which the payoff may be high.

Airports

Since the privatization of the British Airport Authority, as BAA, private sector participation in airport infrastructure has greatly expanded and evolved. To put it plainly, what was in the early 1990s an "emerging role" in developing countries has now "emerged." There are currently more than 40 separate projects in more than 30 countries that have been undertaken through different approaches and have adopted a wide range of forms and variations (i.e., master concessions, BOT, management contracts, etc.).

Given the global nature of the industry, airport-related tariffs and charges are usually based in major international currencies. Moreover, most of the fees paid directly by airlines (i.e., landing charges, ground handling, etc.) are usually calculated and paid in these currencies. That factor, together with the willingness of end users to pay for valuable, cost-effective services, offers sound airport operations a level of financial returns that make private investments and management possible.[18] Private operation of airports has disclosed substantial efficiency gains. For example, better and longer use of existing assets along with substantial contracting-out of services and allowing greater competition within airports such as ground-handling services.

Air transport infrastructure will require major investments in upgrading and expansion in the near future in many countries. Given policy restrictions on the use of private capital to directly fund required investments in ANS and in safety and security regulatory oversight, it is envisioned that government funds allocated to the sector will focus more on satisfying these requirements, leaving airport rehabilitation, upgrades, and expansion to private sector capital and management, although government funding may be required if governments decide to keep unprofitable airports open or to deliver higher levels of services than customers are willing to pay for.

If governments are comfortable with the private sector leading the development of the airport infrastructure and the governments do not wish to impose a specific investment plan or project, then transfer of existing airport assets to private ownership is all that may be necessary (divestment). The new owner's airport development plan, particularly as realized, may look quite different from what government and the state sector airport managers had in mind. But it is more likely to be customer-driven, more cost-effective, and less plagued by periodic over-investment "white elephant" problems. That outcome is dependent on the regulatory environment being sufficiently robust to reassure any private investors about the expropriation risk in relation to existing and new investment and to allow efficient prices.

Contracts may be one mechanism to achieve this, for example, Armenia has its main civilian airport operated under a 30-year conces-

[18] End users (passengers) of airport services also tend to be skewed toward the upper socioeconomic segments of the population.

Box 3: Government-Led Airport Infrastructure Development

Where governments want to achieve particular infrastructure development outcomes at an airport that are more ambitious than private developers are willing to commit to, sources of assistance from the rest of the economy are likely to be required and legal relationships between the government and the infrastructure operators will be more complex. Sometimes governments consider selling airports as groups with the understanding that higher charges at profitable airports will be used to cover losses at unprofitable airports or finance otherwise unprofitable projects at those airports. Sometimes airports with market power are sold with an agreement that the price path for the airports can be higher than what would otherwise be the case to generate funding for the more expensive airport development plan: London's Luton local authority leased out Luton airport to a private consortium with the requirement that the consortium build a prespecified new terminal, for example. Governments may accept lower financial proceeds from the introduction of private participation in return for the developer committing to a particular investment program. The difficultly is that there are strong incentives for the private developer to attempt to renegotiate the investment commitment once the developer is in place unless the investment is commercially robust. Generally, concessions with investment requirements have the highest incidence of renegotiation.[19]

sion with the concessionaire being contractually guaranteed that charges will be adjusted so that it earns a specified rate of return on its investment.

Economic regulation has been used in some countries, for example, South Africa. The implicit notion with economic regulation is that regulators should at least allow private investors to receive a "return on and a return of" their investment in the airport, while price control protects customers from abuse of a dominant market position. This can be made explicit in legislation, although it may constrain the development of efficient pricing and contracting. Communicating the best possible and credible market-driven, cost-related price signals to ATI providers remains important. However, accurate and complete specification of airport outputs (including service quality) is a challenge.

