ASHGATE STUDIES IN AVIATION ECONOMICS AND MANAGEMENT

ROUTLED

Air Cargo in Mainland China and Hong Kong

AKE 11390 K

ANMING ZHANG, GEORGE W.L. HUI, LAWRENCE C. LEUNG, WAIMAN CHEUNG, YER VAN HUI

AIR CARGO IN MAINLAND CHINA AND HONG KONG



Air Cargo in Mainland China and Hong Kong

ANMING ZHANG GEORGE W.L. HUI LAWRENCE C. LEUNG WAIMAN CHEUNG YER VAN HUI



First published 2004 by Ashgate Publishing

Published 2017 by Routledge

2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN 711 Third Avenue, New York, NY 10017, USA

Routledge is an imprint of the Taylor & Francis Group, an informa business

Copyright © A. Zhang, G.W.L. Hui, L.C. Leung, W. Cheung, Y. V. Hui 2004

Anming Zhang, George W.L. Hui, Lawrence C. Leung, Waiman Cheung and Yer Van Hui have asserted their right under the Copyright, Designs and Patents Act, 1988, to be identified as the authors of this work.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Notice:

Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

British Library Cataloguing in Publication Data

Air cargo in mainland China and Hong Kong. - (Ashgate studies in aviation economics and management)
1. Aeronautics, Commercial - China - Freight 2. Airports - China
I. Zhang, Anming 387.7'44'0951

Library of Congress Cataloging-in-Publication Data

Air cargo in mainland China and Hong Kong / Anming Zhang ...[et al.].
p. cm. -- (Ashgate studies in aviation economics and management)
Includes index.
ISBN 0-7546-4216-X
1. Aeronautics, Commercial--China--Freight. 2. Aeronautics, Commercial--China--Hong Kong--Freight. I. Zhang, Anming. II. Series.

HE9878.A4A372004 387.7'44'0951--dc22

2004043709

ISBN 13: 978-0-7546-4216-9 (hbk)

Contents

List of Figures List of Tables List of Authors Preface	xi xiii xvii xix
Chapter 1 Introduction	1
PART I OVERVIEW	5
Chapter 2 An Overview of Air Cargo Flows	7
 2.1 Aviation Growth 2.2 Regions and Airports 2.2.1 Six Regions 2.2.2 Air Cargo 2.3 The Domestic Network 2.4 Hong Kong 2.5 The International Route Network 2.6 Commodities 2.7 Conclusions 	7 9 12 13 15 18 21 21
Chapter 3 The Mainland's Aviation Industry and Policy	23
 3.1 Developments up to 1992 3.1.1 History 3.2 Developments Since 1993 3.2.1 Market Structure 3.2.2 The Mega-Carriers 3.2.3 Price Competition 3.2.4 Non-Price Competition 	24 24 27 27 28 30 31
 3.3 Industry Performance 3.3.1 Financial Performance 3.3.2 Productivity Changes 3.3.3 Causes of Productivity Slowdown 	31 31 33 35
3.4 International Aviation Policy3.4.1 Infrastructure3.5 RemarksAppendix: Nine Freedoms of the Air	37 40 41 42

PART II MAJOR HUBS	45
Chapter 4 Beijing	47
4.1 The Airport	47
4.2 The Gateway to North China	49
4.2.1 North China	51
4.2.2 Other Neighboring Provinces	53
4.3 A Domestic Hub	54
4.3.1 The Concept of a Hub	54
4.4 An International Gateway	56
4.4.1 International Routes	56
4.4.2 Imports and Exports	56
4.5 The Impact of Air Cargo Business	58
4.5.1 Direct and Induced Contributions	58
4.6 The Hub Carrier: Air China	59
4.7 Comparison with Other Hub Airports in Northeast Asia	60
Chapter 5 Shanghai	61
5.1 Recent Developments	61
5.2 The City	65
5.3 The Region	66
5.4 The Roles of Shanghai's Airports	69
5.5 The Hub Carriers	70
5.6 Comparison with Other Airports	72
5.7 Conclusions	74
Chapter 6 Hong Kong	77
6.1 The Airport	78
6.2 The Pattern of Hong Kong's Overall Trade	80
6.3 The Pattern of Air Cargo Flows	83
6.3.1 Local Traffic	84
6.3.2 Gateway Traffic	85
6.3.3 Hub Traffic	86
6.4 Air Rights and Aviation Policy	88
6.5 The Hub Carriers	91
6.6 Competitive Factors	91
6.7 How Long will Hong Kong's Hub Role Continue?	94
Appendix	97
Chapter 7 Guangzhou	101
7.1 The Airports	101
7.2 The Region	103
7.3 The Market Positions of the Five Airports in the Pearl River Delta	107

