Logistics in China:
Implications of Accession to the WTO

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1 Introduction

Work on the geography of poverty has shown how changes in transport costs, even when they make up a small share of the value of a product, can lead to large changes in value added and in growth rates (see Redding and Venables (2000) and Radelet and Sachs (1998)). The rate at which transport costs are accumulated over distance is usually taken as given and the focus in this work is on the effect of location on the variation in incomes. Policy prescriptions usually refer to processes under direct government control, for example, port operations or customs procedures. However in this paper we stress that policy reform, especially via commitments in the WTO, can lead to significant effects not just on transport prices but also on other costs of getting goods to market in the form that consumers prefer. These effects are important not just in international trade but also in trade within an economy. Reductions in this set of costs can add to value added, especially in remote, and poor, areas.

We illustrate these points in a study of the logistics sector in China and of the impact of China’s WTO accession on the performance of that sector. The concept of logistics continues to evolve and recently has become a ‘hot’ topic in China. There is strong interest therefore in logistics services from both businesses and policy-makers. Developing what might be called ‘the logistics way of thinking’ is taking up a significant part of seminar and management training time in China. There is an appreciation that systems, processes and perspectives, that is, the software of the business, is just as important as the physical assets, if not more so, in the growth of enterprises which are internationally competitive in logistics.

We argue in this paper that WTO accession has significant implications for the sector. While there is not any easy match between the various GATS categories and the modern scope of the logistics, it is possible to make a concordance. We complete that work in order to comment on the implications of China’s accession commitments. The requirement to make these associations illustrates an important feature of scheduling
commitments under GATS in emerging business areas.

The next section reviews the definition of logistics services and the following section provides an overview of their evolution in China.\(^1\) We then outline the WTO commitments made by China in relation to this sector and reach a set of conclusions on their direct effects and their indirect implications. The former, we stress, include substantial real resource savings and not just transfer effects with some relatively small efficiency effects.

The indirect effects include reference to policy-making processes and administrative structures. The analysis here highlights the value of complementary reforms in domestic institutions and regulatory agencies and their processes in order to maximise the gains from liberalization.

The following two sections of the paper contain a discussion of the likely orders of magnitude of effects on total logistics costs of a more open logistics sector and discuss the significance of these changes for poor areas in China. We stress the significance of the gains in terms of the scope to increase value added in production processes in poor areas. Some of the main points are revisited in the final section of the paper.

### 2 Logistics Defined

Logistics is the process of planning, implementing and controlling the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption to meet customers’ requirements. The provision of logistics services requires inputs from a number of service providers, including the providers of transport and warehousing as well as other value-adding activities.

The concept of logistics has undergone many significant changes. Coyle, Bardi and Langley (1996) divided the development of logistics into three stages:

- **Stage 1: Physical Distribution or outbound logistics system** (during 1960s and 1970s); businesses attempted to manage systematically a set of interrelated activities

\(^1\) These sections are summaries of the material in Luo and Findlay (2001). For a review of developments in the logistics sectors in three East Asian economies, including China, see Heaver (2001).
including transportation, distribution, warehousing, finished goods, inventory levels, packaging, and materials handling to ensure the efficient delivery of finished goods to customers.

- Stage 2: Integrated Logistics Management (during the 1970s and 1980s); companies began to recognize the additional opportunities for savings by combining the inbound side (materials management) with the outbound side (physical distribution). Initially, this provided potential savings by having a single transportation manager who could coordinate inbound and outbound transportation. Companies also become aware of the opportunities to view the whole process, from raw materials to work-in-process inventory to finished goods, as a continuum that, managed from a systems perspective, could lead to more efficient operation.

- Stage 3: Supply Chain Management (from 1980s to 1990s); companies expanded their perspective on the logistics processes to include all the firms involved, making use of partnerships/alliances between manufacturing companies and their suppliers/vendors, customers (channels of distribution), and other logistics-related parties such as transportation and public warehousing companies.

The concentration on fewer carriers operating under long-term contracts and on outsourcing the whole package of services stimulated the development of Third Party Logistics (3PL) firms. As noted already, several sub-sectors are involved in logistics, for example, the transport sector (including different modes of transportation), the warehousing sector and other related providers of value-added services. The 3PL business is complex, as it should operate across the sub-sectors involved.

Luo and Findlay (2001) review developments in each sub-sector in China, including the basic facts in terms of capacity, volume and growth; evolution and reform of the sector; sector infrastructure and organization and administration issues as well as regulation and policy issues. Some of the key results relevant to this paper are outlined in the next section.

3 THE LOGISTICS SECTOR IN CHINA

Evolution of transport services

Freight turnover in China has increased from 76 billion tonne-km in 1952 to 4381 billion tonne-km in 2000. The volume increased by 3.8 times between 1980 and 2000.

In the political and economic environment of the early 1950s, China put heavy industries in a preferred position. A precondition for their development is the supply of cheap raw materials. This in turn demanded a supply of cheap transport. Rail and water are two modes of transportation which can provide transport services for large volumes at
a relatively low price.

Figure 1 shows the composition of freight carried by mode (measured in terms of weight). After 1978, the transport system in China was characterized by rapid development of road and air transportation. The market share of water and rail transport decreased sharply, reflecting the transformation from traditional heavy industries to more emphasis on light industries which demanded speedy, flexible transportation services and which could bear a higher transport service price. The figure shows the rising share of road transport and the fall in the shares of rail and water in the total tonnage. Data for air transport were included in the construction of the chart: while those numbers are very small compared to those for other modes, and therefore are not evident in the columns of the chart, airfreight volumes are growing fastest among all modes. Trip lengths vary significantly by mode and the length of road trips is relatively short on average. Rail and water show longer trip lengths and therefore account for much higher shares of the transport task measured in terms of tonne kilometres performed. But even in these terms, the road share continues to grow, mainly at the expense of rail.

