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AN OVERVIEW OF RAIL REFORM IN EUROPE

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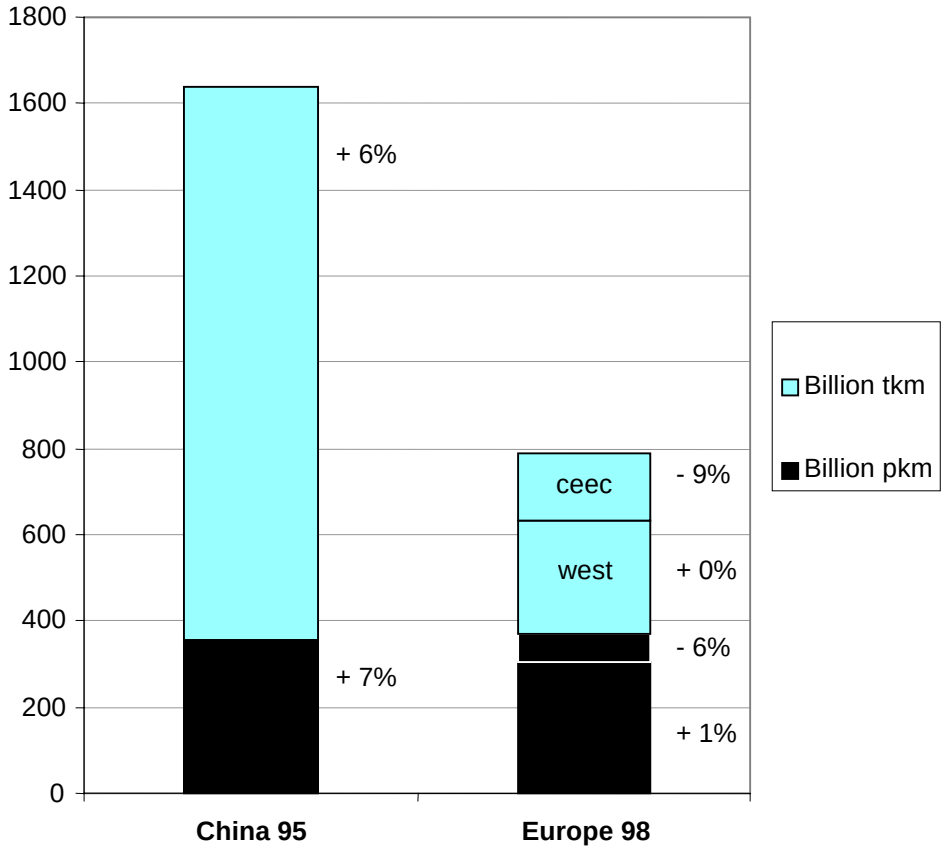
The views expressed in this paper are the author's and do not represent official positions of either the ECMT or its Member Governments. The purpose of the paper is to provide an overall perspective on railway reform in Europe and provide leads for fuller information on specific aspects of regulatory reform. The reference list that follows is therefore perhaps the most useful part of the paper, where authoritative information can be consulted.

AN OVERVIEW OF RAIL REFORM IN EUROPE

CONTEXT FOR THE RELEVANCE OF REGULATORY REFORMS IN EUROPE FOR CHINESE RAILWAYS

The European Conference of Ministers of Transport (ECMT) comprises all the countries of Europe including Turkey, together with CIS members Russia, Ukraine, Belarus, Azerbaijan, Georgia and Moldova. Excluding these CIS countries, the total passenger transport task for the railways of Europe taken together is roughly equivalent to that of China (see figure 1). The freight task in Europe is, however, only a third of that in China. These figures mask sharp differences between the countries of western Europe and those of central and eastern Europe. Both freight and passenger rail transport halved in central and eastern Europe over the decade of the 1990s, following the collapse of the command and control economy. In the west there has been slight growth in rail freight and moderate growth in passenger rail transport. In China both freight and passenger rail have shown strong sustained growth over the last decade.

Fig 1. **The Rail Freight and Passenger Task in China, Western Europe and Central and Eastern Europe** (annual totals and growth rates)



Sources: Railway reform in China, Jian Hong Wu & Chris Nash, Transport Reviews 2000 Vol 20 No 1; Trends in the Transport Sector 1970-1998, ECMT 2000.

Fig 2.
Freight Modal Split
Source: As above.

