

**The Air Cargo Industry in China:
Implications of Globalization and WTO Accession***

Michael Ka-yiu Fung

Professor in Business Economics, Department of Decision Sciences and
Managerial Economics, Faculty of Business Administration, and Associate
Director, Aviation Policy and Research Center, Chinese University of Hong Kong
Shatin, Hong Kong
Email: michael@baf.msmail.cuhk.edu.hk

Anming Zhang

YVR Authority Professor, Sauder School of Business and Centre for
Transportation Studies, University of British Columbia
Vancouver, B.C. Canada V6T 1Z2
Email: anming.zhang@sauder.ubc.ca

Lawrence Chi-kin Leung

Chairman and Professor in Operations Management, Department of Decision
Sciences and Managerial Economics, Faculty of Business Administration, Chinese
University of Hong Kong
Shatin, Hong Kong
Email: lawrence@baf.msmail.cuhk.edu.hk

Japhet Sebastian Law

Professor in Production and Operations Management, Department of Decision
Sciences and Managerial Economics, Faculty of Business Administration, and
Director, Aviation Policy and Research Center, Chinese University of Hong Kong
Shatin, Hong Kong
Email: japhet@baf.msmail.cuhk.edu.hk

July 2005

* The authors thank the comments made by the anonymous referees and Professor
Spychalski. All remaining errors are, of course, ours.

The Air Cargo Industry in China: Implications of Globalization and WTO Accession

Abstract

This paper provides an overview of China's air cargo industry. China's recent accession into the WTO establishes the country's commitment to the liberalization of distribution rights and to the relaxation of restrictions on services such as logistics, thereby creating opportunities for foreign investors. However, the industry has been fragmented and is operating with little market mechanism. It is highly protected and regulated, and is dominated by state-owned enterprises, due to prevalent local protection, and rigid functional demarcations. The manner in which this fragmented industry has coped with the growing need of modern logistics management, which requires integration, both physically and with information, to effectively manage supply chains, is examined. Furthermore, there are tremendous barriers to foreign participation in China's air cargo sector. These arise from a variety of sources, ranging from domestic regulations, guidelines, institutions, and administrative mechanisms to infrastructure and policy constraints. Relevant research issues that are pertinent to the understanding of this transitioning industry are raised.

1. INTRODUCTION

Paralleling its phenomenal economic growth over the last two decades, China's air cargo volume has experienced a rapid growth, from 157 thousand tons in 1980 to about 4.5 million tons in 2003, with an average annual growth rate of more than 15% in that period (Table 1).¹ In China, air cargo is shipped primarily in passenger aircraft, so activities are mainly concentrated at major cities such as Beijing, Shanghai, and Hong Kong where passenger demand is among the highest. As a result, air cargo throughput in these major Chinese cities increased tremendously since 1990: 471% growth in Beijing, 1,527% in Shanghai, and 404% in Guangzhou (Table 1). In addition to remarkable increases in demand due to economic growth, this impressive expansion was partly due to an increase in connections, as major airports in the country became better connected to both domestic and international networks (Table 2).

For many years, a large portion of the country's export air cargo traveled to the Pearl River Delta and then on to Hong Kong where it was consolidated and shipped to overseas destinations. As a result, Hong Kong has been serving as the predominant gateway for China's air cargo since 1980 (Table 1). In 2004, the air cargo throughput in Hong Kong still accounted for 36% of total throughput in China, despite the rapid growth of air cargo throughput in Beijing, Guangzhou and especially Shanghai. While Hong Kong retains its dominant role as an air cargo gateway, it now primarily serves southern China, with the Beijing gateway taking over air cargo that originates in northern China, and the Shanghai gateway handling cargo from eastern and central China (Figure 1). This North-East-South split of the air cargo pie in China between the three gateways is likely to continue.

Despite the high growth in China's air cargo business, many have characterized the logistics industry in China as under-developed, fragmented, and with local protectionism that results from the dominance of state-owned enterprises which enjoy the privileges of monopolistic regulation (Baldinger 1998, Mann 2001, Powers 2001, Jiang and Prater 2002).² However, to manage air cargo processes successfully, the components of the shipment process need to be integrated, physically and with information. With the industry's fragmentation and local protection, air cargo service providers are faced with the very difficult task of providing such integration. Furthermore, the industry as a whole has a competitive environment that is limited by regulation, entry barriers to foreign companies, and policy constraints on aviation.

However, the industry must address many of the aforementioned fundamental problems as it embraces globalization and China's accession into the World Trade Organization (WTO).

The objectives of this paper are to provide a review of how this fragmented industry has coped with the growing needs of modern logistics management, to identify barriers to foreign entry, and to identify policy constraints. The paper also examines the effect of WTO accession on the industry, especially its implications for foreign air cargo logistics companies. It further provides predictions of China's air cargo industry regarding its continued growth, emerging patterns of services supply, and industrial structure and strategic alliances. Finally, we discuss a set of relevant research issues.

2. AIR CARGO BUSINESS PROCESSES AND CHINA'S SITUATION

The air cargo shipping process is a time-definite endeavor that requires the collaboration and coordination of multiple parties: shippers, freight forwarders, trucking companies, shipping companies, customs, warehousing agents, airport terminals, airlines, and consignees (Figure 2). It is also an information intensive process involving electronic agents for customs declarations, querying flight schedules, bookings, tracing cargo status, etc.

In most developed economies, a shipper can outsource its logistics functions to logistics service agents who can be classified according to the type of service that they provide (Table 3). An agent might specialize in the provision of a single logistics service (warehousing and trucking, etc.), or might provide a range of services (e.g., third party service providers), or might even be able to provide logistics support for the entire shipment process (e.g., fourth party service providers and integrators). Among these agents, freight forwarders have a unique role. Analogous to a travel agent, a freight forwarder handles a shipper's request and is typically responsible for the management of a shipment in addition to acting as a liaison with other agents for the client. Forwarders may also act as third party service providers to provide a range of logistics services. More generally, these third party logistics service providers are critical in the provision of logistics services, an essential element in managing supply chains (Chu *et al.* 2004).

In China, a very high proportion of shippers are first party service providers that deliver cargo to gateway airports via in-house resources, resulting in poor utilization of such resources (Hong *et al.* 2004). An important aspect of managing supply chains is the integration of trading, distribution and marketing. However, in China, these three sectors have been under state control with little to no integration (Baldinger 1998). Domestic market-oriented firms are severely

affected, as they typically need a large-scale nationwide network for distribution. These firms have to outsource distribution to logistics providers, which work with a variety of local service providers to establish a distribution network. As a result, supply chain related costs can be 30% to 40% of wholesale prices in China, compared with 5% to 20% in the U.S. (Tanzer 2001). If one takes into account the huge difference in wages between the two countries, then the actual efficiency gap is considerably higher.

3. SOES, TASK SPECIALIZATION, AND FRAGMENTATION

State-owned enterprises (SOEs) have traditionally played a dominant role in China's air cargo industry. Given its strategic importance in national security and long-term economic impact, the industry is regulated by the State Council with three groups of offices (Figure 3): ministries and commissions, including bureaus for the information industry, transport, and commerce, etc.; offices directly under the State Council, including industry and commerce, civil aviation, and customs, such as the Civil Aviation Administration of China (CAAC), which regulates the airline industry; and provincial governments and governments of municipalities, such as Beijing and Shanghai.