If such full transfer of ownership and control is not politically viable, then there is the usual range of options, such as best-practice state ownership (e.g., through a corporatized, state-owned enterprise, SOEs), devolution to local government in the case of regional or local airports, concessions, public-private partnerships (e.g., ACSA in South Africa and the proposed approach in India of using concessions and PPPs for Delhi and Mumbai airports), through to management contracts, for example, Cairo airport. To reiterate, if the policy is for the infrastructure to develop strictly commercially recognizing the inherent uncertainty and risks in operating and developing infrastructure, then these policies should be self-funding from the government perspective. With ATI operated as SOEs, governments would have to decide, as part of their overall public sector management and fiscal policies, whether to allow SOEs to borrow from the capital market. In addition governments, as owners, may face periodic

[19] Luis Guasch, *Granting and Renegotiating Infrastructure Concessions* (WBI Development Studies, 2004).

requests for financial injections to fund development or meet the consequences of adverse demand shocks.

Commercial operators may be able to access capital markets to finance profitable projects, that is, projects that customers are expected to be willing to pay for. There may be problems with any of the arrangements subsequently, for example, pressure to renegotiate concessions, but provided the contracts with the private sector are soundly based, with good government management it should be possible for any subsequent fiscal risk to be effectively mitigated. However, the continuing government involvement implied in each of these options does bring performance and fiscal risks with it, and these must be actively managed by governments, ideally within a clear policy, governance, and regulatory framework.

Government intervention (via use of public money, ownership, or regulatory powers) in the airport sector is often suggested in situations in which the public service nature of the business has a very strong contribution to the country's transport network but the economies of scale are such that financial returns are not sufficient to engage private capital. That is the situation that normally arises when it is necessary to upgrade and maintain the network of secondary airports to integrate the country's transport system (i.e., for political as well as for security reasons), but traffic volumes are not expected to be sufficient to fund the upfront investments with required levels of financial returns. Central or local government fiscal contributions are always an option, subject to competing fiscal priorities. Under those conditions it may be justified to have PSP schemes in which airports are bundled in groups (i.e., key international gateways with secondary airports) to allow for cross-subsidies to support the system [20]. Governments should have to be satisfied that benefits from increasing investment in the regional airports resulting from this policy offset the costs of higher charges at gateway airports and any loss from inter-airport competition. [21]

[20] Private sector participation.

[21] The U.K. CAA recently changed its regulatory policy in regard to the BAA London airports so that each airport would be regulated on a stand-alone basis consistent with a competitive outcome. The previous arrangement allowed charges to be higher at Heathrow to ensure that all investment at Stansted earned the full cost-of-capital regardless of the commercial outcome. www.caaeerg.org.uk

IV The World Bank Group's Approach to Air Transport Infrastructure Development

As with infrastructure development in general, the approach to ATI requirements for our country clients is framed in the context of pragmatism and recognition of fiscal constraints for use of public sector resources in infrastructure development (i.e., making best use of scarce public money). However, the following broad principles lead current Bank analysis when engaging with country clients in the definition of the roles of the public and private sectors in air transport infrastructure development:

- The government has a core, clear, strong, and active role in the provision and oversight of safety and security standards (i.e., technical regulation).
- The government should identify and work toward eliminating the remaining economic regulatory restrictions in aviation. The trend is toward deregulation. Many developing countries remain cautious about liberalization despite the growing evidence. Security of services remains their concern. A policy dialogue has to encourage governments to consider the costs as well as the benefits of the interventions aimed at guaranteeing services relative to more market- and commercially driven approaches. Phased liberalization is an option that many governments prefer.
- Governments have a role in ensuring that competition law and policy are working adequately and that the ATI market structure is consistent with achieving the governments' overall development objectives. When governments are considering addressing performance problems in ATI, it is important that they are encouraged to examine the trade-offs between maximizing the competition between airports that are currently government owned versus any fiscal and regional development benefits from continuation of the status quo. Rectifying market structure problems at a later stage is difficult, particularly if private ownership has been introduced.[22]
- Provision of adequate ANS systems that keep pace with technological and global standards while meeting growing demands should be done on a cost-recovery basis (in the context of this type of monopoly transport mode). Full private sector ownership in this sub-sector is

[22] For example, the unsuccessful effort by the U.K. Treasury and CAA to break up BAA in 1998.

not a realistic policy option or business model today, given safety and security concerns (externalities). However, efforts to provide the services on a more commercial basis and independent from the government's budget process can result in improving overall efficiency in the provision of ANS if regulatory and governance issues are properly addressed. Establishing ANS as an autonomous but accountable state-owned enterprise is likely to offer net benefits.