**Figure 1. Choice of Transport Modes**

![Freight traffic by mode (tonnes) chart](chart.png)

Source: Luo and Findlay (2001)
**Constraints on development**

The program of economic reform has gradually changed the ownership of enterprises in China, especially in the manufacturing sector. But in the transportation sectors the change has been relatively small. Large state-owned enterprises still dominate the sector. In recent years, the use of joint ventures increased, especially in the container berth, container freight station, and motor carrier activities. However these firms still account for only a small portion of the total number of enterprises. Road transport and shipping were deregulated in 1986 while rail and air transportation were also decentralized to some extent. The ownership structure has changed to different degrees in different modes of transportation. The road and inland shipping companies are dominated by collective and private enterprises while coastal and international shipping, rail, and air transportation enterprises are still mostly state-owned.

The transport sector is still a weak link in China’s economy:

- The number of either rail or road trunk lines linking different regions is insufficient. The major railway lines are over-loaded. The trunk lines of the highway system linking different provinces are not well networked and cannot meet the demand. These impediments also contribute to differences in growth rates between regions.
- The coordination between different modes requires planning and development. Within each mode of transport, there are imbalances. In the rail sector, on the busy lines, the mixing together of passenger trains with cargo trains leads to slower speeds and low efficiency. In the air sector, there is an imbalance between the trunk and feeder lines, and in the number of big and small aircraft. In the road sector, the construction of the national level trunk road system has been accelerated, but in the rural areas the road network is far less developed.
- Service quality is generally low and the technical level of the equipment is also low. For example, in the rail sector, the share of double lines and electrified lines in the total length of lines is relatively low. Less than 20% of the freight trucks can carry containers.

The warehousing and storage system in the planned economy before reform was characterized by department or sector administration and operations, that is, different sectors built and owned their own warehousing and storage facilities and served their own demands only. Many sectors formed their own closed warehousing systems.²

² These operated in the *Wu Zi* (raw material and components), *Shang Ye* (manufactured consumer products), *Gong Xiao* (rural area supplier and distributor), *Wai Mao* (foreign trade goods) sectors, as well
Meanwhile, each local government at the provincial, city and county levels also established their own warehousing system to serve their local economy.

Overall, therefore, government administration and enterprise functions are not separated which constrains enterprise performance, the administration is fragmented in both vertical and horizontal dimensions which inhibits the integration of services, and in some activities, the quality of the physical infrastructure is insufficient.

**Demand for 3PL services**

The demand for specialized logistics or 3PL services started to grow faster in recent years, especially that originating from the multinational companies, the leading Chinese state owned companies and some of the private companies, as well as that arising from the e-commerce sector. In the recent years, quite a few 3PL companies have appeared including a) international companies like Maersk, UPS, TNT, and b) traditional Chinese transport, warehousing and forwarding companies, like COSCO and Sinotrans, and c) emerging companies like the Bao Gong Logistics Group.

Relevant departments in the central government have paid greater attention from different perspectives to the logistics sector and its development. They have studied policies that they expect will promote the logistics sector. Local governments like Shenzhen, Beijing, Tianjing, Shanghai, Guandong, Shandong and others have also paid attention to the development of their local logistics sectors.

Most of the logistics activities are still operated in-house and demand for 3PL services is low among traditional Chinese firms. State-owned companies in China have inherited an operating model based on the provision of services in-house, including logistics. According to the investigations by the China Warehousing and Logistics Council, a third party undertakes only 18% of the inbound logistics. For outbound logistics 59.8% are operated together with a 3PL firm, and only 16.1% totally by a 3PL firm. Most of the Chinese firms keep their own logistics assets and personnel (Luo and Findlay, 2001).

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as the railway sector, and the Jiaotong (road and water transportation), military, and Liang Shi (basic food)
Although quite a number of 3PL firms have appeared in the market, most of them offer a low standard of service and efficiency. The reasons include 1) most of the firms only provide simple delivery and warehousing services: value-added services like information services, inventory management, logistics cost control, or logistics system design are not offered; 2) the scale of the firms is usually small and most of them come from among traditional firms with weak network and organization capabilities.

Moreover, modern logistics facilities such as transshipment facilities for different modes of transport, public warehousing and transport facilities and logistics centers are not available. The technology employed in logistics equipment is also at a low level. The extent of standardization of facilities and of application of information technology is at low levels. Logistics facilities are distributed unevenly; for example, transport facilities are less developed in the middle and western part of the country.

An important constraint on the capacity of service providers to offer integrated services lies in the administration system, in particular, in the vertical and horizontal separations in the administrative systems that have carried over from the planning system, the self-protection that remains, the mixing of the enterprise with administration functions and the lack of transparency in policy measures.

These issues, and the extent to which they impede the scope to gain from reform in this sector, are examined in more detail after our review of the implications of China’s WTO accession for the logistics sector.

4 ACCESSION TO WTO AND IMPLICATIONS FOR THE LOGISTICS SECTOR

To provide integrated logistics services, the following service elements must be covered: international and domestic transport (all modes), warehousing and storage, international and domestic freight forwarding, the provision of other value-added services, such as logistics information (tracing and tracking), packaging and labeling, quality control/inspection, and so on, and third party logistics services.