Each SOE in the air cargo industry is created to specialize in a mode, a region, or a specific air cargo service. The original goal of this kind of task specialization is efficiency in the task itself. However, task specialization commonly breeds fragmentation. It is not uncommon to see differences in practices or rules across different regions, modes, or services in the same industry. However, there are no designated entities dedicated to making sure that the air cargo shipping process is smooth.

How are different fragmented SOEs integrated in air cargo logistic processes? SOEs simply form alliances with each other, often involving cross-ownership by SOEs across different regions, modes, and services. China Cargo Airline, established in 1998, was 70% owned by China Eastern Airlines and 30% owned by COSCO (Figure 4). China Eastern Airlines is one of the three major airlines in China while COSCO is a major provider of ground transport, modern logistics, and freight forwarding services in China. Another example is China Post Airlines (Figure 5), a company providing services in air mail, air cargo and air freight forwarding. It is a joint venture by China Post, a specialized postal service provider in China, and China Southern Airlines, also one of the three major airlines in China.

The air cargo logistics process requires collaboration among providers of different services. In China's air cargo industry, it is common to see examples of joint ventures between task-specialized SOEs to smooth out the logistics process. One such example is Shenzhen Airport International Express Supervision Center Co. Ltd. (Figure 6), a company providing customs supervision and express cargo handling services at Shenzhen Airport. It is 50% owned by a subsidiary of Shenzhen Government, Total Logistics (Shenzhen) Co. Ltd., a task-specialized SOE in Shenzhen area, and 50% owned by the other subsidiary of Shenzhen Government, Shenzhen Airport Co. Ltd., also a task-specialized SOE in the same region. A similar case is Guangzhou Baiyun International Logistics (Figure 5), a company specializing in air cargo, air express, and third party logistics services. It is 29% owned by Guangzhou Baiyun International Airport Co. Ltd., a task-specialized SOE in Guangzhou area, and 61% owned by China Southern Airlines Co. Ltd., also a task-specialized SOE in the same region.

Other than collaboration among different service providers, the air cargo logistics process often involves operations across regions. It is also not uncommon to find joint ventures between regional-specialized SOEs to integrate operations in different regions. An interesting case is Dapeng International Forwarding (Figure 6). The company is a joint venture of a regional- and task-specialized SOE – the Shenzhen Airport – and another regional- and task-specialized SOE – Shanghai-based China Eastern Airlines. The formation of this company represents an integration of two tasks and two regions through joint ownership.

In examining the air cargo industry in China, the key irony appears to be that state-owned enterprises have task-specialized in an industry where integrating is equally as important if not more important. The above-mentioned examples of cross ownership and joint-ownership do not necessarily represent efficiency improvement in managing the shipment process. There are no real integrations in a structural sense as these SOEs may engage in risk-sharing collaboration rather than pursuing efficiency in the formation of joint venture. It is quite typical to find inefficiencies such as poor consolidation and integration of shipments, and inadequate utilization and allocation of resource.

4. BARRIERS TO FOREIGN ENTRY AND POLICY CONSTRAINTS

Foreign companies have been attracted by the huge potential of China's air cargo logistics market. However, there are tremendous barriers to foreign participation in China's air cargo sector, ranging from "hard" infrastructure barriers to various "soft" barriers arising from

domestic regulations, guidelines, institutions, and administrative mechanisms. These barriers not only limit market access, but also make it difficult to have integrated national air cargo logistics services.

4.1 Infrastructure Barriers

Inadequate airport and other transport-related infrastructure has been a major impediment to the growth of the air cargo logistics industry. Throughout most of the 1990s, only 10% of airports were capable of accommodating large aircraft (B747, MD-11) and passenger terminals were operating 15% over their capacity at major airports, whereas air cargo terminals and facilities could only handle 65% of potential demand. In addition to airport capacity, China's communications technology and transportation networks are still underdeveloped compared to those in developed economies. In customs operations, for example, although electronic data interchange (EDI) was initiated in 1992, there is still no schedule for mandatory electronic customs declaration and clearance. The use of EDI is still primitive and the customs clearing process remains a largely manual process. While there has been some effort to apply information technology (IT), it appears that it may be a long time before China will have a comprehensive electronic customs clearing process. There is also room for IT application to facilitate information flows in the air cargo logistics process. For example, communication between airlines and forwarders is still typically through fax and phone calls although most airlines operating in Beijing and Shanghai subscribe to IT services from SITA's Super Cargo System for cargo management in the airport.³

4.2 Market-Access and Regulatory Barriers

Foreign companies have encountered market access barriers that include regulatory restrictions, especially before China's WTO accession. Table 4 lists regulations on air cargo logistics-related industries before WTO accession. Specifically, foreign entry into the distribution/logistics industry was restricted by license and joint venture (JV) requirements. International JVs could offer air express, general cargo, and forwarding services, but foreign companies could only hold up to 50% ownership.

In terms of licensing, companies are required to hold certain licenses to engage in ground transportation, bonded warehousing, customs clearance, and related services. In the airfreight forwarding business, there are four classes. Class A license holders are major forwarders authorized to engage in airline booking, customs clearance, and consolidation. They typically

have their own warehouse facilities. Class B forwarders include international forwarding agents, with permanent offices but they usually do not have warehouse facilities. Classes C and D are forwarders outside major air cargo hubs (e.g., Shanghai and Beijing), or small agents feeding business to class A forwarders. The differences between class A and other licenses are as follows. Class A forwarders are able to perform a full range of controlled logistic services with customs brokerage, customs supervised warehouses and bonded trucks. They enter into contracts with carriers for rates and space, and issue master way bills to class B forwarders. Only class A forwarders are authorized to book cargo space and obtain master way bills directly from airlines. However, class A licenses are mainly reserved for large domestic firms; consequently, to obtain the license, foreign companies need to form JVs with large Chinese firms. Such license requirements hamper efforts by foreign services providers to organize an efficient or comprehensive logistics network.

In addition to having a class-A license, for the provision of a full range of services in China, an airfreight agency must obtain a host of other licenses such as a CAAC license for international airfreight, a CAAC license for domestic airfreight, and trucking licenses for each province and city. Although all four major integrators – FedEx, DHL, UPS, and TNT – have JVs in Beijing and Shanghai, domestic companies still dominate the airfreight logistics market, due partly to the license and JV requirements.

4.3 Local Protectionism

In the process of China's economic reform, more authority was decentralized to the regional level. Local governments were subsequently inclined to protect local firms to optimize local economic growth, employment, social stability, and tax revenues; as a result, "local protectionism," referring to the role of local governments in protecting their own companies (markets) against foreign companies, or companies from other regions, became a major barrier to the development of the logistics sector in China (Jiang and Prater 2002). As a consequence, China's domestic market became even more fragmented (Young 2000, Yin and Cai 2001).

In the context of logistics, the licensing requirements discussed above differ by region, thereby creating difficult operating problems for foreign companies – and in many instances, for domestic firms from other regions. A company must re-apply for new licenses if it opens subsidiaries in other provinces. In most cases, the application needs to be reported to government offices of the state, the province, and the city. For instance, a JV freight forwarding company must provide a report from the original local Ministry of Foreign Trade and Economic

Cooperation (MOFTEC) and a recommendation letter from the local MOFTEC in the planned city.⁴ In addition, there is often no central authority responsible for licensing supervision or for resolving other business problems even at the local level. For example, inter-airline contracts must be negotiated separately with the operations, sales, interline, and other functional managers at each airport. Taken together, these two observations – local protectionism and the fact that the licensing requirements differ by region – represent major barriers to the involvement of foreign logistics companies.