С	ontents

7.3.1 Macau and Zhuhai	107
7.3.2 Guangzhou, Shenzhen and Hong Kong	
7.4 The Hub Carrier: China Southern Airlines	
7.5 Prospects	111
PART III INFORMATION TECHNOLOGY	113
Chapter 8 IT Applications in the Air Cargo Logistics Industry	115
8.1 Information Systems in the Hong Kong Air Cargo Industry	116
8.1.1 EAN.UCC	118
8.1.2 RosettaNet	118
8.1.3 Tradelink	119
8.1.4 Traxon	119
8.1.5 COSAC	119
8.1.6 ACCS	120
8.2 The Use of IT by Different Agents in Hong Kong	120
8.2.1 Airlines	120
8.2.2 Forwarders	120
8.2.3 Integrators	120
8.2.4 Warehouse Operators	121
8.2.5 Trucking Companies	121
8.2.6 Government Departments	121
8.2.7 Shippers	121
8.3 Information Systems on the Mainland	122
8.3.1 RosettaNet on the Mainland	122
8.3.2 Eport	122
8.4 The Use of IT by Agents in Beijing and Shanghai	123
8.4.1 Airlines	123
8.4.2 Forwarders	123
8.4.3 Integrators	124
8.4.4 Warehouse Operators	124
8.4.5 Trucking Industry	125
8.4.6 Customs	125
8.4.7 Airports and Terminal Operators	125
8.4.8 Foreign Owned Companies and Joint Ventures	126
8.5 Conclusions	126
Glossary of Acronyms	128
Web Sources	129
Chapter 9 IT Infrastructure Needs of the Air Cargo Industry	131
9.1 A Fourth Party e-Logistics Network: A Proposed IT Infrastructure	133
9.1.1 Hong Kong's DTTN	134
9.1.2 Networking e-Logistics Networks	135
9.2 Standards for an e-Logistics Network	136

vii

9.3 IT Infrastructure Support in Hong Kong	137
9.3.1 Broadband Communication Network	138
9.3.2 Internet Service Providers and International Connectivity	138
9.3.3 Internet Subscribers	139
9.3.4 Certificate Authority and Payment Gateway	139
9.3.5 Internet Exchange Centers	139
9.4 IT Infrastructure Support in the Mainland Hubs	140
9.4.1 Broadband Communication Network	140
9.4.2 Internet Service Providers and International Connectivity	140
9.4.3 Internet Subscribers	141
9.4.4 Certificate Authority and Payment Gateway	142
9.4.5 Internet Exchange Centers	142
9.5 Conclusions	143
Web Sources	144
PART IV Prospect and Conclusion	145
Chapter 10 Further Liberalization and Obstacles	147
10.1 Liberalization and Regional Integration	147
10.1.1 The Bilateral System and the US Bilateral Open-Skies Initiative	148
10.1.2 The WTO/GATS Multilateral Approach	149
10.1.3 Regional Open-Skies Bloc	150
10.1.4 An Open-Skies Bloc for Northeast Asia?	150
10.2 Liberalization of Air Cargo Services	151
10.2.1 The Increasing Importance of Air Cargo	152
10.2.2 Liberalizing Air Cargo Services First?	152
10.2.3 Liberalization in Related Areas	155
10.3 Reasons for China's Conservative International Aviation Policy	157
10.3.1 Weak Airlines	157
10.3.2 Foreign Travel Restriction and Low Income	158
10.3.3 Lack of International Experience	159
10.3.4 Airport Capacity and Management	160
10.4 Other Obstacles	160
10.5 Positive Developments	162
10.5.1 WTO Membership	162
10.5.2 More Liberal Attitude in International Aviation	163
10.5.3 Improvement in Infrastructure	163
10.5.4 Restructuring of the Aviation Industry	164
10.6 Some Policy Recommendations for Mainland Customs	165
Chapter 11 Looking Back and Looking Forward	167
11.1 The Mainland	167
11.1.1 High but Uneven Growth	167
11.1.2 Decentralization and Liberalization	168

11.1.3 Modernization of Logistics	169
11.1.4 International Aviation Policy	170
11.1.5 Reorganization of the Route Network	171
11.2 Hong Kong	171
11.2.1 Mainland Routes and Aviation Policy	171
11.2.2 Infrastructure	172
11.2.3 Cross-Strait Direct Links	173
11.3 Future Research and Better Data	174
References	177
Index	183