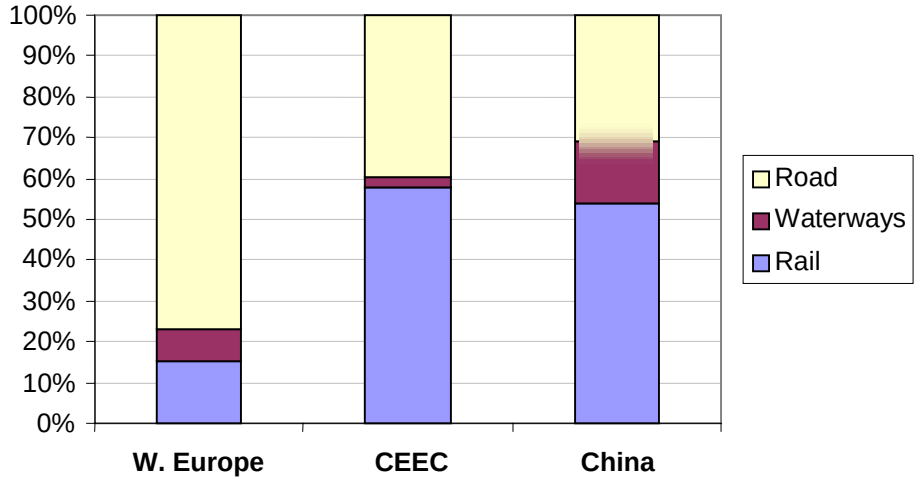
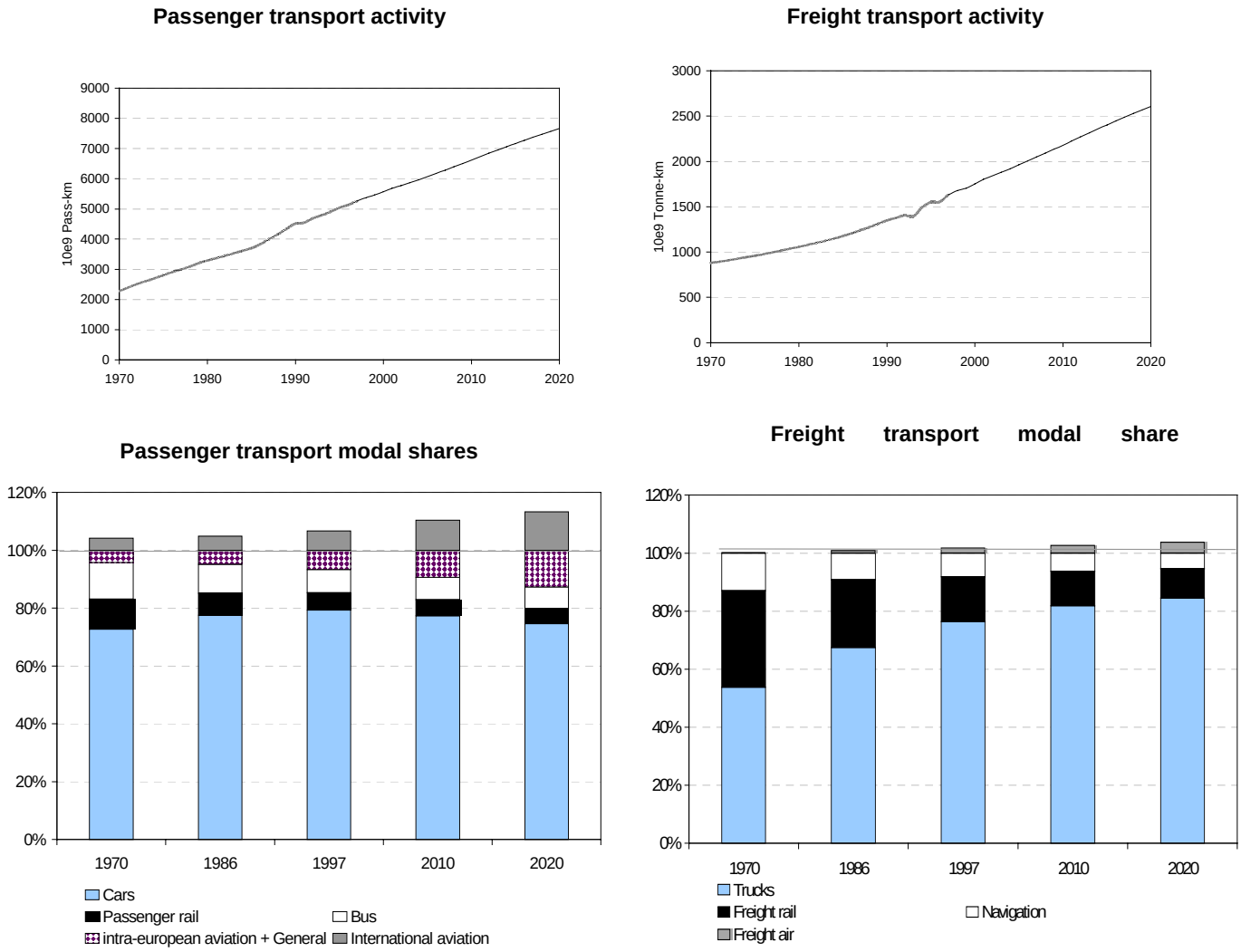
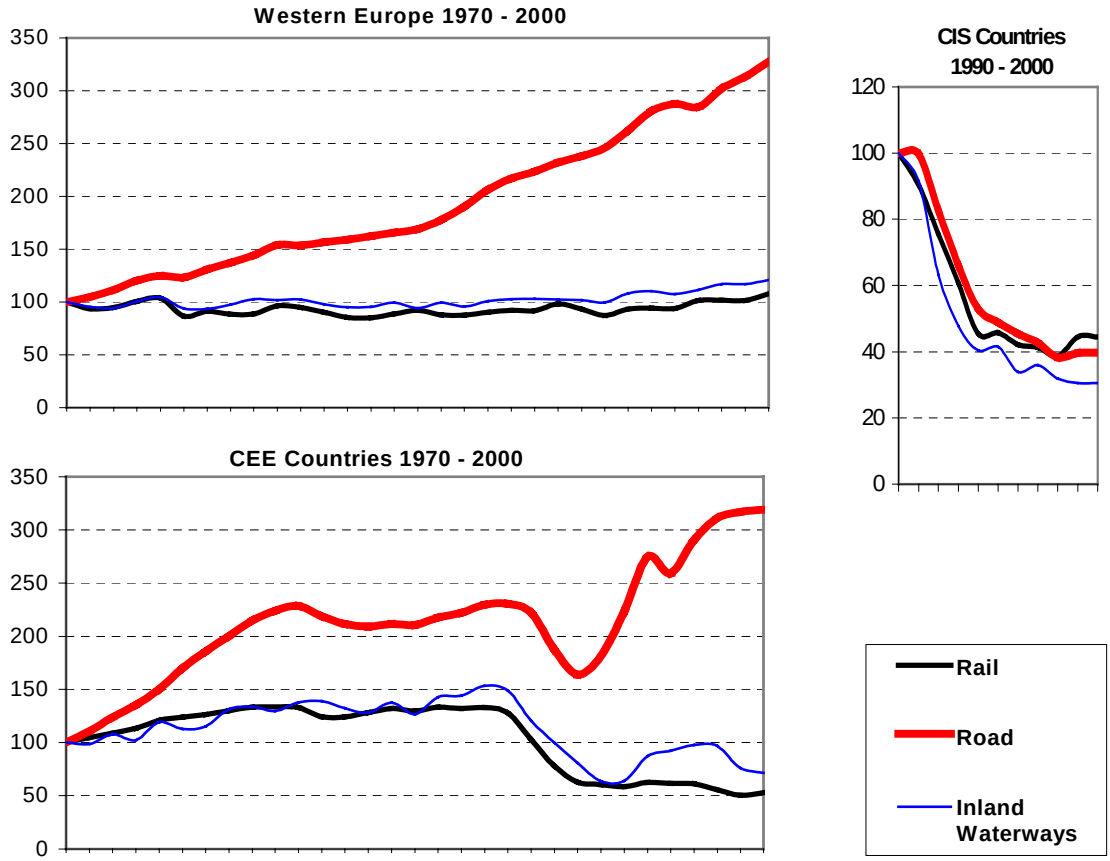


Fig 3. **Passenger and Freight Transport Trends and Projections for Western Europe 1970-2020**



Source: International Energy Agency 2001.

Fig 4. **Freight Transport Trends in tkm in ECMT Member Countries**



Source: ECMT data base.

Figure 2 summarises the modal split pattern for freight transport. The passenger split shows a more extreme pattern: rail accounting for 39% of passenger transport in China, 13% in CEECs and under 7% in western Europe. Modal split in China is moving rapidly in the direction of that in western Europe and in 2001 rail accounted for less than 40% of total freight tkm.

The outlook, shown for western Europe in figure 3, is for strong growth in both total freight and total passenger transport. Central and eastern Europe is expected to show a similar trend from a lower base. Road is forecast to account for most of the freight transport growth and air for most of the passenger growth. The trends of the last decade in western Europe for rail are projected to continue, with slight growth in freight and slow to moderate growth in passenger transport. These trends are displayed in detail in figure 4.

Trends in both east and west Europe have some relevance for China. The modal split is expected to continue towards that in Europe, especially for passengers. Assuming China continues to liberalise its economy and integrate fully into world trade, industrial restructuring will have a major impact on rail freight markets. The results may not be as dramatic as in CEECs since 1989 but the impacts will be at least as powerful as those felt in western Europe following the oil shocks of the 1970s.