4.4 Institutional Barriers

A further constraint on the growth of foreign companies is heavy government involvement in the air cargo logistics industry. Although economic reform has gradually changed the ownership of enterprises in China, especially in the manufacturing sector, the change in the transport and logistics sectors has been relatively modest. China's three largest air carriers – Air China, China Eastern, and China Southern – are still majority state owned. As a result, government is likely to have too large a stake in their success to allow for quick, large-scale foreign entry. Furthermore, airports are owned and run by regional governments, with foreign ownership capped at 49%. Road transport, forwarding, storage/warehousing, and courier services consist mainly of small companies, many of which are owned by local governments and are subject to local protectionism.

In addition, major airport cargo terminals are owned and operated by incumbent domestic airlines, thus potentially creating a conflict of interest in handling air cargo. As an example, Air China operates the main cargo terminal at the Beijing airport, which handles over 80% of total air cargo volume through Beijing. Similar arrangements occur in Shanghai, where China Eastern, through its cargo unit China Cargo Airlines, is the operator of the dominant cargo terminal at the airport.

4.5 Government Functional and Inter-modal Barriers

The existing government structure has not kept pace with industrial development. First, there is no single regulatory/administrative governing body, as air cargo logistics is a new sector in China. Instead, different components of the sector usually belong to different government agencies. For example, as illustrated in Figure 3, the Ministry of Commerce (formerly, MOFTEC), the Ministry of Transport, the CAAC and Customs, among others, all have major influence on foreign airlines and freight forwarders. Second, vertical and horizontal divisions

within government functional systems constrain the sector's development. In particular, the functional system that applies to transportation is divided according to the mode. For instance, the Ministry of Transport is responsible for the country's road and water transportation, whereas the Ministry of Railways is responsible for rail transportation.

4.6 Administrative Barriers

Administrative barriers arise from interpreting or implementing government policies, such as the transparency of regulatory and administrative information that directly or indirectly prohibits trade in services, and foreign investment. Foreign companies have expressed concerns about excessive documentation requirements, lack of publicity of regulations, and lack of transparency of court rulings on business disputes. Specifically, the concern about transparency of regulations and court rulings arises from the fact that an airfreight logistics service provider needs to deal with various levels of administrative bodies and comply with many local regulations. In addition, there are insufficient inquiry points for dissemination of regulations, policy guidelines, and operation restrictions that pertain to the provision of air cargo logistics services in China.

4.7 Customs Barriers

A major administrative body involved in air cargo trade is the customs service. Customs performs two basic functions: trade facilitation and customs control. Historically, tariff collection was a major function. However, as tariff rates have been reduced over the years, the revenue-raising function has diminished in importance relative to trade facilitation. Furthermore, as international airfreight deals with the flow of time-sensitive, high-value goods, the trade facilitation role of customs is particularly important compared to internal shipping or trucking (Zhang, 2003). Shippers, logistics companies, traders, integrators, and airlines, however, all have identified China's time-consuming customs clearance procedures as a key constraint on the development of China's air cargo industry. Ruo (2002) shows that the time spent on crossing customs in China accounts for 42% of the entire international cargo flow. Yu (2002) indicates that customs delays in China can be attributed to complicated documentation examination procedures, complicated commodity inspection procedures, an out-dated IT infrastructure (see also the discussion in Section 4.1) and short operation hours (eight hours per day). As far as air cargo is concerned, the time lost at customs can be critical to the development of the industry.

4.8 Aviation Policy Constraints

As air transportation is a key component in the movement of airfreight, restrictive aviation policies can also limit foreign participation. Like most countries, China closes its domestic air routes to foreign companies. For international routes, all commercial aspects of air transportation have been governed by the restrictive bilateral air service agreements mandated at the Chicago Convention of 1944. China has been part of the bilateral system, and has in general adopted conservative international aviation policies (Zhang and Chen 2003). The conservative approach has resulted in limited air traffic rights between China and the rest of the world.

Given the limited traffic rights, the route/flight frequency allocation within China was biased toward Beijing, China's capital. In 1996, for instance, Beijing had 54 international routes (Table 2). In comparison, Shanghai, which is China's economic and commercial center, had 32 international routes and Guangzhou, the capital city of Guangdong province that once accounted for almost 40% of China's foreign trade, had only 17 international routes. While Beijing's airfreight was only 73% of Shanghai's airfreight at the time, it was No. 1 in air passenger traffic. Unfulfilled airfreight demand in Shanghai was shipped to Beijing (or Hong Kong) for outbound movement. Similarly, international inbound traffic flew to Beijing first, and then was shipped to Shanghai, thereby resulting in extra time and cost for shippers and carriers. The suboptimal cargo network was an impediment to air cargo growth.

5. EFFECT OF WTO ACCESSION

5.1 WTO Commitments

After almost 15 years of negotiations, China was accepted as a member of the WTO in December 2001. With WTO membership, China is required to adopt trade liberalization measures consistent with WTO rules. The implementation of these measures implies a substantial reduction in tariff and non-tariff barriers across all economic sectors. Moreover, the accession agreement stated that the barriers to market entry to various service sectors needed to be eliminated by 2005.

Pertaining to the air cargo industry, China is required to liberalize trading and distribution rights for foreign companies, and relax ownership restrictions on logistics services providers, thus creating opportunities for foreign direct investment (FDI). Table 5 shows the relevant WTO

commitments on transportation and logistics services. In particular, foreign companies can soon assume majority ownership in forwarding and warehousing; to some extent this is already happening. Foreign companies will be able to operate as wholly-owned enterprises in the not too distant future.

Table 5 does not cover air transportation, which is a key component of air cargo movement and logistics. In fact, air transportation is currently not under the WTO multilateral framework. Nonetheless, the Uruguay Round of the General Agreement on Tariffs and Trade, the predecessor of the WTO, did succeed in applying multilateral trade disciplines to three, though relatively minor, aspects of the air transport sector: aircraft repair and maintenance, the selling and marketing of air transport services, and computer reservation system services. This was done in the form of a separate “Annex on Air Transport Services” under the General Agreement on Trade in Services (GATS). As a result, the current restriction of minority share investment in international JVs in aircraft repair and maintenance will also be lifted as a result of WTO accession.

5.2 Recent Liberalization Measures in Aviation Policy

Despite the success in applying multilateral trade disciplines to the three air transport services, the Annex specifically excluded measures affecting traffic rights and services directly related to the exercise of traffic rights.⁵ The GATS rules require that the Annex be reviewed at least every five years, but the first review in 2000 did not accomplish much. Nevertheless, as indicated above, WTO accession means lower barriers to trade and FDI, and thereby makes China more integrated in the global economy. To facilitate this globalization, the country certainly needs a more liberal air transportation regime.

Consistent with this WTO spirit, China has been moving towards a more liberal international policy regime since her WTO entry. In 1999 China and the U.S. implemented an expanded air services agreement (ASA), which included a fourth carrier from each side and an increase in weekly services from 27 to 54. UPS was then added as the fourth carrier from the U.S. side. Together with FedEx, the other U.S. all-cargo carrier, the addition of UPS further stimulated competition in China’s air cargo market. As some important U.S. carriers (Delta and American) were not included in the designated four, expanded code-sharing arrangements (Delta/China Southern and American/China Eastern) then became an important additional mechanism of liberalization. In July 2004, China and the U.S. signed a far more liberal ASA. As can be seen from Table 6, the new ASA adds five more carriers from each side to the bilateral

market, which will be progressively implemented, in phases, by 2010. Furthermore, it includes an increase in weekly services from 54 – consisting of 37 passenger flights and 17 air cargo flights – to 249. Of the 249 flights to be operated by each side, over half, or 128 flights, will be cargo flights. This agreement represents a bold move towards a liberal regime by China. Under the 1999 ASA, whilst the U.S. carriers had fully utilized the 54 weekly flights allocated to them, Chinese carriers utilized only 47 flights and their load factors were less than desired.