A number of GATS categories must be examined in order to incorporate the scope of sectors.
logistics services as just defined. These categories are listed in Appendix 1. However, this list is not comprehensive and in some cases the impact of logistics activities must be inferred from packages of more specific commitments, for example, in relation to 3PL services.

One further issue related to the definition of the sector concerns the coverage of the GATS category of ‘distribution’. Distribution includes some activities which might normally be associated with logistics, such as warehousing and inventory management, etc. It appears therefore that some parts of a logistics sector, as might be defined in ideal terms, are already included in the category of distribution. However distribution refers to these activities when undertaken in the context of wholesaling and retailing. Hence their coverage is much narrower than that which is relevant here.

Our assessments of the implications of the likely policy changes associated with WTO accession are divided into two types, one called direct and the other indirect. Direct effects are those on the costs and quality of services provided. Indirect effects are those on the regulatory or administrative environment.

**Direct effects**

The direct effects of accession are presented in Appendix 1 and summarized in Tables 1-3. The tables show the starting position (Table 1) and the impacts of the commitments within the first three years (Table 2) and in the period after three years from accession (Table 3).

In general, China’s accession to WTO will have a positive affect on performance in the logistics services sector as a whole. Of the elements listed in the tables, only the air transport and water transport sectors are isolated from significant change in policy. The commitments in many areas extend existing policy (for example, in customs clearance,

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3 Distribution (trade) is different from logistics. But the related subordinated services are more and more likely to be included in the logistics sector, as the logistics sector has taken on more and more value added services which are demanded by the shippers. The definition of distribution trade services is that it composed of four main sub-sectors: commission agents services; wholesaling; retailing; franchising. The principal services rendered in each subsector can be characterized as reselling merchandise, accompanied by a variety of related subordinated services, including inventory management; assembly, sorting and grading of bulk lots; breaking bulk lots and redistributing into smaller lots; delivery services; refrigeration, storage, warehousing and garage services; sales promotion, marketing and advertising, installation and after sales services including maintenance and repair and training services. (Covered by CPC 61, 62, 63 and 8929).
container depot services, maritime agency services, road transport, rail transport, warehousing and forwarding as well as courier services). In others, the commitments bind current policy (international shipping). In some cases geographic limits apply (in internal waterway transport, foreign firms can only operate on routes to ports open to foreign shipping).

Discrimination against foreign suppliers continues to exist (mainly in terms of rules on the forms of establishment) for varying periods, which delays the benefits of reform. A schedule might be designed to capture some of the rents created in the transition to full openness. The schedule might also be designed to slow down the transition and therefore (it is hoped) reduce the costs of adjustment. The consequence, however, may only be to delay those costs and add to the risks of backsliding. Another goal may be to limit for a longer time foreign ownership in sensitive sectors. However costs are incurred, including the imposition on foreign suppliers of second best forms of participation in the market (joint ventures instead of wholly owned operations).

As discussed earlier, the demand for integrated services (3PL) is increasing and the tendency is toward providing a package of logistics services. More and more logistics service firms try to provide or control the whole chain of the services. Therefore, the 3PL firm needs to have access to all the relevant licenses, which could include those for international freight forwarding, different modes of transportation (air, international shipping, domestic shipping, road, rail), storage and warehousing, container station and depot services, and courier services. The opening up of the different sectors in logistics, as discussed above, would have a significant impact on the ability of logistics firms to provide the whole chain of services.

**Indirect effects**

The following discussion provides an assessment of the indirect effects of reform. The discussion is summarized in Table 4.

**Local protectionism**

Vertical and horizontal divisions within administrative systems constrain the development of the logistics sector. The administration system which applies to
transportation, for example, is divided according to the mode of transport, and the same systems operate at local and at higher levels of government. Responsibility and power overlaps between the departmental and district administrations.

**Table 1 Starting position**

<table>
<thead>
<tr>
<th>Area</th>
<th>Starting position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air transport</td>
<td>Relatively closed in both domestic and international routes</td>
</tr>
<tr>
<td>Water transport</td>
<td>Inland shipping is open to domestic companies: coastal and international is relatively closed</td>
</tr>
<tr>
<td>Road transport</td>
<td>No restriction for domestic entry, foreign entry only by joint ventures</td>
</tr>
<tr>
<td>Rail transport</td>
<td>State monopoly</td>
</tr>
<tr>
<td>Forwarding</td>
<td>International forwarding: Licensing system applies, foreign participation only via a joint venture, Domestic forwarding: relatively open for domestic companies, not open to foreign companies</td>
</tr>
<tr>
<td>Storage and warehousing</td>
<td>No restriction for domestic entry, foreign entry only by joint ventures</td>
</tr>
<tr>
<td><strong>Integrated services (3PL)</strong></td>
<td>Determined by the above.</td>
</tr>
<tr>
<td>Other (packaging)</td>
<td>No restriction for domestic entry, foreign entry only by joint ventures</td>
</tr>
<tr>
<td>Courier service</td>
<td>No restriction for domestic entry, foreign entry only by joint ventures</td>
</tr>
</tbody>
</table>

