THE ECONOMICS OF FREIGHT TRANSPORT

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THE INTERNATIONALIZATION OF FREIGHT TRANSPORT

- Freight transport has been operating is one of a world of continually rising real incomes and increasing levels of globalization

- This growth is due to significant political and institutional developments, mainly in the form of the lessening of international trade restrictions

WHY DO NATIONS TRADE?

- Trade allows nations to specialize production in areas where they have an advantage and this should benefit both parties to the trade
- Comparative advantage
- The principle of the opportunity cost of switching production from one commodity to the other

RICARDO'S LAW OF COMPARATIVE ADVANTAGE

Figure 1

Labor per unit of output in	Britain	America
Food	5	6
Manufactures	2	12
Total	7	18
Total: 25		

Figure 2

Labor per unit of output in	Britain	America
Food	-	12
Manufactures	4	-
Total	4	12
Total: 16		

- An advantage to be gained for both nations if each was to specialize in the commodity that has the lower opportunity cost in terms of the other

- Each nation should specialize in the commodity in which it has to give up the least in terms of production of the other

- The biggest limitation of Ricardo's theory is that it does not consider the terms of trade

- Although both nations benefit, the key is how that benefit is distributed between the two and it is the terms of trade that will by and large resolve the issue

- Example
  - Britain has almost doubled its production capacity as a result of the trade, whereas America has only increased it by half
  - While this may be appear to be fair as British had an absolute advantage in both commodities, such an argument completely ignores the key issue that both countries need each other and hence why should Britain apparently benefit by far more?
  - Despite such limitations, the theory nevertheless illustrates that trade can be of major economic benefit to the parties concerned and this has been one of the main drivers behind reducing trade restrictions

INSTITUTIONAL DEVELOPMENTS

- All institutional developments that have occurred since have their origins in the Bretton Woods Conference held between the Allied power in 1944

- The Bretton Woods conference laid down the foundations for the development of three organizations which would enhance global trade (General Agreement on Tariffs and Trade (GATT), International Monetary Fund (IMF) and International Bank for Investment and Re-Development (IBIR))

OTHER DEVELOPMENTS

- Increasing sophistication of international financial markets
- Development of the concept of the whole supply chain
- Improvement in political/ economic stability

MODES OF FREIGHT TRANSPORT

- Road haulage
- Rail freight
- Air freight
- Maritime shipping

ROAD HAULAGE

- Market segments
- Cost structures
- Economies of density

Market segments

- Truck load
  - is characterized by a very high number of small firms that operate local haulage services or point-to-point carriage over longer distance
  - The market sector tends to be dominated by small companies with a high proportion of one person owner-driver operations
- Less than truck load (LTL)
  - Operates at an international level
  - A large part of the LTL sector is the parcels or small packet market
    - requires a nationwide network of depots and local collection/delivery services
    - Loads for longer distance carriage are assembled at the depot and made up into full consignments
    - Then sent to the depots in other parts of the country where they broken into local loads and added to other longer-distance loads coming from other parts of the country

COST STRUCTURES

- The main fixed costs are license fees for vehicles, property taxes, management salaries and the cost of terminals, which the highest capital cost related to the vehicle

- Comparison to other modes such as the railways or air freight the cost is relatively low

- Variable costs include wages, depreciation, maintenance, fuel, lubricants and some marketing costs

ECONOMIES OF DENSITY

- Density relates to the size of the vehicle
- Due to the high proportion of variable costs in the operation of road haulage, the MC of operating a larger lorry will be relatively small in terms of the additional operating and capital costs
- Cost per ton carried – if larger trucks are operated the cost per vehicle km will increase; however if fully laden the cost per ton carried should fall - Reduce average costs through economies of density
- Economies can be exploited however is limited by what the actual infrastructure, can take in terms of the weight and dimensions of vehicles

RAIL FREIGHT

- Barriers to entry
- Cost structures
- Economies of scale and scope
- High break-even point

Barriers to entry

- In Europe these have been in the form of legislative measures, where the state-owned operator has had a legally protected monopoly on all rail operations

- High start-up costs – investment requirements in railway technology, whether relating to infrastructure or rolling stock, tend to be very high and this may deter potential new companies from entering the industry

- Rail freight has increased advantages over a certain distance – this has implication on firm size suggesting that small firms may find it difficult if not impossible to enter the industry unless under some form of partnership agreement

COST STRUCTURES

- High level of capital costs
  - Nash (1985) estimated the proportion of fixed costs for railways in Europe to be in the order of 53% - based on both passenger and freight operations, freight-only railway due to the added cost of depots and freight marshaling yards

- Variable and MC tends to be relatively low

ECONOMIES OF SCALES AND SCOPE

- the unit cost is reduced due to common costs being spread across two or more outputs
- Passenger and freight trains can share the same track, which spreads the fixed costs of the track across both types of operations
- As a consequence a lower unit costs for each type of service is achieved than if either one was operated on its own

HIGH BREAK-EVEN POINT

- If fixed costs are very high then it follows that a large volume of output (freight services) must be sold before any profit is made at all