- Airport-related services, given the natural characteristics of the sub-sector, could be provided by the private sector under best-practice design of PSP schemes, including privatization via full divesture as with BAA. The private sector manager has strong incentives to maximize contracting-out of airport services or otherwise allow private provision of services. Government intervention in the provision of airport services could be required in situations in which the economies of scale cannot justify the needed financial returns for private capital mobilization, but the economic returns of having an integrated airport system provide a strong rationale for efficient use of public money. This should be subject to national cost-benefit analysis and government financial impact assessment.

Identifying the likely challenges facing air transport infrastructure given the expected and potential development of the airline market is at the cornerstone of the Bank's engagement with its country clients. This should ensure that efficient options for maximizing competition are properly examined, for example, deregulating the airline market and ensuring the efficient use and development of airport infrastructure. This diagnosis could identify reform options that would allow any performance problems to be best addressed: experience would suggest that governments could consider commercial approaches to the operation and development of airport services and more autonomous operation of state-owned ANS on a cost-recovery basis. Loss-making local and regional airports are often an issue: adjustment of infrastructure services (and, hence, costs) to airline and passenger willingness to pay is the fundamental challenge.

As with other sectors, a regulatory framework consistent with overall aviation policy that maximizes competitive pressures and is supportive of commercial investment would be important. Although general property, contract, and competition law are usually the core legal instruments, commercial ATI developers along with autonomous state providers will need to be clear about their ability to enter into contracts (e.g., with airlines) and charge customers for their services and about what constraints there might be on pricing in addition to normal competition law.

In situations in which governments decide to continue with the ownership of airport assets, as well as ANS, the issue of efficient and cost-effective management, development, and funding of the respective businesses arises. Governments have considerable experience in managing SOEs , but performance has generally been poorer than for the private sector comparators. Focusing attention on identifying the critical success factors for closing this gap on a sustainable basis would be a priority.[23] The effective treatment of these businesses and of other SOEs in the government budgetary and balance sheet management processes is important so that commercial aspects of these operations along with the risks are fully taken into account and appropriately managed.

[23] See, for example, T. Irwin and C. Yamamoto, *Some Options for Improving the Governance of State-owned Electricity Utilities* (WBG, February 2004).

Access to commercial debt finance by these government-owned service providers in their own right may be an option when the government considers it can manage the resulting risks (i.e., access to debt financial markets without sovereign guarantee).

Independent of the policy model chosen there will be a range of implementation issues critical to the success of the policy. The development of a detailed implementation plan may be necessary to identify any transitional issues and solutions along with the necessary financing plan, financial, and cost-benefit analysis.

Is Development of a Government Aviation Sector Policy or Strategy Desirable?

The foregoing would suggest that the Bank staff could approach this issue overall by encouraging the development of an aviation sector policy or strategy by the government that is consistent with the government's overall development and poverty alleviation strategy. Development of such policy or strategy statements has costs and benefits. The benefit is that it may allow aviation policy to be placed explicitly within the government's overall development strategy, benefiting from the policy framework within the strategy. For example, the policy decision would reflect the weight a government attaches to concerns about addressing major market failures versus the likelihood of government failures in considering policy options to address the market failures including their implementation of the chosen option. The policy process may help identify conflicting policy objectives and encourage resolution before commitments are entered into. Development of policy or strategy statements absorbs scarce government time and resources and attracts interest group and bureaucratic interests seeking to promote their own positions. However this process could, among other things, clarify the government's views about its role, if any, beyond the delivery of the core regulatory functions. It could address how

Box 4:
The Adequacy of Government Safety and Security Regulatory Services

Governments may have problems in the employment of the necessary technical staff to undertake safety regulatory oversight (e.g., pilots and engineers) because of civil service pay scale restrictions and funding limitations. As is indicated above, airlines are usually willing to pay the costs of the necessary services if they consider they are receiving value for their money.