Thus, the new ASA may signal an important policy shift, away from China's traditional conservative international policy motivated primarily by the protection of her weak carriers. In other words, international aviation policy serves primarily as the role of facilitating trade, FDI, and economic development. This is particularly so in the case of air cargo, which is consistent with the new government policy of liberalizing air cargo rights ahead of passenger traffic rights.

In addition to the new Sino-U.S. ASA, two other developments are worth noting. First, in May 2003, Singapore Air Cargo was granted fifth freedom rights from Singapore, to Xiamen and Nanjing, to Los Angeles, Chicago, and Anchorage in the U.S. (SinoCast China Business Daily News, May 26, 2003). This was a very rare event, but since then, a significant number of fifth freedom traffic rights have been granted to foreign airlines. For example, the Sino-US ASA contains provisions for U.S. cargo airlines (e.g. FedEx and UPS) to set up hub operations within China, implicitly granting them fifth or seventh freedom rights. Second, China declared an "open skies" policy for Hainan province. Under the arrangement, the CAAC will waive the right to reciprocal air rights in exchange for new services to Hainan and will not require existing bilateral ASAs to be renegotiated. Furthermore, it will not place restrictions on the country of origin of carriers flying to Hainan, and will allow both passenger and cargo operations. In addition, the CAAC will enact a new landing-visa program in Hainan for citizens of all nations (South China Morning Post, July 16, 2003).⁶

5.3 Foreign Direct Investment in Air Transportation

Consistent with the spirit of WTO accession, China has recently made important concessions by allowing foreign companies to take larger equity stakes in domestic airlines. Since 2002, foreign investors have been allowed to take stakes of up to 49% – as long as no single investor holds more than 25% – compared with the maximum 35% allowed under the earlier regulation. For the "Big Three," 10% of Air China's stock is held by Cathay Pacific Airways, whereas 35% of China Southern is held by foreign investors. China Eastern is about 33% foreign owned, and has indicated that it will apply to increase its foreign participation. In

April 2003, the CAAC approved the sale of a 25% stake in China Cargo Airline (CCA) to Taiwan's China Airlines. The deal makes China Airlines CCA's second-largest shareholder. More recently, Lufthansa Cargo invested 25% in a new all-cargo airline based in Shenzhen.

The recent wave of FDI in air transportation may be viewed as a continuation of the gradual relaxation of restrictions on foreign investment. The relaxation of foreign ownership restrictions in the Chinese airline industry began in the mid-1990s. In May 1994, the CAAC announced that foreign investors were allowed to enter JVs with, or buy stock of, Chinese airlines. A ceiling was set at 35% of capital and 25% of voting stock. The first, and indeed the largest, investment was George Soros' US\$25 million acquisition of a 25% stake in Hainan Airlines in 1995. Nevertheless, WTO accession has accelerated the pace and scale of FDI in the sector.

5.4 Regional Protection to Continue?

As indicated earlier, fragmentation coupled with local protection has formed a major barrier to the involvement of foreign logistics companies (or companies from other regions). With WTO entry, is it likely that local protectionism will still continue for quite a while? Air cargo logistics is a service sector, and service trade under the WTO is governed by the GATS. The two most important principles of the GATS are the *most-favored-nation* clause and *national treatment*. In particular, application of the national-treatment principle to service industries requires that foreign companies are treated in the same manner as comparable domestic companies. On the other hand, a country's WTO commitments dictate, in general, that the country must open market access throughout its entire territory. Taken together, these two observations would suggest a negative answer to the above question.

One potential cause for concern is derived from the fact that China is a vast country with regions at different levels of economic, legal, and administrative development, and has historically been riddled with local protectionist measures. The entry promises that result from WTO accession have been negotiated between China's Central Government and other WTO member countries, but the *implementation* of these commitments is likely to occur at the local provincial, municipal, county, and town levels. Bosworth (2002) points out that the obligations under the GATS covering sub-national (local) governments are weaker than those applying to the national government. The requirement is that members take only "reasonable measures" to ensure that sub-national governments meet their obligations. Fortunately, China's commitments under its Protocol of Accession specifically require that it maintain a uniform system of

administration. Furthermore, the central government is required to establish a mechanism whereby those concerned about problems of regional protection may bring their concerns to its attention. These specific provisions seem likely to make the restrictions on China stronger than those under general WTO rules (Luo and Findlay, 2002).

Li and Zhang (2003) show that, in effect, China's WTO entry will facilitate domestic regional liberalization, but that it will not necessitate domestic regional liberalization. The latter result arises in part from the close tie between local governments and their companies: that is, local state-owned enterprises. Finding solutions to local protectionism is thus related partly to SOE reform. The WTO entry has certainly provided additional impetus and momentum for China's SOE reform. In particular, it will deepen the reform in two respects: the separation of ownership and operation, and the privatization of SOEs. Currently, as illustrated earlier, the offices under the State Council still both regulate and operate a business in many sub-sectors of air cargo logistics, thus leading to a clear conflict of interests. While China has deliberated about such separation since the mid-1990s, it has only been since the WTO entry that clear signals of such implementation have been forthcoming. Airport decentralization is such an example. At the beginning of 2002, the CAAC decided to surrender airport control to local governments. The reform would separate the CAAC's regulatory role from its ownership and operating roles, paving the way for more market-oriented management.⁷ As for the privatization of SOEs, despite the success of its rural reform, China's industrial reforms, consisting of a series of attempts to tackle the poor performance of SOEs, have proved to be much more difficult. As the WTO entry will accelerate the entry of foreign companies, the privatization trend is expected to continue, especially in the air cargo logistics sector, in an effort to improve firms' efficiency and competitiveness.

6. PREDICTIONS OF CHINA'S AIR CARGO INDUSTRY

6.1 Continued Rapid Growth

Air cargo has been one of the fastest growing sectors in the world economy for the last four decades. Whereas world economic growth has slowed over the last few years, China has continued its robust economic growth, recording an annual growth of 9.3% for the 2000-2003 period. Paralleling her phenomenal economic growth, China has grown into one of the world's major manufacturing centers and is now the No. 1 destination for the world's FDI flow

(surpassing the U.S.). These factors, together with major events such the 2008 Beijing Olympics and the 2010 Shanghai World Expo, will certainly stimulate the country's airfreight demand.

The high growth in demand will be facilitated by various infrastructure and policy support more now than ever before. As previously discussed, China has been moving towards a more liberal air transport policy regime over the last five years, in line with its broader trade expansion goals and accession to the WTO. In addition, there have been significant improvements in air cargo-related infrastructures. Many new airports (e.g. Shenzhen, Zhuhai, Shanghai Pudong, Hangzhou, and Guangzhou) have been built, and major airport expansions (e.g. Beijing, Shanghai Hongqiao) have been undertaken. Taking these factors into consideration, Boeing forecasted (in its World Air Cargo Forecast released in May 2003) that whereas world air cargo would grow at 6.4% annually between 2001 and 2021, domestic China air cargo would grow at 10.3% per year, the fastest growing market in the world (Boeing, 2003). Furthermore, China's air passenger traffic market was forecasted to grow at 7.6% annually over the 2001-2021 period (the corresponding growth rate for the world as a whole is 5.1%). With these growth rates, China is already the fourth-largest passenger market and the fifth-largest freight market in the world, and is expected to become the largest commercial aviation market outside the U.S. by 2021 – generating demand for more than 1,900 new jet airplanes worth US\$165 billion over the next 20 years. In addition, WTO accession will further result in rapid growth of the air cargo market.