**Table 2 One year after WTO accession**

<table>
<thead>
<tr>
<th>Area</th>
<th>Evaluation of the direct impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Air transport</td>
<td>✓</td>
</tr>
<tr>
<td>Water transport</td>
<td>✓</td>
</tr>
<tr>
<td>Road transport</td>
<td>✓</td>
</tr>
<tr>
<td>Rail transport</td>
<td>✓</td>
</tr>
<tr>
<td>Forwarding</td>
<td>✓</td>
</tr>
<tr>
<td>Storage and warehousing</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Integrated services (3PL)</strong></td>
<td>✓</td>
</tr>
<tr>
<td>Courier service</td>
<td>✓</td>
</tr>
<tr>
<td>Other (packaging)</td>
<td>✓</td>
</tr>
</tbody>
</table>
Table 3 Three years after WTO accession

<table>
<thead>
<tr>
<th>Area</th>
<th>Evaluation of the direct impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Air transport</td>
<td></td>
</tr>
<tr>
<td>Water transport</td>
<td>✔</td>
</tr>
<tr>
<td>Road transport (3)*</td>
<td>✔</td>
</tr>
<tr>
<td>Rail transport (6)</td>
<td>✔</td>
</tr>
<tr>
<td>Forwarding (4)</td>
<td>✔</td>
</tr>
<tr>
<td>Storage and warehousing (3)</td>
<td>✔</td>
</tr>
<tr>
<td>Integrated services (3PL)</td>
<td>✔</td>
</tr>
<tr>
<td>Courier service</td>
<td>✔</td>
</tr>
<tr>
<td>Other (packaging)</td>
<td>✔</td>
</tr>
</tbody>
</table>

* Numbers in brackets show the number of years after accession at which time wholly owned foreign establishments will be permitted.

These administrative structures are no longer suitable for the development of logistics activities for several reasons:

1) Coordination of the different modes of transport services is difficult since the separation of different modes has resulted in differences in organization, service standards, and technical and equipment standards. This lack of consistency leads to the difficulties in developing multi-modal services.

2) Coordination of the construction of infrastructure is poor, which leads to both duplication of investments and to the neglect of the development of transshipment centers.

3) Self-protection is evident at the departmental and district level. Policies and regulations are often designed according to the self-interest of the department, sector, or district involved. A local logistics firm often seeks protection from competition through the application of policy by departmental or district agencies, which hampers the development of cross-department or cross-district logistics networks. The box provides an example of local protectionism.

Box: Local policies and their implications for logistics operations

The Jia Yu Freight Group Company is a new private transport and logistics service company. It has more than 20 branches covering most of the country to provide road express service in a fast-growing business. The manager Mr. Zhai complains about the business environment, especially the local protection: “We face many obstacles in operating our business and providing our services to customers. Transport needs both registration in the Administration Bureau of Industry and Commerce of the local government and a license from Road Administration Bureau (RAB). Each local RAB has a different practice. Some cities like Changzhou in Jiangsu province and Wenzhou in
Zhejiang province do not issue licenses to companies from other regions. Our trucks are not allowed to enter these cities. If we carry cargoes from their cities, we will be fined. Some cities are not so extreme in their treatment of the outside transport companies, but we have to follow their special practice. For example, in Guangzhou, we have to rent their designated office room with a higher rental in a specified place. Otherwise we are not allowed to enter the market. In Guangzhou, we have to deposit a larger amount of money and administration fee. But whenever we meet difficulties, there is no assistance from them.” In general, local governments do not have identical rules and regulations. The road sector has been deregulated, but the local government always wants to protect their local companies by various means, which limits the development of cross-regional logistics services. “The strange thing is the more developed region, the more restrictions there are on the outside firms. For example, in Chongqing, we haven’t met much difficulty in establishing our presence and operating our business.” Mr. Zhai added.

Source: Author interviews

Reform of the administration system will have to be accelerated in order to meet WTO rules. This will break down the scope to apply protection at the departmental and district levels. It will facilitate competition in the market at a national level. Bosworth (2002) points out however that the obligations under the GATS covering sub-national governments are weaker than those applying to national governments. The requirement is that members take only “reasonable measures” to ensure that sub-national governments meet their obligations. However, China’s commitments under its Protocol of Accession specifically require that it maintain a uniform system of administration. Further, 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 disciplines on China stronger than those under general WTO rules.

Separation of the administration from enterprises

Some government departments are still directly or indirectly involved in enterprise activities. As already noted, in the railway and air sector, state-ownership is still dominant. Port administration is mixed with port enterprise operations. These situations not only affect government functioning, but also weaken the competitiveness of the enterprises.
Logistics infrastructure and facilities/equipment

The scale of the infrastructure and the quality of facilities and equipment available to logistics service suppliers are relatively poor. The Hong Kong Trade Development Council’s (2002) assessment is that the airport infrastructure is a ‘major impediment to aviation industry growth’. Furthermore, there is an imbalance in the development between the Eastern and Western part of the country. Road and rail transport, storage and warehousing, container station and depot services and airports are some of the areas where more foreign investment could be attracted after accession.

Human resources

Research on logistics, especially among business firms, is rare and the professional education system has so far included little logistics training. Foreign investment and establishments in the logistics service sector will bring technology and management know-how. The relevant know-how includes not only the operation of particular segments of the logistics operation but also the manner in which the elements fit together, as well as the management of the relationships between all the suppliers and the customers. Opening other service sectors, such as education, will also raise the quality of options available for education and training in this sector.