Contents

ix



List of Figures

Figure 2.1	The tripod of China's domestic route network	15
Figure 2.2	The tripod of China's international route network	20
Figure 3.1	Total factor productivity of the aviation industry, 1987 – 96	35
Figure 4.1	The various roles of the BCIA	50
Figure 4.2	The North China region	52
Figure 4.3	Two networks	55
Figure 5.1	The East China region	67
Figure 5.2	Major airports in East China	69
Figure 5.3	The organizational structure of China Eastern	71
Figure 6.1	Hong Kong as an entrepôt	82
Figure 6.2a	Local traffic	85
Figure 6.2b	Gateway traffic	86
Figure 6.2c	Hub traffic	87
Figure 6.2d	Hong Kong as an intermediary between the mainland and Taiwan	87
Figure 7.1	The Central and South China regions	104
Figure 7.2	International airports in the Pearl River Delta region	108
Figure 8.1	Information exchange in Hong Kong's air cargo industry	117
Figure 9.1	Logistics processes with multiple agents	132
Figure 9.2	A fourth party e-Logistics network	133
Figure 9.3	A network of e-Logistics networks	136
Figure 9.4	The mainland's connectivity to foreign countries	141



List of Tables

Table 2.1	The mainland's aviation growth	8
Table 2.2	Major regions	10
Table 2.3	Major airports in 2000	12
Table 2.4	Cargo traffic between major cities, 2000	14
Table 2.5	Hong Kong's aviation growth	16
Table 2.6	Hong Kong juxtaposed with the mainland, 2000	17
Table 3.1	Inter-city passenger transport on the mainland	24
Table 3.2	Market share and concentration of the airline industry	28
Table 3.3	Price competition on the Shanghai–Beijing route, January – June 1998	30
Table 3.4	Airline yield and unit cost (yuan)	32
Table 3.5	Financial statistics of CAAC carriers	33
Table 3.6	Labour productivity, 1978 – 2000	34
Table 3.7	Capacity and load factor, 1990 – 97	36
Table 3.8	Some operating statistics, 1992 – 96	36
Table 4.1	Beijing capital international airport (BCIA) statistics	48
Table 4.2	Major airports of North China, 2000	50
Table 4.3	Social and economic indicators of North China and neighboring provinces, 2000	53
Table 4.4	Social and economic indicators of three regions, 2000	54

xiv	Air Cargo in Mainland China and Hong Kong	
Table 4.5	The domestic route network, 2000	56
Table 4.6	Top import and export items by air, Beijing, 1999 (US\$ million)	57
Table 4.7	Country distribution of major air-transported trade items exported from Beijing airport, 1999 (US\$ million)	58
Table 5.1	Hongqiao and Pudong airport statistics	63
Table 5.2	Top import and export items by air to/from Shanghai, 1999 (US\$ million)	63
Table 5.3	Country distribution of major air-transported items, 1999 (US\$ million)	64
Table 5.4	Social and economic indicators of East China, 2000	65
Table 5.5	Major airports of East China, 2000	67
Table 5.6	Asia's international airports and their expansion plans	73
Table 6.1	Chek Lap Kok airport statistics	79
Table 6.2	Hong Kong's trade components	81
Table 6.3	Hong Kong's re-export trade	81
Table 6.4	Trade components transported by air	83
Table 6.5	Commodity composition of air-transported trade, 2000 (HK\$ million)	84
Table 6.6	Country origins and destinations of air-transported trade, 2000 (HK\$ million)	85
Table 6.7	A hub between the mainland and Taiwan (HK\$ million)	88
Table 6.8	A decline in Hong Kong's entrepôt role	95
Table 7.1	Major airports in Central and South China, 2000	102
Table 7.2	Pearl River Delta airport statistics	103

Table 7.3	Social and economic indicators of the Pearl River Delta region, 2000	104
Table 7.4	Social and economic indicators of regions and municipalities with international airports, 2000	106
Table 7.5	Major commodities transported by air to/from Guangzhou, 1999 (US\$ million)	106
Table 7.6	Country distribution of major imports and exports by air to/from Guangzhou, 1999 (US\$ million)	107
Table 7.7	Macau's route network, 2000	108
Table 9.1	Hong Kong's connection bandwidth to foreign countries (in Mbits/second)	138
Table 9.2	China's connection bandwidth to foreign countries (in Mbits/second)	141
Table 10.1	Cargo share of revenue for major US and Asian airlines	155
Table 10.2	Labor productivity comparison, 1997	158
Table 10.3	International inbound/outbound tourists, 1998	159



List of Authors

Anming Zhang received his BSc from Shanghai Jiao Tong University, and a MSc and PhD (Economics and Management Science) from the University of British Columbia. He had taught at the University of Victoria, Canada, for six years before teaching at the City University of Hong Kong. He currently teaches at Sauder School of Business, and is Director of the Centre for Transportation Studies, University of British Columbia. He has published more than 50 research papers in the areas of industrial organization, transportation and international trade. He received the Yokohama Special Prize for Outstanding Young Researcher, awarded at the 7th Tri-annual World Conference on Transportation Research, Sydney, Australia, in July 1995.