6.2 Emerging Patterns of Air Cargo Services Supply

Clearly, the air cargo business is set to grow in China, but the shape of this growth has yet to be determined. As indicated earlier, air cargo is shipped primarily in passenger aircraft. This is not unique to China, and can be considered a feature of Asia's air cargo industry. In Hong Kong, for instance, between 55% and 60% of airfreight is carried in the belly compartments of passenger aircraft. As a consequence, in Asia, passenger airlines compete keenly for general air cargo business. This model is in sharp contrast to the pattern developed in the U.S., where most passenger carriers use narrow-bodied aircraft for their domestic operations, which puts severe limitations on their capacity to carry cargo. As a result, dedicated air express carriers have emerged, using a combination of wide- and narrow-bodied aircraft, over 20 years raising their share of cargo carried from 4% to 60% (Zhang and Zhang, 2002a).

Although air cargo growth in Asia in general is not likely to converge with the U.S. pattern, there is good reason to believe that China will move towards the U.S. model. This

prediction is based primarily on the existence of a potentially large domestic market, which should be conducive to the use of narrow-bodied aircraft for passenger traffic, and to the separation of passenger transport services from cargo services. We have already seen some signs of this separation happening. Both China Eastern and Air China have set up independent all-cargo airlines by forming equity alliances with foreign airlines. China Southern also plans to establish a new all-cargo airline soon (Hong Kong Da Gong Bao, January 28, 2003). In addition, several independent cargo airlines have either just been established or are in the planning stage with private investors (most often with foreign equity participation).

This development of separating cargo from passenger services will have a significant impact on policy and air cargo market liberalization. In particular, it will make cargo liberalization easier than it would have been otherwise. One of the most difficult, but key, issues in the negotiation of international air services agreements is that negotiation of cargo rights may not be easily separated from negotiation of passenger rights in those circumstances where cargo and passenger products are jointly produced (Zhang and Zhang, 2002b). Fortunately, segregation of the cargo and passenger operations foreseen for China is in parallel with the liberalization trend and policy in the international aviation market. There is an effort to put air cargo under the GATS because of a stronger rationale for cargo liberalization – the optimal air cargo routing is circular rather than bilateral – than passenger liberalization, thereby requiring the fifth/seventh freedoms that allow cargo to go through third countries, and to set up regional air cargo hubs. There is also a stronger push by relatively concentrated shippers and governments. Low transportation costs are a key to the international competitiveness of firms, regions, and nations.

6.3 Industrial Structure and Strategic Alliances

In the airline industry, WTO accession has provided the major impetus for China to examine the competitiveness of her state-owned carriers. Following deregulation in the 1980s, China developed a highly-fragmented domestic airline industry, with more than two dozen carriers, some with only two or three airplanes. To make the industry more competitive in the face of rising international competition post-WTO and to give airlines greater autonomy, the CAAC launched three new aviation groups in October 2002 by consolidating the ten carriers under its control. Each group would have assets of about US\$6 billion (50 billion yuan) and fleets of more than 100 aircraft (Far Eastern Economic Review, December 10, 2002). The three anchoring carriers are Air China, China Eastern and China Southern; together, the three consortia account for over 80% of domestic flights.

As long as the air cargo industry remains a strategic industry, it is very likely that there will be the presence of state-owned enterprises in one form or another, simply because the government will wish to retain a certain degree of control over the industry. However, the competitiveness of these SOEs will need to be substantially strengthened, as the implicit advantage of government protection will be gradually eroded when the industry opens up after the WTO entry. Consequently, there should be several consolidations of SOEs. The huge matrix of hybrid SOEs will likely be consolidated to become more competitive, as the regulating functions and business operation functions of air transport are separated.

With WTO accession, foreign companies can assume majority ownership and can even be sole owners of air cargo-related enterprises. Despite this, local knowledge and networking is vital. Only enterprises that excel in physical and information integration across regions are likely to grow and prosper in a transforming economy that is significantly different from the market economy in developed countries. Foreign companies face many risks including over regulation, rule changes, and local protectionism. More importantly, as only the fittest SOEs will survive the gradually opening competition, foreign enterprises should seek local JV partners that are truly strong.⁸ Whether an enterprise is state-owned, privately-owned or joint-ventured, we predict that strategic alliances, largely in the form of share-holding, will be the norm in the future and Chinese enterprises with strong regional influence will be favored JV partners.

7. CONCLUDING REMARKS

The main objectives of this paper were to provide an overview of the air cargo industry in China, and to discuss the implications of globalization and WTO accession for foreign air cargo logistics companies. We found that China's air cargo industry is fragmented and operating with few market mechanisms. The industry has been highly protected and regulated, and is dominated by state-owned enterprises, due to prevalent local protection, and rigid functional demarcation. The industry has no single regulatory/administrative governing body. Instead, different components of the industry typically belong to different government agencies. For instance, the functional system that applies to transportation is divided according to the mode of transport, and the same systems operate at both local and higher levels of government. Responsibility and power overlap between departmental and regional administrations.

The fragmentation of the air cargo industry contravenes the growing need of modern management of logistics process, which requires integration, both physically and with

information, in managing supply chains. Currently, different fragmented SOEs simply form partnerships – largely in the form of equity alliances – with each other, in an effort to address the problem. There is a huge matrix of hybrids of SOEs, which involve cross-ownership (owned by SOEs across different regions, modes, and services). However, the alliances of functional and regional-based SOEs have not done a good job in integrating air cargo shipments, individually and collectively, and do not necessarily represent efficiency improvement in managing the shipment process.

Foreign companies are attracted by the huge potential of China's air cargo market, but there are tremendous barriers to foreign participation. These barriers arise from a variety of sources, ranging from domestic regulations, guidelines, institutions and administrative mechanisms to infrastructure and policy constraints. However, China's recent accession to the WTO establishes the country's commitment to the liberalization of distribution rights and to the relaxation of restrictions on services such as logistics. In addition, China has undertaken a series of liberalization measures for air transportation, which, *per se*, are not under the WTO framework and so are not covered by her WTO agreements. Together with the size of China's air cargo market, WTO accession will create tremendous opportunities for foreign investors as well as foreign air cargo logistics companies.

There are a number of potential areas for future research. First, given the historical background of the industry, it would be very instructive to analyze its future evolution from the perspective of changing the ownership structure. The latter is taking place at a rapid pace owing to both the deepening of the SOE reform, which includes separation of ownership and operation, share-holding enterprises and privatization, and the elimination of foreign ownership restrictions following WTO accession. Relevant research questions include whether hybrid forms of ownership – i.e., the alliances of functional- and regional-based SOEs identified in this paper – will give way to integration, and how that will affect the industry and shippers.