Table 4  Summary of indirect implications

<table>
<thead>
<tr>
<th>Areas of existing problems</th>
<th>Evaluation of indirect impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local protectionism</td>
<td>GATS obligations also apply at sub-national government level</td>
</tr>
<tr>
<td>Inadequate infrastructure and facilities/equipment</td>
<td>Likely to attract more foreign investment</td>
</tr>
<tr>
<td>The mixture of administration with enterprises</td>
<td>The state-owned enterprises are under pressure to transform to a market oriented operation, and government administration can be separated from enterprise management.</td>
</tr>
<tr>
<td>Lack of research and professional skills</td>
<td>Foreign invested enterprises will bring know-how, innovation, technology and management.</td>
</tr>
</tbody>
</table>
5. COST SAVINGS IN THE THIRD PARTY LOGISTICS SECTOR

There is little empirical work on the efficiency of the logistics sector in China, or on the impacts of reform. Some ideas about methodology and some indicators of the scale of impacts are available, however, from work done in other markets, for example, on the effects of the integration of transport markets in Europe (European Commission, 1997).  

The work on European logistics services markets identifies eight input-oriented measures of logistics performance:

- Customer orientation
- Integrated long-range planning
- Supplier partnerships
- Cross-functional operations
- Continuous improvement process
- Employee empowerment
- Integrated IT systems
- Measurement, comparison and action

Different stages of development of the logistics sector can be identified in terms of measures of each of these indicators. Higher levels of performance measured by these indicators leads to better performance in terms of costs of each element of the service and in terms of other indicators such as on-time delivery, order completeness, invoice accuracy and damage-free delivery. All these features can therefore be summarized in the total costs of logistics services, which refer to the sum of inventory, administration, warehousing and transportation costs. Market opening lowers the prices of the direct inputs (eg transport), but it also raises services quality and thereby lowers other costs (eg warehousing or inventory, or allowances for losses).

Transport is usually the major single component of logistics costs. For example in 1992 in Europe, logistics costs on average were 10.1% of revenue, down from 14.3% in 1987. The 1992 share was made up of 3 points due to transport, 2.3 to warehousing, 1.9 to administration and 2.9 to inventory carrying. The logistics cost share of revenue was expected to fall to 9.1% in 1997. In the firms regarded as leaders in the operations of logistics, the logistics share of revenue was estimated to be as low as 6.5% (1992), 36%  

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4 Experience of regulatory reform in the United States can be used as another comparator. A longer time of series of data on the European experience may also now be available.
lower than the overall average. The largest falls over this period in Europe were observed in the component associated with inventory costs, followed by those linked to administration, warehousing and transportation. Transport, even in those leading companies, remains the largest single component of total logistics costs.

The significance of logistics costs varies between sectors of the economy as illustrated in Table 5. The shares of logistics costs in total revenue are significantly higher according to this source for electronics compared to textiles. Gibson (2001) also notes that in some sectors such as fresh food logistics costs can be 50-60% of total revenue.

The table also illustrates the variation between the significance of logistics costs in “Asia” and those in “Europe”, the latter being lower 24%. Gibson (2001) suggests that in China logistics could account for “30-40% of (the) total cost of manufactured goods”. Another source suggests that “supply-chain-related costs can be 30% to 40% of wholesale prices in China, compared to 5% to 20% in the U.S.”5 The Hong Kong Trade Development Council (2002) refers to an assessment that logistics account for “40% of general production costs” and that “logistics…takes 90% of the whole production cycle time”.

### Table 5 Share of logistics costs in total revenue, Europe and Asia

<table>
<thead>
<tr>
<th></th>
<th>Europe</th>
<th>Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textile</td>
<td>8.7</td>
<td>11.5</td>
</tr>
<tr>
<td>Automotive</td>
<td>8.9</td>
<td>13.5</td>
</tr>
<tr>
<td>Chemicals</td>
<td>10.2</td>
<td>13.8</td>
</tr>
<tr>
<td>Fast moving consumer goods</td>
<td>10.4</td>
<td>14</td>
</tr>
<tr>
<td>Electronics</td>
<td>12.6</td>
<td>14</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>10.4</strong></td>
<td><strong>13.7</strong></td>
</tr>
</tbody>
</table>

Source: Gibson (2001)

A key factor in the performance of the logistics sector is the damage rate. One source reports that for fast moving consumer goods, the damage rate is 5% in China

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compared to “well below 1%” in developed economies. High rates of product loss lead to requirements for higher inventory levels. These costs can be significant: consequently the transport component of the total distribution cost can be relatively small. Also switching to a higher quality service which charges higher fees, for example, a foreign provider, can still lower overall logistics costs.

Boillot and Michelon (2000) provide a breakdown of the total logistics costs in China. They report that losses and damage account for 48% of the total, compared to 21% for the transport activities. They quote industry estimates that total logistics costs could fall by 37% as a result of moving from the current arrangements for managing logistics to a sub-contracting approach. The bulk of this reduction appears in their assessment to be attributable to the reduction in losses and damage, rather than a reduction of profit margins. Management fees may increase, to reflect the higher costs of the higher levels of management inputs, in terms of time and experience.

In summary, a more open market for logistics services that transfers the technology for the redesign and management of integrated services is likely to have significant effects on total logistics costs in China. The composition of those costs will change, for example, the contribution by management fees will increase, but this change will be compensated for by reductions in other items, not necessarily in the transport component but more likely in the costs associated with damage, losses and inventory.

We summarize this discussion as follows. If total logistics costs are 30-40% of wholesale prices in China, as suggested above, and if those costs fall by 35%, then the share of logistics costs in wholesale prices would fall by 10 to 14 percentage points to 20-26% of wholesale prices. Even this assessment may be conservative, since the share of logistics costs in the wholesale price is still above the average for “Asia” in Table 6. It also lies above that observed in developed market economies, although there are limitations to the extent that comparisons of these ratios can be made across countries.