Indeed, the overall loss of modal share recorded for rail in western Europe over the last three decades masks a remarkable story of success in attracting new business to replace lost markets for moving coal, steel and other heavy materials for businesses that failed to compete

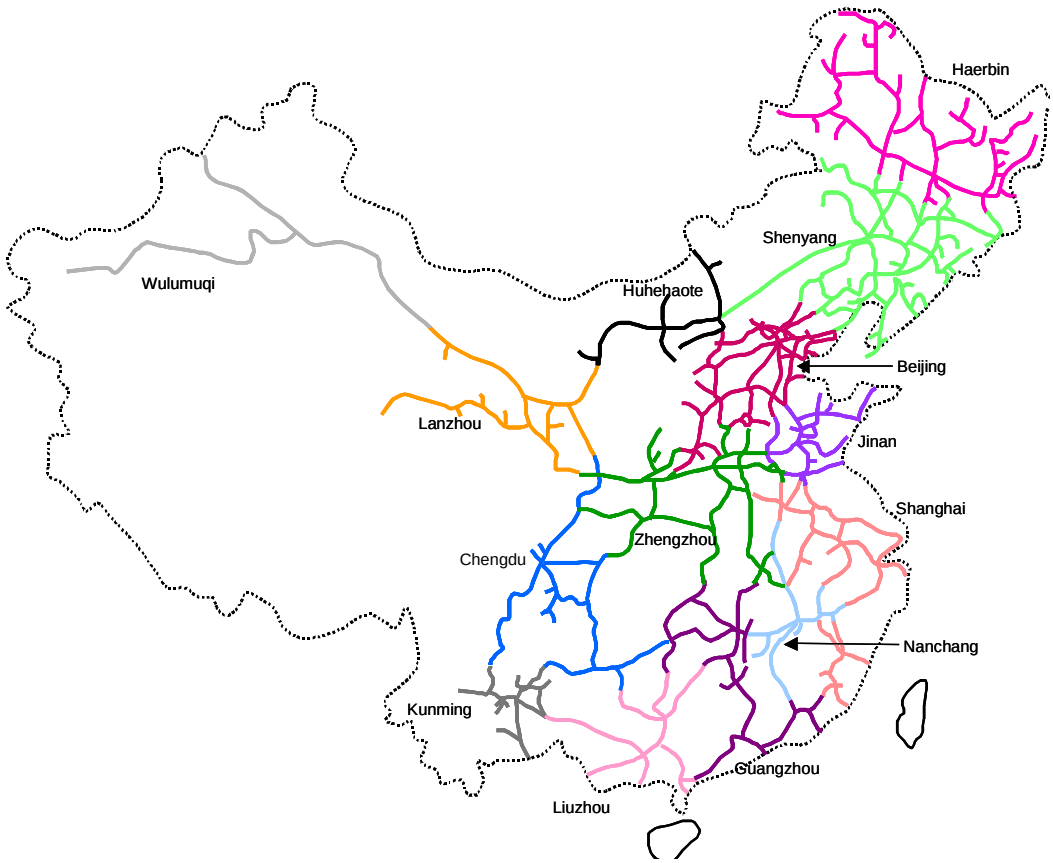
on world markets. Given that many of the substitute markets developed — automobiles, auto parts, parcels, containers, etc — involve goods that are much lighter than the steel, iron ore and coal lost, the stability in t-km figures is surprising. Unfortunately we lack figures for the value of the goods moved.

In China, over the long term, restructuring of heavy industry will no doubt alter freight transport markets in a similar way to Europe, with at the same time new rail freight markets being developed. Accession to the World Trade Organisation can only accelerate this trend.

However, the current freight market differs sharply from rail freight markets in Europe. Coal accounts for 45% of all rail freight tkm[i] in China. There is little relevant current experience in Europe for the issues faced in the transport of coal in China. Australia provides much more useful case histories for the regulation and de-regulation of coal transport prices, investment and competition in mine-port railways, coal trade policy, etc[ii].

The growth in overall transport services experienced over recent decades by western Europe and forecast to continue, with its attendant problems of environmental and nuisance impact and demand for public and private finance can, however, be expected to be matched and indeed outstripped in China, which has seen double the European rates of growth in rail freight and passenger transport during the 1990s, albeit starting from much lower levels of mobility. Apart from coal transport, the challenge for meeting the needs of tomorrows freight transport markets is essentially the same in both China and Europe. There is a powerful trend for an increasing part of the added value in goods in the market to be derived from logistics and distribution services. As a result the transport sector faces market adjustments every bit as challenging as those of the last decades, and flexibility to change with the market will be the key for success.

The Chinese Rail Network



REFORM IN EUROPE[iii]

Over recent years, political attention in Europe has been focussed on the more negative interpretation of figures 3 and 4 — that whilst the overall transport market has grown strongly rail has grown its business only slightly, and lost modal share. Whilst many countries have pursued their own rail reform agendas driven by national priorities, the European Commission has played a lead role in shaping opinion across Europe and in proposing remedies. Many politicians see the situation for freight in particular as disastrous and want rail to claw back a higher part of the modal share. Much of the concern is driven by congestion and the nuisance impact of the rapidly growing number of trucks on the roads. The European Commission frequently extrapolates the trends to show rail freight transport disappearing in 20 years time. This will not happen, but reflects real concerns that rail is losing markets because its quality of service is in some cases poor and its labour productivity relatively low.

The Commission has targeted international rail freight for priority in reform, with the prime reason put forward for poor service and low productivity the lack of competition in train operations and the monopoly powers enjoyed by national railways.

On the face of it, almost all of Europe is reforming its railways towards a single model of competing train operators using a network run by separate infrastructure managers. Steps towards this model are required in all Member States of the EU by European Directives.

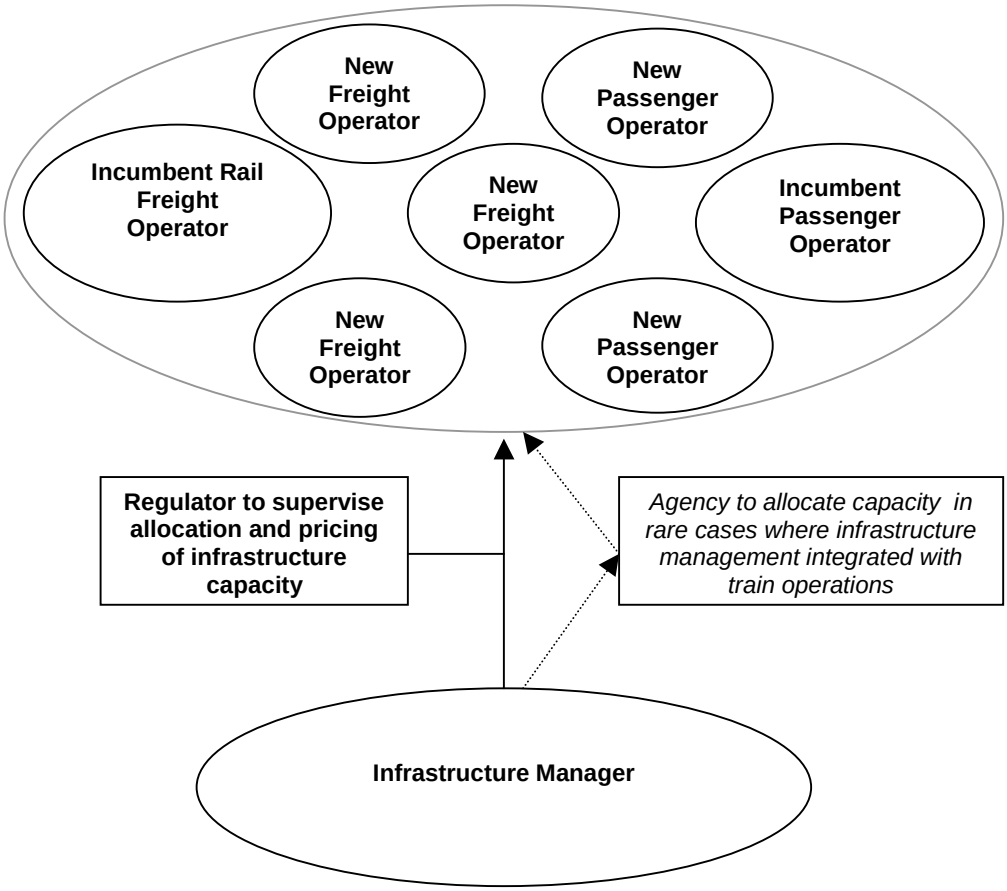
However, the reforms adopted nationally differ greatly, and even where similar restructuring patterns exist they were often adopted to address very different problems and achieve different goals.