Second, this paper has described the (potential) tension between the current institutional arrangements – especially, barriers arising across regions and across modes – and the integration requirements of the modern air cargo logistics management. It is important to analyze this tension or conflict by explicitly modeling the efficiency criteria of cargo operations, such as cost minimization, or service quality maximization, or both. Finally, as previously mentioned, air cargo growth in Asia in general is not likely to converge with the U.S. pattern, in which air cargo transportation is provided by dedicated express carriers. However, there is good reason to believe that China will move towards the U.S. model, and there are some signs of this already

happening. Yet it took over 20 years for dedicated express carriers to dominate the air cargo market in the U.S. A comparative study of the U.S., Asia in general, and China in particular would be useful in pointing out both the business opportunities and overall economic effects of a similar process in China.

End Note

- ¹ In this article, “China” refers to mainland China. Thus, cargo throughput in China excludes Hong Kong and Macau, the two Special Administrative Regions of China. Furthermore, “domestic” routes refer to intra-mainland routes, whereas non-domestic routes are either international routes with other countries, or “regional routes” including Hong Kong and Macau.
- ² See Heaver (2004) for a comprehensive review of China’s logistics industry.
- ³ SITA stands for 'Société Internationale de Télécommunications Aéronautiques'.
- ⁴ This is stated in the application procedure for a foreign international freight forwarder license published by MOFTEC on 9 September 1996, regulation 12.
- ⁵ Traffic rights were defined in the widest sense to include routes, capacity, pricing and the criteria for the designation of airlines. Specifically, paragraph 6(d) of the annex states that “traffic rights mean the right for scheduled and non-scheduled services to operate and/or carry passengers, cargo and mail for remuneration or hire from, to, within, or over the territory of a member, including points to be served, routes to be operated, types of traffic to be carried, capacity to be provided, tariffs to be charged and their conditions, and criteria for designation of airlines, including such criteria as number, ownership and control.”
- ⁶ A main purpose of the open-skies policy is to help the southern island to compete with rival tourist centers in Southeast Asia. According to CAAC figures, 12 million people visited Hainan in 2002, but just 3%, or 389,400, came from outside China. In comparison, in 2001, about 2.7 million foreign tourists visited Phuket in Thailand, and nearly 1.3 million foreign travelers visited Bali in Indonesia.
- ⁷ The CAAC has just completed this reform. It will however retain administrative control over Beijing’s Capital International Airport and airports in politically sensitive Tibet.
- ⁸ The success of foreign JVs operating in China has been mixed over the years. There have been many reasons for lack of success. One reason that is often cited is the misrepresentation of competency by local partners. Typically, a local partner that appears to be strong on paper does not live up to its reputation. As minority partners, foreign companies are often left with limited power to effect changes. In the air cargo industry, although many supposed logistics service providers claim expertise in the industry, their know-how is not comprehensive. Many such companies have short-sighted management, and there is no clear responsibility within the operations.

References

- Baldinger, Pamela (1998) "Secrets of the Supply Chain," *China Business Review*, September-October 1998, 8-17.
- Boeing (2003), *Current Market Outlook*, Boeing Commercial Aircraft Company, 2003.
- Bolton, Jamie M. and Yan Wei (2003) "Distribution and Logistics in Today's China," *China Business Review*, September-October 2003, 8-13.
- Bosworth, Malcolm (2002) "Most-favored-nation Treatment and National Treatment in the GATS," in Sherry Stephenson and Christopher Findlay (eds.), *Services Trade Liberalization and Facilitation*, Asia Pacific Press, ANU, Canberra.
- Chu, Sung-Chi, Lawrence C. Leung, Yer Van Hui, and Waiman Cheung (2004) *4th Party Cyber Logistics for Air Cargo*, Kluwer Academic Publishers, Boston.
- Civil Aviation Department Hong Kong (various years) *Annual Report*.
- Heaver, Trevor (2004) "Logistics in East Asia," in Shahid Yusuf, M. Anjum Altaf and Kaoru Nabeshima (eds.), *Global Production Networking and Technological Change in East Asia*, co-published by Oxford University Press and the World Bank.
- Hong, Junjie, Anthony T.H. Chin and Binglian Liu (2004) "Logistics Outsourcing by Manufacturers in China: A Survey of the Industry," *Transportation Journal*, 43: 17-25.
- Jiang, Bin and Edmund Prater (2002) "Distribution and Logistics Development in China: The Revolution Has Begun," *International Journal of Physical Distribution & Logistics Management*, 32: 783-798.
- Li, Jie and Anming Zhang (2003) "WTO Accession and China's Domestic Regional Liberalization: A Theoretical Analysis," *Pacific Economic Review*, 8: 127-142.
- Luo, Wenping and Christopher Findlay (2002) "Logistics in China: Implications of Accession to the WTO," Unpublished manuscript, Australian National University.
- Mann, Ainsley (2001) "Dry Packaged Goods: Overcoming Logistical Hurdles," *China Business Review*, July-August 2001, 24-29.

National Bureau of Statistics of China ed. (various years) *China Statistical Yearbook*, China Statistics Press, Beijing.

Powers, Patrick (2001) "Distribution in China: The End of the Beginning," *China Business Review*, July-August 2001: 8-12.

Ruo, Gui-Hua (2002) "Shanghai Customs Clearance Procedures and Logistics Information Services," Presentation to the *Forum on "WTO Implications on Air Cargo Logistics in China,"* December 2002, Hong Kong.

Tanzer, A. (2001) "Chinese Walls," *Forbes*, November 12, 2001.

Yin, Wenquan and Wanru Cai (2001) "The Genesis of Regional Barriers in China's Local Market and Countermeasures," *Economic Research* (Jing Ji Yan Jiu, in Chinese), 6: 3-12.

Young, Alwyn (2000) "The Razor's Edge: Distortions and Incremental Reform in the People's Republic of China," *Quarterly Journal of Economics*, 115: 1091-1135.

Yu, Shen (2002) "International Logistics and Customs Management: Practice in Shanghai Customs," Presentation to the *Forum on "WTO Implications on Air Cargo Logistics in China,"* December 2002, Hong Kong.

Zhang, Anming (2003) "Electronic Technology and Simplification of Customs Regulations and Procedures in Air Cargo Trade," *Journal of Air Transportation*, 8: 87-102.

Zhang, Anming and Hongmin Chen (2003) "Evolution of China's Air Transport Development and Policy Towards International Liberalization," *Transportation Journal*, 42: 31-49.

Zhang, Anming and Yimin Zhang (2002a) "Issues on Liberalization of Air Cargo Services in International Aviation," *Journal of Air Transport Management*, 8: 275-287.

Zhang, Anming and Yimin Zhang (2002b) "A Model of Air Cargo Liberalization: Passenger vs. All-cargo Carriers," *Transportation Research, E (Logistics)*, 38: 175-191.

Zhong Guo Min Yong Hang Kong Zong Ju Ji Hua Si, ed. (various years) *Statistical Data on Civil Aviation of China*, China Civil Aviation Publishing House, China.