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6 EIU China Hand December 1999, Chapter 12, Section 1 (from www.store.eiu.com/samples/Chchapter.html, accessed 21 December 2001)

7 The ratio of logistics costs to wholesale prices in different countries will depend not only on the characteristics of the product, but also the factor intensities of the different production processes of both the logistics services and the manufactured products, and the relative factor prices in the economy concerned.
6. IMPLICATIONS FOR LESS-DEVELOPED AREAS IN CHINA

We saw in the previous section that the extent of the fall in logistics costs could be 10-14% of wholesale prices in China. Using an example developed by Radelet and Sachs (1998), suppose that a region of China faces a perfectly elastic demand for its output and a perfectly elastic supply of purchased intermediate inputs that come from outside region. Suppose that the share of purchased inputs in gross value is 30%. Then if logistics costs are 35% of the value of output and inputs, value added is 24.5% of the value of output. If logistics costs fall to 23% of the value of output, valued added rises by 64% to reach 40% of the value of output. Changes in logistics costs even in the range suggested here can make a significant difference to the value added available for distribution to the factors of production. If the payment to capital is fixed then the amount of valued added available to labor changes by an even greater proportion. This example illustrates the significance of logistics efficiency for inland areas of China.

A more efficient logistics sector will benefit people living in poor areas in a number of ways. First, as implicit in the example above, their terms of trade will improve. The costs of items they buy from the rest of China will be less. The prices they receive for the items they export to the rest of China will be higher. The impact of reform, which reduces logistics costs, also generates extensive real gains: the impacts on real incomes are greater than those of the removal of a tax, for example, the impact of which includes transfer effects – when logistics costs are reduced resources are saved (the rectangle effects are gains, not just transfers, in other words: see Deardorff, 2001).

Reductions in transport costs can also lead to significant increases in trade orientation. Some of the orders of magnitude involved in these effects are illustrated by the work on Africa by Limao and Venables (2001). Of more interest here is the estimate of the response of trade to reductions in transport costs. Limao and Venables report an estimate of an elasticity of 2.5 which could be applied to the reduction of 35% in logistics costs according to the assessment reported above.

For example, if the cost of payments for capital is 20% of the value of output, the funds available for the wage bill rise by a factor of 3.5 as logistics costs fall from 35% to 23% of wholesale prices.
The opening up of markets due to improvements in transport and logistics services can also have effects on competition in the local markets. Competition has a number of additional effects.

One is the impact on the rents available. Suppliers who previously had monopoly power are constrained by the options of supply from outside the region. Thus regulatory reform not only lowers costs but its competitive effects forces the passing on of those cost reductions to consumers in business and in households. Firms that previously earned rents from their protected position are clearly worse off but overall the region will realize a welfare gain from the introduction of competition. In terms of the welfare of the group of people living in the poor area, this effect is even larger when those who captured the rents were not local firms.

Another effect of competition, and a greater foreign (both out of the country and out of the region) presence in all markets within a poor area, could be a dynamic one, for example, on the transfer of technology and productivity growth. This effect is likely to be greater in those services markets where an establishment is required to deliver the activity, and where therefore there is more interaction between the new supplier and local firms.

Some localities may still not receive services at a quality typical of more developed areas after markets become more competitive. Governments often respond to this situation by subsidizing the provision of services. Subsidies might be arranged within the sector (supported by a regulatory structure that facilitates these transfers between consumers), or through explicit payments from the budget. There are important efficiency considerations in the design of these policies, both on the funding side and in terms of the manner in which the subsidies are applied.

Gruen (2001) has questioned and proposed options for the management of service obligations. The popular approach to a service obligation policy is to use cross-subsidies between consumer groups to provide specific services (eg a rail link) to all residents in a particular area. Gruen suggests, instead, strategies in which services are provided to well-defined target households and where the recipients have options for the manner in

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9 There is anecdotal evidence of this effect in markets for light industrial products made in the past by township and village enterprises. Brand name products from suppliers based in Eastern parts of China are now much more widespread.
which they receive that support (‘cashing out’ for example, or at least substitutability between modes of supply, in this case, of transport services). Analysis of costs and benefits of alternatives is important, for example, those of building a road to an existing community or implementing an option for relocating that community.\footnote{Gruen also discusses the value of broadening the funding base for service obligation policies.}

An important consideration in the design of policies to support provision of services to poor areas is their consistency with obligations under the WTO with respect to subsidies. There are, however, models of how to design these policies, for example, in their treatment in the basic telecommunications reference paper of April 1996 which notes:

Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

There is considerable experience in the rest of the world in relation to community service obligation policies, much that China can learn from that experience and great scope for China to innovate in policy development in this field.

7. CONCLUSION

The China experience illustrates, firstly, that the design of commitments in the GATS is complicated in new business areas. The GATS categories do not match exactly the business structures used to provide logistics services, for example. However it is possible to make a concordance: China’s commitments, which are significant and which in most parts go beyond a binding of current policy, provide a template which other developing economies may consider for this sector.

The case also illustrates how commitments in the WTO can open up the component activities of the logistics sector, including areas which in the past might have been regarded as non-tradeables. The commitments thereby also facilitate the growth of Third Party Logistics providers. The design and management of the provision of services in this field is important: not just the extent and quality of physical capacity matters. The
presence of foreign providers of these integrating services will be facilitated by the WTO commitments.

A feature of the set of commitments reviewed here was the application of timetables for their implementation. Some motivations for that approach can be identified, but it comes at some cost, including the higher risks of backsliding and the use of inefficient forms of business organization by firms who enter in anticipation of later and further market opening (for example, where joint ventures are permitted but full foreign ownership is not).