This is because the diagnosis of lack of competition in railway markets is only a small part of the issues for regulatory reform in railways in Europe — indeed many observers argue that competition from other modes is quite sufficient in almost all European product markets to prevent any abuse of monopoly powers by the railways. Though most public debate over the European Commission's policy focuses on the introduction of competition through vertical separation of train operations from infrastructure management, the Commission also seeks to address many of these other important issues.

Outside of the European Union, the countries set to join it in 2004 are following the restructuring promoted by the Commission, to ensure there are no obstacles to them joining the Union (even if the 2001 railway Directives came too late to be part of the set of laws they must compulsorily conform to). Many other Governments in central and eastern Europe are following the same path.

More importantly most Governments in central Europe have achieved deep restructuring in response to the end of the command economy and collapse of their traditional markets, and over the last year have shown growth in freight and passenger transport for the first time since 1989. Further from the Union, railway restructuring is following different paths, conditioned by local market and political conditions.

Fig 5. **The Idealised Structure for the Rail Industry Promoted by the European Commission**



European Union Law

Directive 91/1893/EEC required separate accounting for rail services provided under public service obligations and encouraged the use of contracts between governments and rail companies for these services.

Directive 91/440/EEC provides rights of access for international freight traffic to transit national rail infrastructure to international groupings of railway companies (and to any road/rail combined transport operator). It required the separation of financial accounts between train operations and infrastructure management and outlawed cross-subsidies between them. At the same time the Directive stressed the need for commercial management freedom for railway companies and required member states to reduce the level of debt from accumulated deficits of rail companies.

Directive 95/18/EC set out some supporting rules on the award of operating licences and safety certificates.

Directive 95/19/EC required governments to lay down rules for establishing fees for the use of transit infrastructure, publish procedures for the allocation of capacity and appoint an independent body for appeals against allocation decisions.

Directive 2001/12/EC modifies 91/440/EEC to provide access rights for the transit of international freight traffic on most of the network from 2003 and all of the network from 2008 for any operator.

Directive 2001/13/EC amends 95/18/EC, providing for operating licences valid across the EU.

Directive 2001/14/EC replaced 95/19/EC and sets out the framework for charges for the use of rail infrastructure by freight trains, with short run marginal costs as the starting point and mark-ups allowed for a number of purposes including partially reflecting the long run costs of infrastructure.

Directive 2001/16/EC sets out new procedures for making technical standards to promote interoperability of national rail networks, making governments rather than the rail industry responsible for standards.

The "second infrastructure package" of draft directives[iv] to be proposed by the Commission to the EU Council of Ministers during 2002 will propose extending the access rights provided by 2001/12/EC to include cabotage, i.e. loading and unloading international trains and adding and removing wagons within transit countries and to cover domestic freight markets. It will also set up a new agency and new procedures for harmonising safety procedures and equipment specification, complementing 2001/16/EC in this respect.

Earlier plans to require completely separate ownership of infrastructure management from train operations, and completely separate management of operations from key infrastructure allocation functions have been dropped for the time being in face of opposition from some national governments. The Communication that accompanies the legislative proposals sets out plans to extend access rights to passenger services in future stages of reform.

RELEVANT EUROPEAN EXPERIENCE

European Governments are each addressing different sets of issues, depending on what they view as the failures and successes of their railways as currently constituted. All the EU Member Governments, and many other Governments are implementing the EU Directives but each in its own way and in forms that complement national priorities, respecting the letter of the European law but not always the spirit of the Commission's policy papers. The results are far from uniform. To identify European experience that might be of use to reform in China it therefore seems best to examine specific issues in turn rather than discuss one or more models of regulation.

Commercialisation — Separating Government Duties from Railway Management

Ministries of Railways ran many of Europe's post-war railways. Today, the only ECMT member countries to retain ministries of railways are to be found in the Commonwealth of Independent States, and Russia plans in the near future to separate the railway from Government.

Conferring freedom to management to run railways as commercial businesses has been the cornerstone of the rail reforms in all European countries over the last few decades. This was initiated in western Europe largely in response to liberalisation of road transport markets, and enabled the railways to survive the severe industrial restructuring that followed the oil shocks of the 1970s. Commercial freedom was conferred in the simplest of terms, railways were constituted as (state-owned) joint stock companies and required simply to make a long term financial return by managing the business in the way they saw fit subject to a limited set of conditions such as tariff regulations, control of borrowing and review of line closure programs. The key point was to separate the regulatory and political decision making of government from the commercial management of the rail business.

The point made in the paper for the seminar by the World Bank[v] that "experience suggests that the Chinese Ministry of Railways needs to be separated into a government function and an enterprise function" is subscribed to by every European Government and fully borne out by regulatory reforms over the last half century. As the background paper for the seminar by Wu and Nash[vi] makes clear, there is little internal or external pressure for Chinese Railways (CR) to improve quality of service or financial performance under current arrangements. Pressure comes from central planning (in the State Council, State Planning Committee and Ministry of Finance) to increase the volume of transport undertaken. Chinese Railways have been supremely successful in responding to this, running increasingly longer and heavier trains. Quality of service has suffered, however, in that there are long waits for passengers to get places on trains, long waits for forwarders to schedule goods movements, many rejected requests for carriage and slow and infrequent services.

Central control of the prices charged for rail transport mean that there is little or no discrimination between the value different users, and different categories of transport attribute to rail services, except on the relatively small proportion of new lines and new services where some freedom to price according to the market has been granted. Relatively low value movements may be crowding out higher value traffic. Central planning can never match the effectiveness of market based pricing to establish relative values.

These failures are likely to have a significant impact on the economy, an impact that will grow as the economy modernises and puts more value on communications and efficient, flexible logistics systems. The rigidities of central planning will also make it impossible for Chinese Railways to respond effectively to changes in demand for its services. The potential for external shocks (oil price rises, coal and steel restructuring etc.) to create financial difficulties for CR should not be overlooked, and CR will need the commercial management freedom to respond if structural accumulation of debt is to be avoided.

The Economic Contract Responsibility System tried in China went a long way towards the required separation of functions but failed, in part, probably because it set too detailed targets and conditions, which already impinged on business management, substituting long term commitment to grow rail business with short term strategies to maximise income within the 5 year contract. Similar problems were created by the way Railtrack was regulated and instability in the way the Government has awarded passenger train franchises in the United Kingdom (see below).