Table 1. Air Cargo Throughput in Major Chinese Cities and Hong Kong (tonnes)

	Beijing*	Shanghai*	Guangzhou*	China*		Hong Kong [#]	
				Total	Ann. growth %	Total	Ann. growth %
1980	37,850	21,207	25,432	157,390	-	258,627	-
1985	105,333	67,964	57,788	390,934	-	447,681	-
1990	141,972	126,768	125,356	658,405	-	811,493	-
1991	152,168	155,620	151,216	787,366	19.6	868,227	7
1992	187,115	186,632	171,374	998,269	26.8	989,676	14
1993	225,287	235,625	188,262	1,229,064	23.1	1,174,861	18.7
1994	242,120	270,216	233,856	1,499,717	22	1,332,186	13.4
1995	371,384	366,302	278,797	1,961,543	30.8	1,477,084	10.9
1996	390,098	408,021	320,951	2,288,502	16.7	1,622,234	9.8
1997	457,540	476,011	351,770	2,571,312	12.4	1,795,740	10.7
1998	511,142	571,774	407,570	2,883,601	12.1	1,643,588	-8.5
1999	628,209	765,819	448,117	3,467,351	20.2	2,059,988	25.3
2000	774,205	878,902	491,868	4,001,776	15.4	2,229,545	8.2
2001	591,195	804,465	456,270	3,392,759	-15.2	2,119,620	-4.9
2002	629,045	1,074,870	496,880	4,018,341	18.4	2,545,654	20.1
2003	662,746	1,397,827	453,738	4,517,441	12.4	2,737,376	7.5
2004	668,690	1,936,196	506,988	5,525,765	22.3	3,154,289	15.2

* The 2001-2003 data contain mail and cargo, while others include luggage as well.

[#] Hong Kong data contain cargo only, and are compiled according to fiscal year, e.g. the 1980 data contain April 1980 to March 1981.

Sources: Annual Report of Hong Kong Civil Aviation Department, various years; Statistical Data on Civil Aviation of China, various issues.

Table 2. Changes in Air Cargo Throughput (tons) and Connections, 1990-2003

City	1990				1996				2003			
	Cargo	Connections			Cargo	Connections			Cargo	Connections		
		Domestic	Int'l	Total		Domestic	Int'l	Total		Domestic	Int'l	Total
Shenzhen	n/a	n/a	n/a	n/a	90,435	25	2	27	353,597	64	3	67
Xiamen	17,884	2	3	5	91,589	19	8	27	120,552	44	13	57
Haikou	7,372	3	1	4	39,678	11	-	11	56,970	42	2	44
Shanghai	126,768	19	13	32	408,021	38	32	70	1,397,827	61	65	126
Wuhan	8,172	3	0	3	34,464	14	-	14	55,022	22	2	24
Beijing	141,972	22	35	57	390,098	44	54	98	662,746	61	65	126
Guangzhou	125,356	31	7	38	320,951	40	17	57	453,738	57	18	75
Chengdu	34,604	7	1	8	99,727	23	3	26	177,310	48	6	54
Xian	18,780	4	0	4	49,031	11	4	15	62,859	36	9	45
Shenyang	13,113	3	1	4	32,781	8	4	12	69,509	24	10	34

Notes: 1. The 2003 data contain mail and cargo, while the 1990 and 1996 data include luggage as well.

2. Hong Kong and Macau routes are counted as international connection cities in the table.

Sources: China Statistical Yearbook, various issues; Statistical Data on Civil Aviation of China, various issues.

Table 3. Definition of Logistics Service Providers

Type	Definition
First Party Logistics (1PL)	Own all logistics assets and manage their logistics functions, e.g. suppliers
Second Party Logistics (2PL)	Are commodity capacity providers, supporting the geographically expansion of 1PL and facilitating logistics services for the 1PL, e.g. trucking companies
Third Party Logistics (3PL)	Handle and integrate different logistics functions, involving in some management capacity of a supply chain, e.g. freight forwarders
Fourth Party Logistics (4PL)	Are service integrators of 2PL and 3PL, serving a single contact point for the 1PL. They provide end-to-end solutions to ensure high value-added supply chain services to the 1PL.

Source: Chu *et al.* (2004).

Table 4. Regulations on Air Cargo Logistics-related Sectors Before WTO Accession

Sector	Regulatory Barriers on Foreign Companies
Freight Transport by Rail and Road	- Joint venture (JV) partnership allowed to conduct cross-boundary operations with Hong Kong only
Storage and Warehousing	- Permitted to own warehouses in free trade zones (FTZs) for company use - No ownership or management of warehouses is permitted outside FTZs
Freight Forwarding	- Only minority share investment in JVs accepted - Limited to certain geographic areas - Generally not allowed to handle domestic freight forwarding
Aircraft Repair and Maintenance	- Only minority share investment in JVs accepted
Courier Services	- Only minority share investment in JVs accepted - Generally not allowed to do domestic express business - One year to set up branches and five years to form another JV

Table 5. China's WTO Commitments on Transportation and Logistics Services

Sector	Upon Entry: Dec. 11, 2001	Status*	Year One: By Dec. 11, 2002	Status*	Year Two: By December 11, 2003	Year Three: By Dec. 11, 2004	Status*	Year Four: By Dec. 11, 2005	Year Six: By Dec. 11, 2007	Status*
Rail Transport	Up to 49% foreign equity permitted	Permitted 2002-03 (freight only)					Majority foreign equity permitted	Permitted 2004-06 (freight only)	100% foreign equity permitted	No limits on foreign participation after 2006
Road Transport	Up to 49% foreign equity permitted		Majority foreign equity permitted	Permitted as of Dec. 1, 2002, but capped at 75%. Higher proportion permitted in certain sectors and in western areas.			100% foreign equity permitted			
Storage and Warehousing	Up to 49% foreign equity permitted		Majority foreign equity permitted	Warehousing permitted for road transport and BMN.			100% foreign equity permitted			
Freight Forwarding	Up to 50% foreign equity permitted, with certain conditions. 5-year waiting period for second JV.		Majority foreign equity permitted with certain conditions.	Permitted as of Jan. 11, 2003, but foreign equity capped at 75%	Waiting period for second JV reduced to 2 years. National treatment for registered capital requirements for branches.			100% foreign equity permitted. National treatment for capital requirements for subsidiaries.		

* As of August 2003. *Source:* Bolton and Wei (2003).

Table 6. New China-U.S. Air Services Agreement (ASA), July 2004

	Before July 2004	New ASA: Effective by stages to 2010
Flights per week	54	249
- Passenger	37	121
- Cargo	17	128
U.S. to China Routes		
- Passenger	5 cities	No restriction on destination
- Cargo	Any cities	
China to U.S. Routes		
- Passenger	12 cities	No restriction on destination
- Cargo	-	
Airlines	Four airlines each side U.S.: FedEx, United, Northwest, UPS China: Air China, China Eastern, China Southern, China Post Airlines	Nine airlines each side U.S. side: can add one all-cargo airline immediately after signing the ASA

Source: www.carnoc.com; www.dot.gov.