One of the challenges, however, is to promote complementary administrative and regulatory reform. The China case highlights the risks associated with administrative structures, even at central level, which add to the complexity of establishing the most efficient business structures (with respect to inter-modal transfers of freight for example). Perhaps an even more important issue is to translate national commitments to the WTO into local government policy, especially in regions where there has been a tradition of using regulatory instruments to protect local businesses. The implementation of the principles of transparency and non-discrimination in the application of business regulation are important elements of the extent to which markets are actually opened to foreign competition.

A more open logistics sector, especially through the growth of 3PL providers, can lead to significant cost reductions. One estimate, based on assessments of the state of logistics services in China by industry commentators, is that more widespread presence and use of efficient and internationally competitive 3PL providers could lower costs by an amount equivalent to at least 10% of the wholesale price of manufactured goods on average. The impact on these relative terms may be even higher for fresh food produce. These amounts are not simply transfers, but real gains associated with the saving of resources. An important source of gains is associated, for example, with lower wastage rates in transport and warehousing.

Changes of these magnitudes in the quality of transport services could have important effects for poor areas. Their lack of access to markets in the rest of the country and in the rest of the world is an important constraint on their development. A more open
and competitive logistics sector will remove some of the impediments to their participation in trade within the economy and with the rest of the world. The effects of lower logistics costs on value added and on the value of the wage bill available for distribution to workers are significant. In an example shown in the paper, a reduction in the logistics costs by 12 percentage points in the wholesale value of goods leads to an increase in value added of more than 60%.

However some impediments remain to the supply of services in remote areas. Policies to support the provision of services where these impediments apply are not inconsistent with the GATS but should be evaluated against alternative strategies for promoting income growth for those communities.
Appendix 1

CHINA’S COMMITMENTS ON LOGISTICS SERVICES RELATED SECTORS AND IMPLICATIONS\textsuperscript{11}

\textit{Air transport}

Air transport remains quarantined from the coverage of the GATS except with respect a limited number of complementary services. Even in these areas, China’s commitments are relatively limited.

\textbf{1. Aircraft repair and maintenance services}

\textbf{Commitment}

Foreign service suppliers are permitted to establish joint venture aircraft repair and maintenance enterprises in China. The Chinese side should hold a controlling share or be in a dominant position in the joint ventures. Licenses for the establishments of joint ventures are subject to an economic needs test.

\textbf{Implications}

The commitment effectively binds current policy. There are already two joint venture aircraft repair and maintenance service firms in China. One is AMECO with a 40\% foreign share (founded in July 1989), and the other is GAMECO with 50\% share (founded in Aug. 1989). Binding policy may reduce uncertainty from the perspective of potential entrants. Further entry would add to competition and may facilitate the introduction of new technology and management expertise in aircraft repair and maintenance, so that a higher volume of qualified services are made available within China.

\textbf{2. Computer Reservation System (CRS) Services}

\textbf{Commitment}

For cross-border supply:

1. Foreign Computer Reservation Systems, when having agreements with Chinese aviation enterprises and the Chinese Computer Reservation System, may provide services to Chinese aviation enterprises and Chinese aviation agents by connecting with the Chinese Computer Reservation System.

2. Foreign Computer Reservation Systems may provide services to representative offices and sales offices established in the destination cities in China by foreign aviation enterprises which have the right to engage in business according to the bilateral aviation agreements.

3. Direct access to and use of Foreign Computer Reservation Systems by Chinese aviation enterprises and agents of foreign aviation enterprises are subject to approval of the General Administration of Civil Aviation of China (CAAC).

\textsuperscript{11} See Hong Kong Trade Development Council (2002) for another review of the commitments in relation to transportation and logistics.
Implications
The commitment refers only to foreign connection with the Chinese system. The commitment confirms policy as it is now. Chinese carriers have code sharing arrangements with carriers in more than 10 foreign countries but direct foreign participation in the provision of CRS services is not allowed. Commercial presence by foreign providers is still not permitted.

Water transport (international shipping and domestic shipping)

1. Maritime Transport Services: international transport (freight and passengers)
   (CPC 7211 and 7212 less cabotage transport services)

   Commitment
   Establishment of registered companies for the purpose of operating a fleet under the national flag of the People’s Republic of China
   - Foreign service suppliers are permitted to establish joint venture shipping companies.
   - Foreign investment shall not exceed 49 per cent of total registered capital of the joint venture
   - The chairman of board of directors and the general manager of the joint venture shall be appointed by the Chinese side.

   Implications
   The commitment is the same as current policy.

2. Auxiliary Services: Maritime services (CPC 741), Customs clearance services for maritime transport

   Commitment
   Foreign participation is possible only in the form of joint ventures, but foreign majority ownership permitted.

   Implications
   Joint ventures are already allowed now, but currently the maximum foreign share is 49%. The commitment relaxes that constraint.

3. Container station and depot services

   Commitment
   Foreign participation is possible only in the form of joint ventures, but foreign majority ownership permitted.

   Implications
   Joint ventures are already allowed now, but currently the maximum foreign share is 49%. The commitment relaxes that constraint.
4. Maritime agency services

Commitment
Foreign participation is permitted in the form of joint ventures, but with the foreign equity share no more than 49 per cent

Implications
Maritime agency services are not open now so this commitment is significant, although the level of foreign ownership remains constrained.

5. Internal Waterways Transport: Freight transport (CPC 7222)

Commitment
For cross-border supply: international shipping is possible on routes to ports which are open to foreign vessels.