Price Regulation

Freedom to set prices for transport services is an important part of the management freedom required. In Europe passenger tariffs have been progressively liberalised. Governments still supervise prices for many categories of service, often regulating standard fares but allowing freedom for companies to offer premium services (1st class, high speed supplements etc.) at higher prices or to offer cheaper tickets to specific groups of customers or with restrictions such as no refund when the ticket is not used. Urban mass transit systems rarely cover costs, typically only a third to a half of costs are recovered through the farebox, with central or local government making up the revenues[vi]. Ticket prices are often negotiated between the rail carriers and the public authorities.

There is almost no regulation of freight tariffs now in Europe. Price competition from road transport is severe and sufficient to cap rail tariffs in almost all markets. The principle of price discrimination, allowing railways to charge what the market can bear, charging some freight users more than others was traditionally accepted, though challenged by recent EU policy.

One captive market relevant to China was revealed by regulatory reform in the United Kingdom, where for coal transport introducing competition brought down tariffs substantially.

The importance of long distance coal and other bulk transport in China, and the monopoly power enjoyed by rail in these markets, means tariffs for these categories of freight will require regulation (or introduction of effective competition). Even so tariffs should not deviate far from marginal costs, as cross-subsidising coal prices from railway losses can be just as damaging to the overall economy as cross-subsidising railways through inflated coal transport tariffs.

Regulatory oversight of general rail freight tariffs in China may also be required while the road network is inadequate to deliver effective competition from road haulage, but this need will diminish as the road and motorway network grows. Moreover, inland and short sea shipping already competes strongly with rail on the eastern seaboard and along the principal rivers.

Price liberalisation is urgent throughout the economy. If prices remain centrally planned elsewhere, reform in the railways may have unintended consequences in markets subject to heavy intervention.

Coal price controls in China

Price liberalisation is especially important for coal, which is so dominant in rail freight transport. 1.1 billion tons of coal was produced in China in 1999 down from a peak of 1.4 billion in 1996. 29 million tons were exported, 3 million imported. Much of the coal is of reasonably good quality and the state mines produce from relatively easily worked seams although methane is a problem — 2 000 killed in state mine explosions in 1995, 4 000 killed in other coal mines, some illegal. Despite the distortions of decades of central planning, coal mining therefore appears an economic long term prospect, if safety conditions can be greatly improved. It is therefore destined to continue to be a major part of the rail freight task.

Demand for coal exceeds supply. Much of the blame for shortfalls in supply is placed on lack of capacity in the railway system, leaving production stranded in stockpiles at the mine mouths. The major mines are located inland in the north and north east, demand is centred not only here but on the long eastern seaboard. The railways transport 450 million tons a year over an average 580 km. One dedicated coal line, Datong-Qinhuangdao port, alone transports 100 million tons per annum. Another dedicated line of similar size is planned further south and an overall capacity increase to 850 million tons per year is planned, though yet to be financed.

There are, however, other, potentially more economic ways of addressing the supply and demand imbalance. Though coal prices are being liberalsied in steps, they continued to be controlled by central government for the main markets — power and state industries. Speeding up the processof liberalisation is urgent, as establishing a market price is the only way to balance real demand and supply.

Moreover, only 22% of coal produced is washed before transport, so large quantities of waste ash are transported with the coal (average ash content 17%). Plans to increase washing have been frustrated by severe water shortages across the dry regions where the bulk of coal is mined. At the same time mining damages aquifers and the washing that is done discharges 30 million cubic metres of heavily polluted water into the rivers of the dry north every year. Water shortages also put in doubt plans to build mine mouth power stations to ship electricity in place of coal. Un-priced and inadequately regulated water use, both for abstraction and discharge, makes it difficult to judge what the optimal solution might be. Indeed the optimal rate of coal abstraction might be much lower once water resources are properly taken into account.

Compensation for Public Service Obligations

The second fundamental part of regulatory reform for railways in Europe has been creation of transparency in the funding of public service obligations. These are increasingly made on a contractual basis, the state, or local authority purchases transport services from the rail company rather than contributing to general revenues. The governments of central and eastern Europe still fail to consistently make full payment for the services provided but even here there is now transparency in the obligations the state puts on rail carriers and the compensation expected. There is also increasing flexibility in the kinds of services governments will pay for to meet social mobility needs, in the interest of finding more efficient solutions. Bus and even taxi services can substitute for what were traditionally rail services and some administrations use competitive tendering for the award of public service contracts[vii].

As noted above, the European Union has legislated to require all its Member States to create transparency in the compensation provided in respect of public service obligations and is expected to issue more explicit regulations, together with rules on state aids to railways during 2002, once agreement on a proposal for a draft Directive issued in 2000 is reached.

In China, much recent investment in rail infrastructure has had a military dimension (this was also the case in Europe in the past). Allowance for this strategic aspect to development costs must be made in determining the returns rail companies are expected to show and the costs they pass on to freight customers and passengers.

Regionalisation and Feeder Lines

Regional services have become increasingly problematic in many countries, both where demand is low on outlying parts of the network and where regional trains compete with express trains for space on congested parts of the network. Germany and more recently France have successfully re-channelled state funding to support such services to local governments. This gives the local governments that demand support both power and responsibility to purchase services and make their own judgement as to what services are viable, and present value for money. In Italy, freedom was conferred last year for local government to switch money previously provided by central government to support rail transport services, not only to other modes but also to entirely different services, such as health or education, if this is where the local government sees the priority for public services.

In a number of countries, notably Germany, local governments are able to put regional rail services out to competitive tender, and in several cases new operators have won the business away from the incumbent national rail company. Germany has also transferred feeder lines that the national railway found uneconomic to private companies, able to run freight services at lower cost, subject to more flexible safety and employment regimes.

Horizontal Separation

The kind of regionalisation described above should not be confused with separation of authority over the trunk rail network into regional administrations or companies. Experience of this kind of rail structure in Europe has been mixed and must be placed in the context of interoperability. Europe's railways are organised around national rail companies. Each evolved in relative isolation and adopted technical systems that were incompatible, often by design in the interests of national defence and providing business for national industrial suppliers. The result is serious problems of interoperability between networks, with different gauges between CIS countries and the rest of Europe and another change of track gauge for Spain and Portugal, different power supplies, different signalling systems and electrical

incompatibilities between locomotives and on-board equipment with track-side signalling and power systems. China is fortunately free of major interoperability problems but still vulnerable to issues of procedure, liability, capacity allocation priority and trust between regional administrations.

Carriages and wagons circulate freely in Europe under effective international conventions covering mutual responsibility and liability for their contents and the rolling stock itself (the intergovernmental COTIF agreement and the International Railway Union's RIV and RIC regulations)[viii]. These could serve as models in case of further horizontal separation in China, and it would be wise to put procedures in place in conjunction with any further extension of the powers of China's regional railway administrations.

European models for handling procedural issues are less mature. Train crews, as well as locomotives are regularly changed at European borders, increasing costs, and making delays to international services frequent, partly due to difficulties in co-ordinating the availability of traction and crews. Language difficulties are part of the reason for changing crews, but long established working patterns, underlined by labour union agreements, have proved difficult to modify.

There is a model in Europe for managing the time-tabling of inter-jurisdictional trains, Forum Train Europe[ix], which works through conferences of national rail companies to prepare an international timetable for scheduled passenger and freight services. It will have to adapt to the liberalising market for rail freight services in the European Union and it is not well suited to determining difficult questions of priority for different types of train — freight versus passenger for example.