Figure 1. Aviation Hubs in China

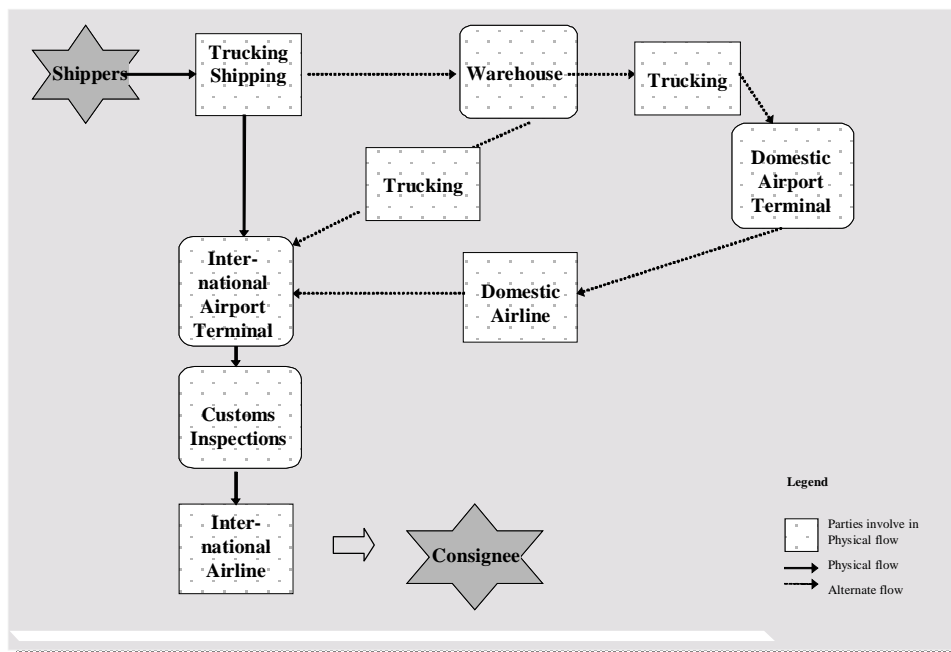
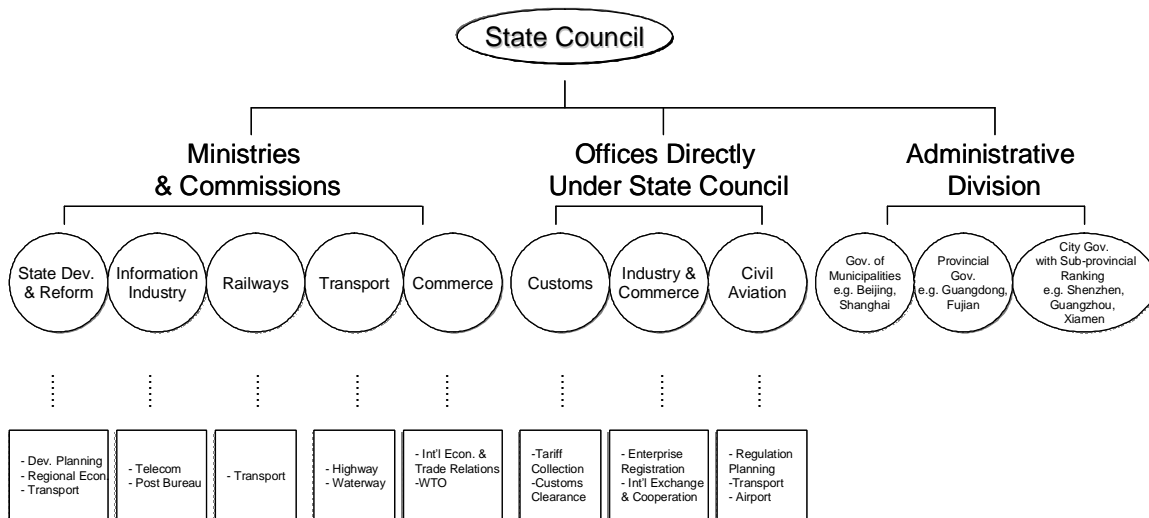
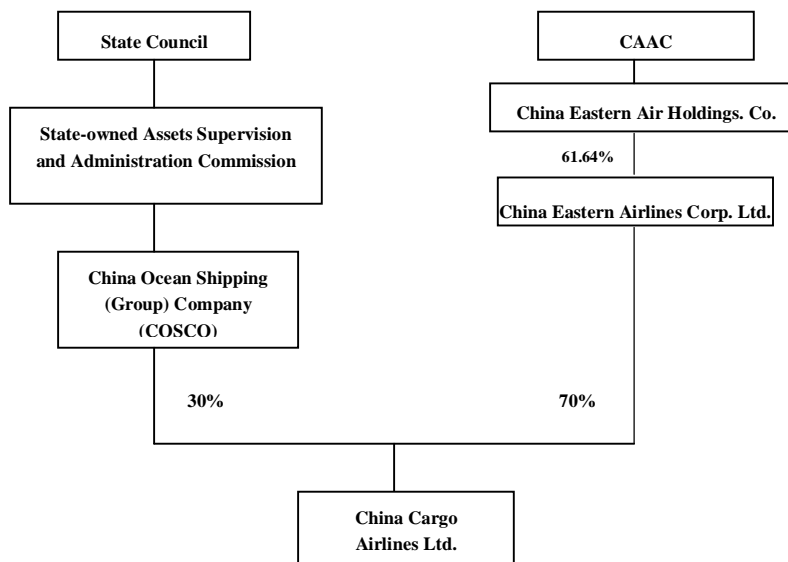


Figure 2. Air Cargo Shipping Process



Source: China.org.cn (May 2003)

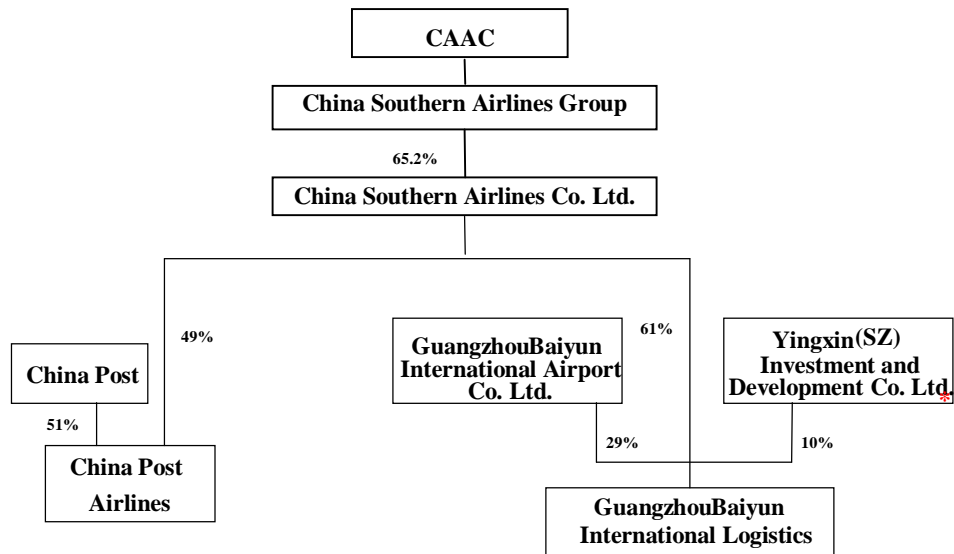
Figure 3. Air Cargo related interests under China's State Council



Source:
China Eastern Airlines Corp. Ltd.
Dart Express Group

Notes:
English name of the company with (*) is translated by the Authors

Figure 4. China Cargo Airlines: Alliance of Logistics Service Provider and Airlines Company



Source:
 China Post
 Guangzhou Baiyun International Airport Co. Ltd.

Notes:
 English name of the company with (*) is translated by the Authors

**Figure 5. China Post Airlines: Alliance of Postal Service Provider and Airlines;
 Guangzhou Baiyun International Logistics: Alliance of Airport and Airlines Company.**



Source:
 Shenzhen Airport Co. Ltd..
 Shenzhen International Holdings Ltd.
 Air Tiger Express Companies, Inc.
 Dapeng (Shanghai) International Forwarding Co. Ltd..

**Figure 6. Dapeng: Alliance of Airport and Airlines, Across Regions;
 SAIESC: Alliance of Logistics Service Provider and Airport, Same Region.**