- This may suggest that a profit can only be achieved if there is only one firm in the market – natural monopoly

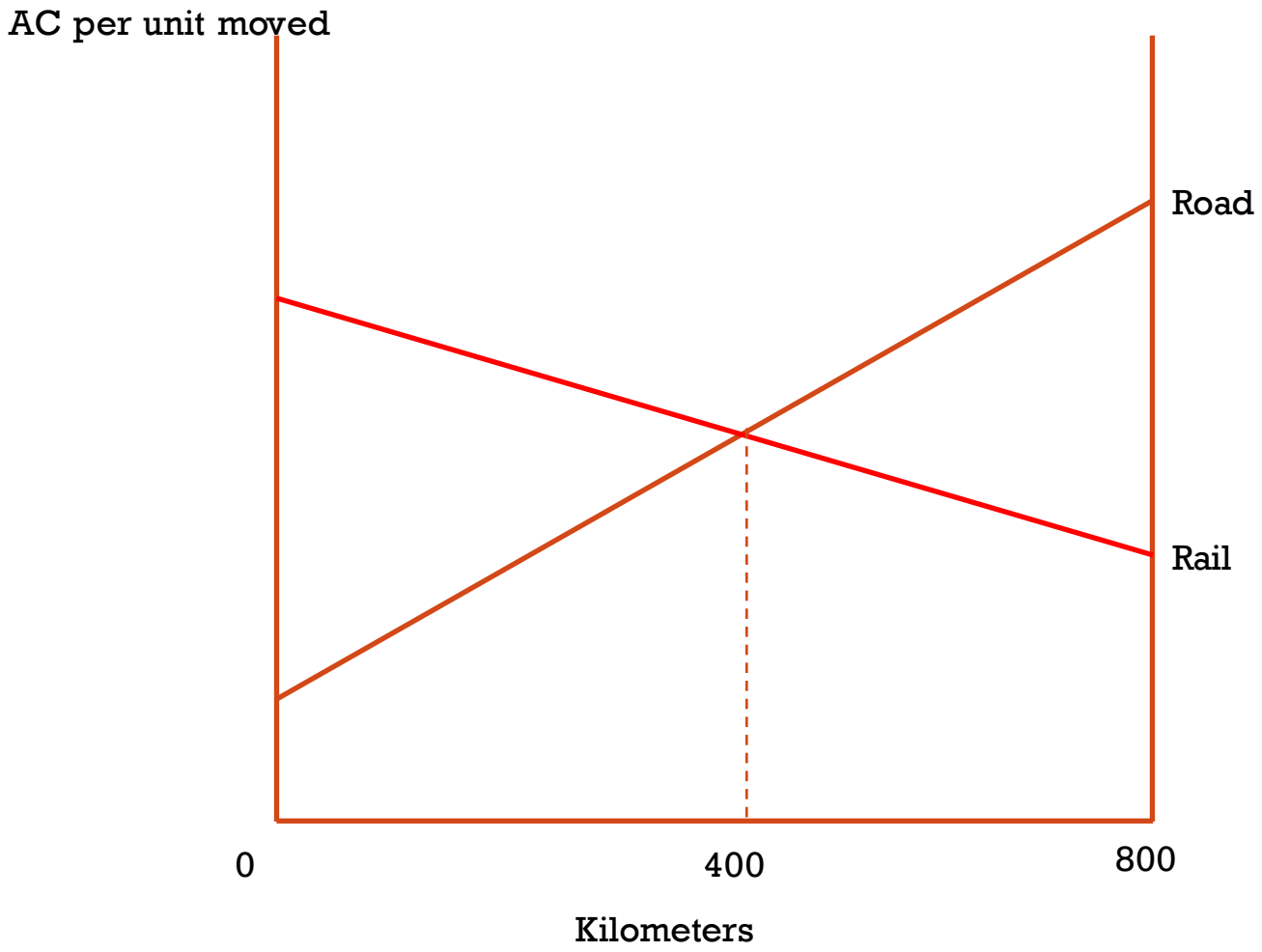
Advantages

- Environmental impact
- Distance
- Capacity
- Power costs
- Weather constraints

Disadvantages

- Accessibility
- Shipment size
- Security
- Frequency

AVERAGE COST PER UNIT MOVED, RAIL VERSUS ROAD



KEY ISSUES FACING RAIL FREIGHT

- The industry has been facing falling or stagnate freight tonnage
- Passenger oriented rail networks
- Lack of harmonization of standards, regulations and standards in the EU
  - Freight train face a complex patchwork of conflicting standards and requirements for rolling stock, locomotives, signaling and information systems
- Structure economic change

AIR FREIGHT

- Structure of air freight industry
- Market shares
- Air freight key economic characteristics

Structure of the air freight industry

- Line haul operators
  - Only move cargo from airport to airport, relying on third parties in the form of freight forwarders and consolidators to deal directly with customers and cater for their overall requirements
  - All cargo operators
  - Combination passenger and cargo operators
  - Passenger only operators
- Integrated operators
  - Door-to-door consignment market
  - UPS, Federal Express, DHL
- Niche operators

