Analysis of Interaction between Air Transportation and Economic Activity

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Passenger and GDP Trends Aggregated by Region

- Aggregate data exhibit correlation between GDP and Air Passengers.
Feedback Relationship between Air Transportation and an Economy

Figure source: The Impact of Information Technologies on Air Transportation by R. John Hansman, 2005.
Describing the Enabling Impact

Enabled Flows are defined as flows which directly impact the Economic Attributes.

Economic Attributes consist of:
- Factor Conditions: land, labor, capital, institutions, infrastructure
- Demand Conditions
- Firm Strategy

Interaction Potential is determined by inherent Economic Attributes of the Economy and the Rest of the World.
Research Approach

- **Identify Enabled Flows**
  - Goods
  - Investment
  - Knowledge
  - Services
  - Labor
  - Remittances
  - Tourism

- **Describe how Enabled Flows affect Economic Attributes**
  - Factor Conditions: land, labor, capital, institutions, infrastructure
  - Demand Conditions
  - Firm Strategy

- **Identify which factors may stimulate or the suppress the development of Air Transportation System.**
Data Analysis

- We use comparative country-level data analysis to identify different behaviors.


- Data Sources
  - ICAO Air Transportation Passenger data
    - The air transport data represent the total (international and domestic) scheduled passenger traffic carried by the air carriers registered in a country.
  - The World Bank GDP data

- Data Limitations
  - Discontinuation or addition of a particular carrier may cause significant changes in the data but not in the actual traffic
  - In liberalized environments airlines not registered in a particular country may carry local traffic.
  - Data for small countries may reflect the financial and capacity issues faced by a single carrier.
Explore Variability in the Growth Patterns

- Use temporal data to determine the correlation between passenger and GDP.
- Use Air Passengers and GDP growth patterns to identify different behaviors.
Stimulating and Suppressing Growth Behaviors

GDP Growth

Economic Growth
Declining Air Usage

Q2
Q1

Q3
Q4

Air Passenger Growth

Decline

Economic Decline
Increasing Air Usage

Suppressing Factors => Negative Passenger Growth Rates

Stimulating Factors => Positive Passenger Growth Rates
Yearly Growth Rates for 139 Growth Countries
Four Growth Behaviors: Number of Occurrences

- GDP Growth
  - 21% of occurrences
  - 62% of occurrences

- Air Passenger Growth
  - 8% of occurrences
  - 10% of occurrences

Suppressing Factors => Negative Passenger Growth Rates
Stimulating Factors => Positive Passenger Growth Rates
List of 28 Case Studies

GDP Growth

Q2
Q1
Q3
Q4

Air Passenger Growth

Japan
Indonesia
Switzerland
Costa Rica
Algeria
Libya
Nigeria

China
Lao
Vietnam
Ireland
Turkey
Slovakia

Chile
Qatar
United Arab Emirates
United States of America
India
South Africa

Bulgaria
Argentina
Peru
Zimbabwe

United Arab Emirates

Large changes in year-on-year growth rates:
Belgium, Russian Federation, Ecuador, Kuwait, Madagascar
1978+: economic liberalization reforms, supporting and aviation infrastructure investment
1987: Civil Aviation Administration of China separated from airline management
1997: partial domestic deregulation
Identified Reasons behind Changes in the Growth Rates

<table>
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<tr>
<th>GDP Growth</th>
<th>Air Passenger Growth</th>
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<tbody>
<tr>
<td>Domestic deregulation</td>
<td>Economic liberalization reforms</td>
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<td>Liberalization</td>
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<td>Privatization</td>
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<td>New airport construction</td>
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<td>Low-cost carrier development</td>
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<td>National airlines</td>
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1992-2002: civil unrest marked by violence and terrorism
1994-1999: foreign airlines services suspension
1990s: macroeconomic stabilization policies: the hydrocarbons sector accounts for nearly 30% of GDP, and over 97% of export earnings
Identified Reasons behind Changes in the Growth Rates

Airline Bankruptcy
Airline Sale to Other Country

Airline Strategy: merges
Demand Shocks: SARS, accidents
Political Instability
Airline Ban
Services Suspension
Development of other transport modes

GDP Growth

Q1
Q2

Air Passenger Growth

Q3
Q4
1998: deteriorating political climate

2000: economic reforms leading to hyperinflation, fuel shortages
Identified Reasons behind Changes in the Growth Rates

- Economic Downturn
- Political Instability
- War
- Political/Economic Sanctions
Early 1980s: government policy to grow the air transportation sector.

High air passenger growth rate sustained since then.
Identified Reasons behind Changes in the Growth Rates

GDP Growth

Air Passenger Growth

Q1 Q2 Q3 Q4

Government Strategy
Further Work

- Perform detailed case study analysis to describe the enabling mechanisms.
- Describe how Economic Attributes affect the Interaction Potential and the resulting Air Transportation Demand.
- Develop a quantitative model describing the evolution of a particular mechanism in an economy.