Regionalisation within a national railway was probably taken furthest by British Rail (BR) before it was split up and privatised. BR operated largely passenger services and the minor freight operations were maintained on a national basis. The passenger regionalisation under BR was judged to have significantly improved business focus. The passenger franchises that replaced BR operate regional monopolies, with the exception of Virgin Cross-country. The current structure has resulted, at least for some franchises, in more customer focus again, but privatisation may have been more fundamental in this respect than horizontal separation.

Under BR, inter-regional service demands for train path allocation were addressed without too much difficulty through negotiation between the small number of BR managers involved. Long distance express passenger trains came first in BR's overall hierarchy of priorities facilitating the task in many cases. Under the more numerous private concessions, Virgin Cross-country has been reasonably successful in securing adequate train paths. This has worked because the passenger concessions receive substantial public funding and have relatively equal weight in negotiating with Railtrack for train paths. Also the traditional hierarchy of giving express passenger services priority remains, as it does throughout Europe. The freight railways, however, have repeatedly complained that they are not given adequate priority, reflecting their weaker financial position. In any case, regionalisation was not applied to freight services.

Railtrack plc, the infrastructure manager now in administration[x] (bankruptcy proceedings), itself created management zones corresponding to the BR regions. This largely mirrored the organisation of passenger concessions and facilitated contact and negotiation with the prime users of the network by area, something that proved extremely difficult in the early years after privatisation. Railtrack plc was, however, a single company and its hierarchical structure enabled inter-regional conflicts of priority to be resolved.

Horizontal separation of passenger services thus can bring benefits, providing there are robust traditions or mechanisms that give appropriate weight to different types of operator and

services (local versus inter-regional) competing for train paths. Regionalisation of freight services, on the other hand, appears to make little economic sense except in cases such as dedicated shuttle services like coal where a specific regulatory regime may be appropriate. This is really separation by market not region.

The division of Europe into national railways is seen as a major handicap for the development of rail freight markets. Overcoming the geographical fragmentation of the industry is now the prime motivation behind EU policy and law making on railways. It also conditions the models that are politically viable for the introduction of competition in European rail markets, ruling out some of the more obvious routes for regulatory reform.

China would be wise to avoid fragmentation of responsibility for its freight railways in ways that could substantially increase costs and over-complicate the allocation of train paths. Competition, where it is introduced, should be developed in the form of commercial competition between railways offering end to end services and not be based on regional administrations isolated from the demands of the national freight market (these points are developed below).

Debts

Managing debts is the third major area of reform in European rail policy. European railways have long been free to borrow money from banks, receive loans from government and raise capital from bond issues for investment, and have generally managed these commercial debts satisfactorily.

In parallel they have tended to accumulate non-commercial debts through persistent deficits that have arisen from under-compensated social obligations imposed by governments and from delays in decisions, such as line closures and labour restructuring, that required government approval. Despite repeated write downs, debt accumulation in a number of countries reached alarming proportions in the 1980s, when the EU legislated (91/440/EEC) to push governments to find more durable solutions. Historic debts were taken into the central budget by Governments in some countries and moved to new financing structures in others.

Of most interest is the way in which railways that showed a serious inability to control costs have been restructured to prevent further debt accumulation in the future. France is the leading example. The response was to separate infrastructure ownership from train operations, but to maintain effective vertical integration of the railways by contracting back all services (maintenance, capacity allocation, timetabling etc.) to the train operator. This has created complete transparency in infrastructure accounts and effective pressure from RFF, the new infrastructure company[xi], on the operator, SNCF, to identify and control costs. An inventory of capital infrastructure assets is now maintained, and project cost over-runs have been cut dramatically. There is also effective pressure to find ways of using existing infrastructure more efficiently rather than a tendency always to build new capacity where scarcity begins to be apparent.

There has been criticism that RFF has not reduced the debts it inherited. It is important to understand, however, this was not its purpose, at least not so far. The French Government is addressing the debt problem in stages. Transparency, and creating contractual pressure to control costs, was seen as the fundamental task. For the time being, under the financing arrangements renewed annually by the Ministry of Transport, RFF pays more to SNCF for maintenance tasks etc. than it receives from SNCF in fees for the use of infrastructure. Interest on the debts is covered by the fees received, but the capital debt is effectively the responsibility of the State, although isolated from the general State budget. A second phase of reform will probably see fees for infrastructure use increase, although perhaps not to levels sufficient on their own to write down the accumulated debts.

It would be prudent for the Chinese government to take its own measures to ensure transparency in rail financing given the recent emergence of deficits in the Chinese railways. Establishing transparency, and appropriate allocation of debts between the railways and the State according to the allocation of commercial and regulatory risks now, could ensure China avoids going through the debt crises suffered by European railways in the 1980s.

Over-manning

Railways are fundamentally a technology and capital intensive industry rather than a labour intensive industry. Nevertheless many European railways continue to carry excess labour forces (though this does not preclude shortages of certain skills). All have, or are in the process of rationalising workforces and adjusting pay and conditions (labour unions have tended to capture some of the monopoly rents inherent in monolithic railways). The most recent example of a successful program for rationalising the rail workforce relevant to China is perhaps to be found in Poland, where the limited amount of money available from the State for paying severance compensation was made to go further by differentiating payments according to the re-employment prospects in each region of the country. Redundancy was on a voluntary basis. Rail workers in Warsaw, the Capital, where employment opportunities were relatively good were willing to take quite modest payments, freeing resources for higher compensation payments elsewhere.

Investment

In western Europe the UK provides an atypical but useful example of experience with investment in the railways, illustrating a number of important considerations for railway regulation. Compared to most of the rest of Europe there has been marked under-investment over the last 50 years (in road infrastructure too). On the other hand cost recovery and operating efficiency was high and financial targets for the railways met. The run up to privatisation saw the suspension of investment plans in the face of uncertainty. At the same time Eurotunnel and later the high speed Channel Tunnel Link saw new forms of private investment in major rail infrastructure projects in return for exemptions from the general rail infrastructure pricing regime, allowing faster cost recovery — although the financing of both projects failed and had to be rescued by Government brokered agreements with the lending banks involving long extensions to the original concessions. The failures arose largely from mis-assignment of risks and confused lines of responsibility[xii]. The Channel Tunnel Link learned some of the lessons of Eurotunnel and assigned rewards and penalties for meeting construction deadlines well and split financing between government and the private sector (Eurotunnel was 100% private) to reflect the very long term asset life, which discount rates used in the private sector can not be aligned to. Both projects suffered from demand forecasts that were vulnerable to delays and in Eurotunnel's case proved over-optimistic. Some of the Channel Tunnel Link's problems were caused by political risks in delaying decision making over the route of the link not being covered contractually.

Privatisation in 1994 led to a major upturn in the prospects for investment, both from the public and private sector. Finance Ministry spending limits, dictated by short term concerns to contain the public borrowing requirement, were replaced by longer term contractual arrangements, generally 7-15 years, with more scope to raise money from private sources. Passenger concessions were franchised with high levels of public support over the early years, and made conditional on investment from the new operators. Government had renewed confidence in getting value for money from investing in infrastructure, resulting in the Labour governments current Ten Year Plan for Rail[xiii]. New partnerships were formed with private construction companies providing debt and equity capital, albeit at a higher overall cost of capital. Increased investment was accepted as the major benefit of UK reforms even by the many critics of other aspects of the reforms.