George W.L. Hui received his graduate degrees in economics from Northwestern University. He was previously a member of the Finance Department of the Chinese University of Hong Kong, Research Director of the One Country Two Systems Economic Research Institute, and Senior Fellow of the Economics Department of the National University of Singapore. He is now a visiting scholar at the Department of DSE of the Chinese University of Hong Kong.

Lawrence C. Leung is a Professor at the department of Decision Sciences and Managerial Economics of the Chinese University of Hong Kong. He received his degrees in industrial engineering from Northeastern University (BS) and Virginia Tech (MS and PhD). His research interests are e-Business and air cargo logistics. He has contributed articles to Decision Sciences, European Journal of Operations Research, IEEE Transactions on System, Man, and Cybernetics, IIE Transactions, Interfaces, International Journal of Production Research, Journal of Manufacturing Systems and Transportation Research.

Waiman Cheung is Director of the Center of Cyber Logistics. He holds an MBA and a PhD in Decision Sciences and Engineering Systems from Rensselaer Polytechnic Institute. He once operated his own MIS consulting company and worked as Technical Staff for Oracle Systems in the US. He has conducted studies and consulting work for DHL, the Airport Authority of Hong Kong, Sun Hung Kai Properties and the Innovation and Technology Commission of the Hong Kong Government. He is also a member of the H-logistics work group under the Hong Kong Logistics Development Council. **Yer Van Hui** received his BSc from the Chinese University of Hong Kong, MSIE from Texas Tech and PhD from Virginia Tech. He taught at the National University of Singapore, the Chinese University of Hong Kong and University of New South Wales before joining City University of Hong Kong. Besides teaching and research, he is active in professional services and business consulting.

Preface

This is a reference book on the air cargo industry in China. The idea of putting together such a book first came up several years ago when we were conducting air cargo-related research for several companies in Hong Kong. We wanted to know more about state-of-the-art of this industry in China. During the process, we realized that very little was written and that such a book would benefit researchers, practitioners, policy makers and students interested in this topic.

So this is the first book of its kind. There are probably many reasons why such a book has not been written. Primarily, we believe that China's air cargo industry has yet to come into its own since there have been many changes in the industry and in the policies affecting it – as the country evolves from a centrally-planned economy to one with a greater role for free enterprises. These changes have been happening so fast that studies addressing them commonly have a narrow focus. Our goal here is to provide a systematic and comprehensive study of China's air cargo industry as well as its policy evolution.

We also believe that this is a timely endeavor. Three major events are currently driving changes in China's air cargo industry, namely, 1) the restructuring of its aviation industry, 2) the emergence of information technology (IT) and global production outsourcing and 3) China's entry to the World Trade Organization (WTO) in 2001.

Since China's open door policy two and a half decades ago, its air traffic and aviation industry has grown rapidly, largely due to the process of globalization and China's various economic reforms such as decentralization and liberalization policies. Recently, the Chinese central government has restructured its highly fragmented airline industry. One of its measures is to create three large airline consortia, which account for a majority of flights inside China.

The emergence of globally integrated production and distribution systems and the emergence of e-Commerce and e-Business have meant fast-growth in air cargo. Today's air cargo logistics requires integration – physical as well as virtual. At this point, air cargo logistics in China is merely transportation of cargo with weak intermodal connections. The adoption of IT in the industry is still very much at an infant stage.

With China's WTO accession, the country has made substantial market access commitments covering the industrial, services and agricultural sectors. For the first time, foreign companies will be given trading and distribution rights. In most logistics sub-sectors – including storage and warehousing, express delivery and ground transportation – majority-owned joint ventures will be allowed.

We would like to acknowledge the support of the Center of Cyber Logistics (a joint effort of the Chinese University of Hong Kong and the City University of Hong Kong) and the Centre for Transportation Studies (University of British Columbia). Our heartfelt appreciation goes to Sung-Chi Chu and Winnie Lo both of the Center of Cyber Logistics for reading and handling the manuscripts. Anming Zhang would like to gratefully acknowledge his joint research colleagues in past projects: Hongmin Chen, David Dodwell, Tae Oum and Yimin Zhang, from whom he has been significantly benefited. He would also like to thank the Department of Economics and Finance, Faculty of Business of the City University of Hong Kong for providing a very pleasant research environment and excellent support while he was working on this book in Hong Kong.

The opinions expressed and statements made in this book are those of the authors and should not be ascribed to those persons or organizations whose assistance is acknowledged above.