It would be desirable for any review process to examine the efficacy of aviation regulatory agencies. That could involve working with the government to ensure that the government regulatory agency(ies) is(are) able to deliver on its regulatory policies and obligations. This review would use the usual public sector management review approaches. Sound process design, including use of cost-benefit analysis and full transparent consultation including with airlines, would increase the prospect of a better regulatory framework. Organization options to achieve that could be considered. Many of the services could be contracted-out to international suppliers even while the accountability stays clearly with the government and its nominated staff. The development of a detailed implementation plan may be necessary to identify any transition issues and solutions along with the necessary financing plan, financial, and cost-benefit analysis.

government ownership interests are going to be protected and managed. It would articulate how adverse environmental issues would be handled, both local and global.

It would be desirable for the policy or strategy to be developed openly and transparently. This allows the interests and expertise of airlines, for example, to be used. Other interested parties such as representatives of exporters, importers, and tourism firms will have an interest in contributing to this process. Within governments it is desirable that agencies with broad interests in economic development and fiscal policy be involved in the preparation and implementation of this policy. The development of sound business plans by government service providers in the sector will also be an important input. These plans in turn will be affected by the implementation of government policy, for example, a state-owned airline will have to adjust its plan when governments decide to remove regulatory protections.

V The World Bank Group's Instruments to Support Air Transport Infrastructure Development

Policy Dialogue

The policy dialogue can involve insights into local problems and the presentation of international experience with lessons learned and well-researched policy options for sectors, projects (public, private, and PPP), or both.

Technical Assistance

Technical assistance (TA) can be used to identify and/or implement institutional, organizational, regulatory, or business process reforms in government enterprises or to move them toward greater private participation. TA is not provided to private companies, but benchmarking studies of the private sector and postprivatization or concession performance can be useful to provide models for other governments considering such policies. Typically, PPPs impose heavy requirements for professional services that TA can help to fund, subject to successful initial screening.

IBRD/IDA Investment Loans and Credits

IBRD/IDA loans and credits can be made for public sector transport enterprises, for investment, structural reforms, or transition costs such

Armenia: Poverty Reduction Support Credit (2004)

IDA's Poverty Reduction Support Credit I for Armenia identified the high costs of air services as a constraint on economic development. In the Letter of Development Policy submitted as part of the Credit, the Authorities agreed on the need to undertake reforms on aviation and move toward a widespread use of open skies arrangements. The Authorities and the Bank formulated a work program for that purpose, the initial output of which is a draft Bank report for the Authorities on civil aviation liberalization.

West and Central Africa: Institutional Capacity Building (IDF Grant TF 027394)

To address the inefficient, costly, and irregular nature of air services in Central and Western Africa, a World Bank grant was provided for the purpose of (1) strengthening the institutional capacity of the West and Central region to implement the air transport reforms agreed on by the 23 member states, (2) building consensus on an action plan and regulatory framework to achieve full liberalization of air transport markets in the region, and (3) developing a regional air transport database. A variety of lessons were learned from the project. Any reform and capacity building that is embarked on needs to be sustainable if air transport liberalization is to be successful. The 23 member states lack human and financial resources to implement reforms and carry out their regulatory functions effectively.

Bolivia: Regulatory Reform and Capitalization Technical Assistance Project (IDA, PO37005 – CREDIT 2647-BO, January 1995)

The project's objectives were to assist the government in planning, designing, and executing its capitalization program and to ensure that the government had at its disposal the varied and complex advice needed. The project included a component to assist in sectoral reforms and to establish a regulator covering the national airline (LAB), two small military airlines (TAM and TAB), and airports. As a result of the assistance, Bolivia succeeded in capitalizing the national carrier that it had previously tried and failed to privatize. The project also supported privatization, including a concession covering the three main airports, which handle 85 percent of the country's air transport. In November 1996, a 25-year concession was awarded to a private consortium, making Bolivia the first country in Latin America to privatize its airports.

as staff restructuring. Loans can be made to government, or guaranteed by government, for onlending to small and medium private transport operators, for example, as part of a rural development project. IBRD/IDA loans can be made to the public sector to meet a capital financial commitment to a PPP scheme. They may complement an IFC loan.