Over the last year, however, failure of the system has jeopardised investment too. Renewal of passenger franchises was postponed by the government, with one or two year extensions in place of 7 to 20 year renewals. In response much investment in rolling stock is again suspended. Railtrack had great difficulty in finalising major infrastructure upgrading projects because of the large number of parties with which it had to make agreements for each project. Then in October 2001 it was put into receivership by the government as repeated requests for additional funding put its solvency into question. Hostility to this decision in the financial markets, where a number of major institutional investors have suffered significant losses, may make private investment in rail infrastructure more difficult to attract, and again increase the costs of borrowing capital.

Some observers argue that the underlying reason for the failure of Railtrack was a conflict of interest between making short term profits for a private company and investing to ensure safe operation of the system. There are other industries such as aviation, however, in which the potential conflict of interest is managed entirely adequately by the culture of the private sector companies involved and the regulatory system imposed. The crisis in Railtrack's financing was precipitated by an emergency program of track renewal imposed by the regulator following a fatal accident that revealed an inappropriate maintenance regime based on renewal-on-requirement rather than preventive renewal, supported by ineffective procedures for reporting the results of track inspections to management. The underlying cause of the failure of Railtrack was the extremely complex set of contractual relations that have to be managed in the highly fragmented structure created in the UK.

To the extent that these experiences can be related to China they suggest there is scope for attracting many kinds of private investment to railways. Coal export lines are an obvious candidate for foreign direct investment, but many forms of debt and equity investment are possible in other parts of the market too. What is required to make all these arrangements work are clear assignments of risks, and assignment of the right categories of risk to the right parties — political and regulatory risk to government, project management risks to the engineering and rail industry partners and traffic forecast risks to be shared explicitly. Uncertainty in the regulatory environment reduces or postpones investment so regulatory reform has to be managed carefully. The major benefit of investment in railways by the Government, or backed by Government guarantee, is that the cost of capital is lower, and can be adjusted to reflect the extremely long asset lives of rail infrastructure. Government funded investment can, however, be delivered through privately owned infrastructure and operating companies as well as through state owned companies and administrations.

Competition

The reason for the fragmentation of the rail industry in the United Kingdom was an initial drive to introduce direct competition between rail companies throughout the industry. The industry was vertically separated, creating Railtrack to run the infrastructure independently of any operator and provide non-discriminatory conditions for access to infrastructure for all operators. Private passenger franchises were intended to compete with each other on routes in overlapping areas and indeed inside each others home territories. Passenger franchises were kept relatively short, 7 years, to enable competitive re-tendering of services. Rolling stock leasing companies were established to take the burden of owning capital equipment away from train operators and make market entry and exit easier. Freight operations were to be split and sold to competing companies.

In order to find buyers for the rail operators, the goal for introducing competition had to be scaled back. But in the rush to get legislation through parliament before an election, the fragmented structure devised for full competition was not modified.

Only two buyers could be found in the freight sector, one for container services and one for all the other services combined, although new niche operators have since emerged and a power company used the new freedom to run coal trains themselves. The nuclear industry continues to run its own trains.

On the passenger side, competition was initially restrained between franchises and later abandoned on all but a few routes in order to negotiate acceptably low schedules of public support for operations by the new private operators.

On the infrastructure side, Railtrack has been criticised for competitively contracting out too many core engineering services with the purpose of pushing down costs and without the ability to plan maintenance, monitor performance and enforce quality effectively. Railtrack management also proved incapable of keeping to schedule on project developments, with too much uncertainty and too much time and resources spent on negotiations with a myriad of partners. Another company might perform better than Railtrack but will still face very high transaction costs.

The successes of regulatory reform in the United Kingdom — strong growth in both freight and passenger traffic against the expectation for continuing decline, greater customer focus from some passenger franchises, increased transparency in the allocation of priority for train paths, increased financial support to target government policy priorities such as transferring freight from road to rail[xiv] — have been seriously undermined by the over-fragmentation of the railways.

The relevant question for China is can the benefits of competition in the railways be achieved without the costs of fragmentation. Experience in other European countries, and elsewhere, is worth reviewing in this respect.

Almost all European governments accept the value of introducing competition, in one form or another. Competitive tendering of exclusive passenger concessions in Italy, the Netherlands, Germany and the United Kingdom has been described and Denmark began concessioning trunk passenger services in 2002. The practice is likely to be adopted for regional passenger services across much of Europe as there have been few problems with the experience so far. The most critical issue is the length of concession required to provide for investment in rolling stock, and management of the re-franchising process at the end of the concession to avoid interruptions to investment.

The few examples of competition on the tracks between neighbouring franchises in the United Kingdom have been one of the more successful parts of the British reforms, bringing more frequent services and reducing prices below regulated levels. Focussing regulatory effort to introduce this kind of competition on a limited number of routes where large benefits are anticipated, rather than across the board, may be a productive approach.

In freight markets a variety of approaches have been taken to introducing competition. The United Kingdom is the only case where railways have been restructured with the primary aim of introducing competition in all markets[xv]. For freight this has been achieved, although the UK market is atypical of Europe and very different from China. Rail accounted for only 7% of freight transported at privatisation, most markets had already been lost to road. Transporting materials for maintenance work for Railtrack is the biggest single market, and the second freight operator Freightliners (container business) has been successful in winning maintenance contracts away from EWS, the general freight carrier. Freightliners is, however, in danger of going out of business as the grants it receives from Government are scaled back over time and it is unable to make profits. As already noted a power company, Powergen took over its own coal transport at privatisation and subsequently entered into a contract with EWS

at a price below that charged formerly by British Rail. In addition a number of niche operators have emerged, transporting goods such as quarry stone.

Sweden separated track from train operations as early as 1989 with the creation of a state owned infrastructure authority, but not for the purpose of introducing competition. This was done primarily so that train operations could be charged low, subsidised rates for using the tracks and become more competitive with road transport services. It had proved impossible to raise road charges to levels judged efficient. More recently a number of franchises to operate regional and intercity passenger services have been awarded in Sweden through competitive tender, and competition on the tracks for the incumbent freight rail operator Green Cargo (formerly SJ Cargo) from new entrants is being promoted, though new operators have been slow to emerge.

In relation to European Union policy, the extent of existing rights of access to national railway networks for freight traffic differs between Member States.

- Some have gone beyond the demands of Directive 91/440/EEC and, for freight services, have opened their network to any single carrier, in principle, on the whole network without restrictions (Great Britain, Denmark).
- Others have given access to their network to foreign carriers on the basis of reciprocity (Austria, Germany) or on certain routes, namely freightway corridors (Norway, Sweden, the Netherlands).
- The rest have opened their network only to the extent demanded in Directive 91/440/EEC, i.e only to international freight transit and only for international groupings of rail companies or combined transport operators.

To date, examples of a single railway undertaking operating complete international traffic movements are rare and national railway companies still account for the great majority of rail freight operations. Even in those Member States where access is open, new entrants, even if numerous as in Germany, are mainly of limited size and mainly serve national traffic.