Market shares

10 Largest air freight carriers, revenue ton kilometers, 2001 and 2004

Operator	2001	2001
FedEx Express	11	14.6
Korean Air	5.6	8.3
Lufthansa Cargo	7.1	8
United Parcel Service (UPS)	5.9	7.4
Singapore Airlines Cargo	4.9	7.1
Cathay Pacific	n/a	5.8
China Airlines	n/a	5.6
EVA Airways	n/a	5.5
Air France	5.1	5.4
Japan Airlines	4.2	4.9

Source: Cowie J. (2010). Compiled from IATA statistics

AIR FREIGHT –KEY ECONOMIC CHARACTERISTICS

- Goods in joint supply
- Barriers to entry
- Firm size
- Price and non price competition
- Yield management

Goods in joint supply

- A large percentage of air freight goes in the cargo hold on commercial passenger aircraft – the production of more passenger services automatically produces a higher supply of freight operations, as these extra passenger aircraft all have cargo holds

- Strong demand in the passenger market will result in increased capacity in the freight market

Barriers to entry

- Barriers to entry tend to be very high, with one of the major constraints being access to key locations
- Air cargo needs to be transported directly to the area of highest value, as many of the advantage of air freight can be offset when this is not the case
- Freight operators are therefore in direct competition with passenger airlines for airport access, as area of high demand for passenger destination tend to be the same as areas of high demand for freight
- Airports may prefer to handle passenger aircraft due to added overall revenue they bring through passenger tolls and spend within the airport – this lack of access is why some freight only operations tend to be at night and based around regional airports rather than key passenger hubs

Firm size

- High proportion of fixed costs
  - if a company can increase the output produced in terms of revenue-generating traffic by working the existing assets more intensively, then unit costs will be significantly lower
  - Increases aircraft utilization in which less time is spent on the ground and more time spent in the air

Price and non price competition

- Competition for business tends to be very high, thus there is very strong downward pressure on prices
- Within the line haul sector- the strong market position of freight forwarders who make up complete consignments tends to drive prices down, while the integrated operators market is keenly contested

- Non price competition
  - Speed and reliability of delivery
  - Firms buying out rival operators in order to enhance their own market position

Yield management

- Uncertain capacity
  - In the freight market- the available capacity is dependent upon a number of other issues, hence cannot be deterministically established before hand

- Three dimensional capacity
  - The capacity to be filled is in three dimensions, weight, volume and number of container positions
  - Difficult to maximize the load in all three dimensions

- Itinerary control

- Allotments

Advantages

- Shorter journey times
- Faster journey times
- Can be used in an emergency
- Lower the costs of storage and distribution in the country of sale

Disadvantages

- High charges
- Limitation on capacity
- Congestion around airports
- Per ton kilometer transported air freight has the highest detrimental impact on the environment

MARITIME SHIPPING

- Market segments
- The international organization of shipping
- Economies of scale
- The shipping business cycle and the shipping risk
- Liner conference
- Flags of convenience

Market segments

- Inland shipping
- Coastal shipping
- Short sea shipping
- Deep sea shipping

The international organization of shipping

- International Maritime Organization (IMO)
  - Provide the machinery for the co-ordination and co-operation of government regulations in international shipping with the aim of achieving the highest standards possible in terms of safety and efficiency in navigation

Economies of scale in shipping

- Economies in manufacturing – associated capital costs of vessels

- The operation of vessels – where operating costs do not rise proportionally with the size of the vessel

The shipping business cycle and the shipping 'risk'

- Shipping business cycle – tends to go through large highs and very low troughs

- Given such uncertainties about the future, therefore, major question marks arise over the decision of when to invest in new ships and scrap old vessels and when not to

Liner conference

- The schedule services of general and container cargo between the major ports

- The conference introduced a reduction in rates based upon a rebate system to regular clients, hence the reduction was applied after a period of time had lapsed

- This tends to tie in shippers into certain conferences, and from these origins developed a system of liner conferences with a fairly intricate system of rates, schedules and ports served

Flags of convenience

- An open register allows foreign national ship owners to register their vessels in a different country and thus be subject to the rules and regulations of that state rather than their 'home country'

- This is not only applies to shipping regulations, but the labor rules and regulations applying to the crews will come under the jurisdiction of whatever state the ship is registered with

- It is one method therefore of bypassing costly labor legislation which is the main reason why the International Transport Workers Federation are strongly opposed to flags of convenience

- Why countries openly seek to attract shippers to register under their flag is because for many this represents an important inflow of hard currency, i.e. a strong globally traded currency that holds its value such as US dollars, the euro, Swiss franc etc.

- The largest maritime fleet is registered in Panama, as it has an open register

- Reason in favor of flags of convenience - Allow international shipping lines to register under whatever code will best suit their mode of operation

REFERENCE

Cowie J. (2010). The Economics of Transport. Routledge.