Implications
This policy will apply only in ports that are open to foreign shipping, of which there were 130 by 1999.

Road transport

Road Transport Services: Freight transportation by road in trucks or cars (CPC 7123), Storage and warehousing service (CPC 742)

Commitment
Foreign participation is permitted in the form of joint ventures, but with the foreign equity share no more than 49 per cent. Within one year after China’s accession, foreign majority ownership will be permitted. Within three years after China’s accession, wholly foreign-owned subsidiaries will be permitted.

Implications
In the road transport sector, joint ventures are allowed at present, but with foreign partners allowed only a minor share (less than 49%). This sector is now very competitive with low margins since it was subject to domestic deregulation in 1986. Road transport is an essential link of the logistics chain and plays the most important role compared to other transport sector. The road sector is also the fastest growing one among the four modes of transport. Foreign logistics firms might have an interest in participating by either providing new capacity (perhaps in special road transport services) or buying an existing fleet. Some of the effects of deregulation include greater use of sub-contracting, larger scale and lower cost operations.

Rail transport

Rail Transport Services: Freight transportation by rail (CPC 7112)

Commitment
Foreign participation is permitted in the form of joint ventures, but with the foreign equity share no more than 49 per cent. Within three years of China’s accession, foreign
majority ownership will be permitted and within six years of China’s accession, wholly foreign-owned subsidiaries will be permitted

**Implications**

Railway transport continues to be monopolized by the government. China’s WTO commitment in this sector shows that it is meant to open up to the outside world. The process is however slower than that in the road sector. Only after six years of accession to the WTO will wholly foreign-owned subsidiaries be permitted. Some parts of the rail sector are profitable and others are not (e.g., in rural areas). Foreign firms will take an interest in the profitable lines or regions. There is evidence from other markets that productivity in rail is related to government policy. Key factors include the degree of managerial autonomy and the extent of subsidies made available. Higher levels of private (and foreign) ownership would be expected to add to productivity in this sector. One important issue is how the unprofitable lines can be maintained if required on the grounds of meeting service obligations. The effects of reform in this area could be significant. One source comments that “most logistics companies and distribution managers continue to argue that there is never a good reason to use rail for transport”. Factors in this view include damage rates, delays, slow speed, lack of information and booking requirements, as well as lack of route flexibility.12

**Warehousing and storage**

**Storage and warehousing services (CPC 742)**

**Commitment**

Foreign participation is permitted in the form of joint ventures, but with the foreign equity share not more than 49 per cent. Within one year of China’s accession, foreign majority ownership will be permitted and within three years of China’s accession, wholly foreign-owned subsidiaries will be permitted.

**Implications**

Storage and warehousing is an important link for the logistics services. Joint ventures are allowed at present, but with foreign partners allowed only a minor share. The margins in this sector are low. There also appears to be excess capacity, but the service standard is low and the mix of services available does not match demand. The opening up of the market could help foreign-owned logistics suppliers establish their own presence in this sector either by building new warehouses or buying the existing warehouses that are appropriate.

**Forwarding**

**Freight forwarding agency services (CPC 748 and 749 excluding freight inspection)**

**Commitment**

Upon accession, foreign forwarding agencies which have at least three consecutive years of experience are permitted to set up freight forwarding agency joint ventures in China,

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with foreign investment not to exceed 50 per cent; within one year after China’s accession, foreign majority ownership will be permitted. Within four years after China’s accession, wholly foreign owned subsidiaries will be permitted. The minimum registered capital of joint venture is to be no less than US$1 million. With four years after accession, national treatment will be accorded in this respect. The term of the joint ventures shall not exceed 20 years. After one year of operating in China, the joint venture can set up branches but another US$120,000 should be added to the original registered capital of the joint venture for the set-up of each branch. Within two years after China’s accession to the WTO, this rule on an additional registered capital requirement will be implemented on the national treatment basis. A foreign freight forwarding agency may set up a second joint venture after its first joint venture has been in operation for five years. Within two years after China’s accession to WTO, this requirement will be reduced to two years.

Implications
Joint ventures are allowed at present, but with the foreign partner allowed only a minor share. Within four years of accession to WTO, wholly foreign-owned subsidiaries will be permitted. Foreign owned firms could enter easily into the market after the restriction is lifted. Many firms have already presented themselves in the market in the form of a joint venture: although according to the regulations only a minor share is allowed, the foreign partner actually may control the business. Some firms enter the market by using the “shell” of a domestic company. Complete opening of the market will reduce the costs of these firms of providing forwarding services and also enhance their ability to provide “whole of chain” services.

Other related areas

Courier Services (CPC 75121, except for those currently specifically reserved to Chinese postal authorities by law.)

Commitment
Upon accession, foreign service suppliers will be permitted to establish a joint venture with foreign investment not exceeding 49 per cent. Within one year after China’s accession, foreign majority ownership will be permitted. Within three years after China’s accession, foreign service suppliers will be permitted to establish wholly foreign-owned subsidiaries.

Implications
Courier services are an important part of the group of logistics services. A joint venture is allowed at present, but only with a minor share for foreigners. The opening up of this sector could bring up more competition in this market and there is evidence already of the interest of foreign firms in this sector.

Packaging services (CPC 876)

Commitment
Foreign service suppliers will be permitted to establish a joint venture in China. Within one year after China’s accession, foreign majority ownership will be permitted. Within
three years after China’s accession, foreign service suppliers will be permitted to establish wholly foreign-owned subsidiaries.
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