IBRD/IDA Policy and Program Loans and Credits

IBRD/IDA policy and program loans and credits can be used by clients subject to a program of sector reforms that would be inappropriate to associate with a specific investment loan. Part of a program loan could be used to support the public sector financial commitment to a PPP.

Arab Republic of Egypt: IBRD Loan (IBRD, P082914, March 2004)

IBRD made a $335 million loan to Egypt to (1) construct new terminals at Cairo International Airport and Sharm El Sheikh international airports, which handle close to 50 percent of Egypt's passenger traffic, and (2) provide technical assistance to prepare a national airport master plan and to help gradually liberalize air transport in Egypt and devise a national strategy for developing air cargo. The airports have been state-owned enterprises. Implementation of the project will take place between June 2004 and June 2008. Bank involvement will ensure that necessary actions are taken including proper management contracts being put in place with private sector firms. The Bank's experience in large and complex transport infrastructure projects and knowledge of associated development issues will also play an important role.

A project management unit is being established within the Egyptian Holding Company for Airports and Air Navigation to coordinate, supervise, and monitor overall implementation of the project.

IBRD/IDA Guarantees

The purpose of World Bank guarantees is to address the growing need to offer political risk mitigation products to commercial lenders contemplating financial investments primarily in the infrastructure sectors of developing countries. The Bank's fundamental objective in offering guarantees is to mobilize private capital for such projects. World Bank guarantees require the host country government's counterguarantee. The types of guarantees offered by the World Bank are as follows:

- *Partial credit guarantees* cover debt service defaults on a specified portion of a loan or a bond. Such guarantees are designed for public sector borrowing and allow public sector projects to extend maturities and lower spreads.
- *Partial risk guarantees* cover debt service defaults on a loan to a private sector project caused by a government's failure to meet its contractual obligations related to a private project.
- *Policy-based guarantees* cover a portion of debt service on a sovereign borrowing by an eligible member country from private foreign creditors in support of agreed structural, institutional, and social policies and reforms.

IFC Loans and Guarantees

IFC financial support could be given for a state-owned entity in the context of preprivatization equity. IFC could alternatively help provide financing requirements (including acquisition costs) for a private purchase of a state-owned entity. IFC loans can be made to any private company in the transport sector (whether infrastructure or transport operators). IFC loans can be made to the successful private bidder in a PPP transport scheme. IFC can also offer partial credit guarantees and use its international triple-A credit rating to help clients diversify their funding sources, extend maturities, and obtain financing in their currency of choice, including local currency. In securitization transactions, IFC participates as a structuring investor or guarantor, typically at the mezzanine level of risk. Risk-sharing facilities allow clients to transfer credit risk to IFC from their own portfolios or from a new portfolio they originate.

Argentina, San Martin: Terminal 6 S.A. Expansion Project (IFC 7058, October 1995)

Terminal 6 S.A., owned by four large Argentine agricultural companies, is operated as a cost center for these companies, each of which ships large quantities of goods through the facility.

IFC investment included a loan of $17 million for the expansion of an existing rail receiving station, the construction of new storage silos, refurbishment and improvement of existing facilities, and refinancing of an existing IFC loan. The aim of the project is to increase the throughput capacity of Terminal 6, which would enable the company to capitalize on its expected increase in Argentine agricultural production and the capacity of the rail network.

IFC Advisory Services

The Advisory Services Department (CAS) of IFC provides advisory assistance, primarily to governments, on private sector participation in the provision of infrastructure services and the restructuring of state-owned enterprises. The services help to establish PPPs through which governments can bridge the need for increased services under budget constraints with the benefits of private sector expertise, management, and finance.

MIGA Guarantees

MIGA is available to provide noncommercial risk guarantees (Transfer and Inconvertibility, Expropriation, War and Civil Disturbance, and Breach of Contract) to investors, including contractors and operations and maintenance providers, as well as commercial banks. Breach of Contract coverage is of particular interest for PPPs because it guarantees the investor/lender against the nonhonoring of sovereign or subsovereign obligations concerning the PPP project, including payment obligations.

Tanzania: Privatization of Tanzania's National Airline (October 16, 2002)

The International Finance Corporation advised the government of Tanzania on the privatization of Air Tanzania Corporation, the national airline. In 2002 South African Airways submitted a $20 million offer for the purchase of 49 percent of the shares in Air Tanzania Company Limited (ATCL) and won the contract. One-half of the payment went to the government, and the remaining half was invested in ATCL.

The transaction, a first for Africa, took place under a domestically liberalized and competitive market structure. The new airline is expected to improve the quality and cost of air transport services to and within Tanzania. IFC's technical assistance grant funding was provided to augment management processes and implement specific initiatives required for reducing operating costs.

Ecuador, Quito: Construction of New Airport (MIGA, Quiport – 2003)

The project involves construction of a new airport near Puembo, 24 kilometers outside the capital city of Quito. The project will be a key economic driver for sustainable economic development of the metropolitan region of Quito. The airport is expected to be operational by early 2008 and will replace the existing airport in the city of Quito, which suffers from safety deficiencies as well as capacity constraints.

MIGA issued three guarantees of $32.7 million, $16.3 million, and $16.3 million to the Aecon Group Inc. of Canada, the HAS Development Corporation of the United States, and ADC Management Ltd. of the United Kingdom for their respective shareholder loans to Corporacion Quiport of Ecuador.

In addition, MIGA issued guarantees of $450,000, $225,000, and $225,000 for the investors' respective equity investments in the project enterprise. The Aecon Group and HAS Development Corporation have coverage for a period of 14 years for their shareholder loans; the remaining four guarantees are for a period of 15 years. Each guarantee provides coverage against the risks of Transfer Restriction, War and Civil Disturbance, and Breach of Contract.

Peru: Privatization of Jorge Chavez International Airport (JCIA) (MIGA, Fraport – 2003)

MIGA has provided Fraport AG of Germany with a guarantee for $11.5 million to cover its $12.8 million counter-guarantee for a performance bond posted for the privatization of Lima's airport, Jorge Chavez International Airport (JCIA). The coverage is against the risk of expropriation (the wrongful call of the performance bond) and extends for eight years.

Peru depends greatly on its airport network because of its geography and because the ground-handling transportation infrastructure has not been fully developed. JCIA is especially important to the country because it is Peru's main operating international airport, accounting for 97 percent of international traffic, as well some 58 percent of national traffic. JCIA also functions as a regional hub for all air cargo traffic.

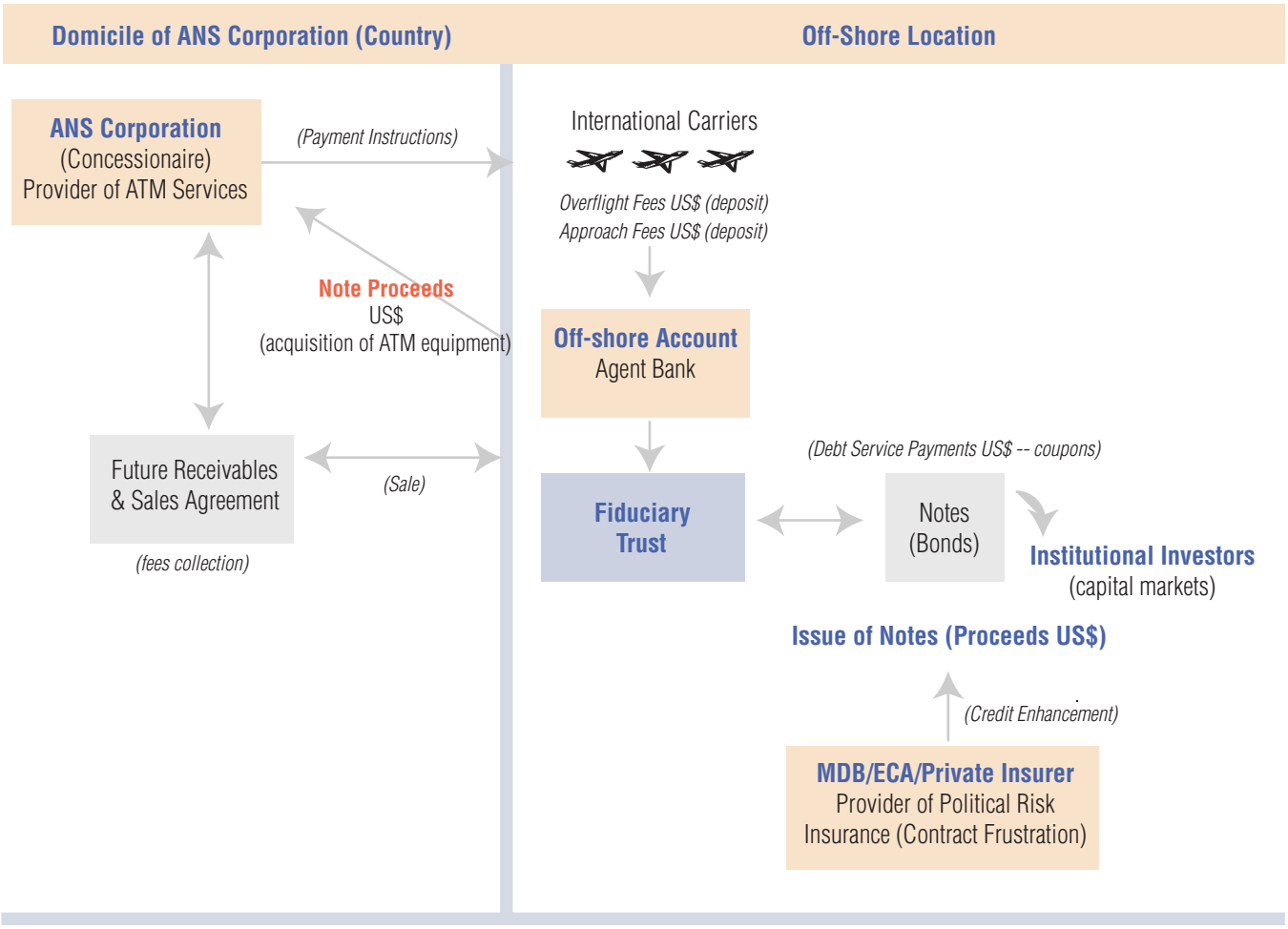
The airport's privatization is expected to provide the government with additional revenues through increased income tax, custom duties, and concession fees. During the first four years of the concession, the consortium is expected to invest more than $130 million in new infrastructure, including upgrades to the current terminal, construction of a new passenger concourse, expansion and addition of new aircraft aprons and taxiways, and creation of a hotel and world-class retail center within the existing airport perimeter.

Annex

Securitization of Future Flow of Receivables (i.e., overflight and approach fees)

1. Documentation of future invoicing of overflight and approach fees by structuring long-term service contracts with domestic and international carriers being served by the ANS corporation.
2. Establishment of a fiduciary trust (a dedicated trust) domiciled in an offshore location.
3. Sale of the future flow of receivables to the fiduciary trust domiciled in an offshore location (outside the ANS corporation jurisdiction).
4. Payment instructions to domestic and international carriers to deposit US$ value of overflight and approach fees into an offshore bank account pledged to the fiduciary trust (agent bank account).
5. Fiduciary trust issues US$ denominated notes collateralized with the future flow of receivables. Notes (bonds) have a pledge on the revenues being deposited by the carriers into the agent bank account (with the standard configuration of structured finance transactions including debt service reserve accounts, maintenance reserve accounts, and liquidity reserves, if needed).
6. Notes are placed in the international capital markets via sales and distribution to institutional investors (underwriting arrangements with major financial institutions—investment banks).
7. Subject to the level of credit rating required by investors in these types of transactions [securities] under market circumstances (at the time of issue) and the underlying country risk of the ANS location, an additional credit enhancement could be needed (partial risk guarantees and partial credit guarantees).

Diagram 1:
Securitization of Future Flow of Receivables (overflight and approach fees)



Source: "Financing Air Navigation Infrastructure in Emerging Markets," *Air Finance Journal,* Fall 2001, Ellis J. Juan.