This may change in the near future. In Germany, for example, DB Cargo plans to hand over 650 freight terminals to other operators. Examples of new entrants serving international traffic have also recently emerged:

- Rail4Chem (Germany), the country's largest "single carrier", was formed in 2001 from a merger between the rail divisions of BASF AG and Hoyer GmbH, VTG-Lehnkering AG and the Swiss company Bertschi AG. It began operating in February 2001. In Belgium it depends on the national carrier SNCB to operate services to Antwerp;
- HGK (Germany), an operator owned by the city of Cologne, which co-operates closely with DB but also operates a service to Rotterdam in association with Short Lines (Netherlands), with locomotives (but not drivers) crossing the border – Short Lines was the first open access freight operator in the Netherlands.

In addition, the following companies hold licences to operate internationally:

- In June 2001, IKEA Rail (Sweden) signed an agreement with the German, Swedish and Danish infrastructure managers to allow it to operate its own freight trains (one each night) with an EU licence. Operations are not expected to start until March 2002 due to difficulties in obtaining locomotives for border crossings
- In July 2001, LTE Logistik und Transport (Germany) was awarded a licence to operate in Austria

- Hupac (Switzerland), a combined transport operator, is now licensed to operate in Germany.

The main rail competition issue for European Union policy makers and national regulatory authorities is how to provide sufficient neutrality in infrastructure capacity allocation and pricing between state rail operators and new entrants wishing to make use of the access rights provided by the law.

In this respect, the German competition agency has concentrated on infrastructure pricing and required DBNetz, the infrastructure manager, to revise its tariffs three times, removing first the possibility of offering discounts to large volume customers and then eliminating virtually all price discrimination. Small new entrants operating occasional traffic will benefit, but at the cost of greatly reduced efficiency overall. In the UK the government has become increasingly concerned to make rail competitive with road, and the regulator recently cut overall infrastructure charges for freight trains by half[xvi], with the government to make up the revenue loss to the infrastructure manager over a 10 year transition period while efficiency improvements are made to halve corresponding costs. At the same time charges for each operator are the result of confidential negotiations, subject to review by the regulator, leaving freedom to match charges to costs in an efficient manner and provide incentives for efficient behaviour.

The European Union has legislated to provide a framework for developing charges for the use of infrastructure, Directive 2001/14/EC. This does not set out levels for charges or prescribe a formula for working out charges but sets short run marginal costs as the starting point for developing charges with a series of additional elements that can also be taken into account. This conforms with the priority attached to providing incentives for efficient use of existing infrastructure, rather than efficient development of new infrastructure capacity, set out in EC policy papers. The high charges applied to the channel tunnel, designed to recover investment costs to a relatively short commercial schedule, are exempted from inclusion in the EU rules along with some other specific rail links. For the time being the great diversity of charges for use of the rest of the EU networks conform with European law despite 10 fold variations in the level of charges applied.

The other main preoccupation is with the fairness of allocation and time-tabling decisions for new entrants. The European Commission believes structural separation of these functions from any link to a train operator is the only sufficient guarantee of neutrality, but felt unable to include this requirement in the package of Directives to be presented to Council in 2002 in the face of opposition from national Governments that see the risks and costs structural separation requiring a more gradual approach. The collapse of Railtrack in the UK and the current crisis (deteriorating punctuality, overcrowding, delays in rolling-stock procurement, maintenance backlogs, inability to manage industry interfaces) in the vertically separated and fragmented Netherlands railway system reinforce this view[xvii].

On the other side of the argument, Sweden and other countries where separation is well established see the holding company arrangement in Germany and elsewhere, with the infrastructure manager and the incumbent freight and passenger operators under the same holding, as a major barrier to the entry of the their own national freight operators and new entrants such as IKEA Rail. The German market is the key route for Scandinavian trade with Europe. Italy also has adopted a holding company structure, although the government expects to see a good number of new entrants awarded licences to operate in 2002. The French arrangement, whereby the infrastructure company contracts the day to day running of time-tabling and allocation back to the incumbent operator, is also viewed as an unacceptable barrier to entry.

Competitive neutrality can be guaranteed in other ways too, without the risks involved in systematic vertical separation. Some industry mangers and advisors to Government in the UK argue for a partial reintegration of the system[xviii]. Railtrack's regional "zones" could be merged with passenger franchise holders. Key sections of the track, where there are real conflicts of interest and competition for train paths, could continue to be managed by an independent company, a government agency or possibly a consortium of the competing users.

The United States and Australia have both adopted more flexible models of regulation and structural arrangements for competition matched to their markets, that work better than those developed so far in Europe. They may be more relevant to China.

- In the US, the main railways are vertically integrated. There is competition between freight companies. Many markets can be served by competing routes and in other cases there are rights of access to tracks for competitors. Access terms are normally agreed by mutual consent but where agreement can not be reached a regulated access regime and charges are imposed. Amtrack, the passenger operator, owns track between Washington and Boston over which freight operators negotiate access, again subject to regulated access where agreement can not be reached. In other areas of the country Amtrack negotiates access to the tracks of other railways. The courts play an important role in resolving access rights and charges, and robust models for determining fair and efficient charges have been developed.
- Australia has separated track from trains, but the approach and regulatory responsibility varies between federal interstate routes and within-state routes. At the federal level there is complete separation, at the state level partial integration, and different arrangements in each state. In most states access rights are handled in a similar way to the US. In some a regulator imposes access rights and charges across the board. The Federal government can impose regulated access if a state's regime is deemed inadequate to provide the rights of access required in federal law.

The remark in the World Bank paper[xix] that "enterprises that go to market must be organised in accordance with the market segments they face" (paragraph 8) is fundamental. As already noted, Australian regulatory experience is far more relevant for coal transport markets than experience in Europe. But in several respects much of China's rail market resembles Europe more closely than the United States or Australia. The network is used intensively, traffic is mixed and passenger services receive significant financial support from the public purse and enjoy a commensurate degree of political support (and rail companies are likely to suffer matching political interference). This complicates competition for train paths greatly and is the main reason that competition for the market through concessions has been the usual path chosen for introducing competition in passenger services in Europe, instead of competition on the tracks.

It should also be understood that the purpose of vertical separation is to provide neutrality in allocating infrastructure capacity between train operators competing for the same business. It is <u>not</u> required for making decisions on allocating capacity between trains serving different markets or market segments, e.g. between passenger trains and freight trains, between coal trains and container trains, between freight trains and maintenance possessions, etc.. This is the kind of conflict that characterises much of the Chinese network, as in Europe. These different kinds of trains "compete" for track access but this should not be confused with competition to serve the market. Neutrality is not required here so much as transparency and a system of priorities that reflects the economic value of "competing" uses of the track and in an explicit manner reflects political priorities. Scope for operators denied train paths to appeal to a regulator for review of the decision can be a useful additional arrangement for disputes over priority for different types of train as well as an essential part of the arrangements for ensuring non-discrimination in the award of train paths to companies competing in the same market.

So what can be concluded on competition in China's railways? First European governments are convinced competition can bring benefits in terms of improved quality of service, innovation and lower costs. The uncertainty arises over matching the right kinds of competition to the right markets and achieving sufficient neutrality in competitive conditions without imposing excessive costs and risks. Different parts of the Chinese rail system may require different forms of organisation and regulation.

- Competition in dedicated coal freight services can and should take very different forms to that in mixed use lines.
- There may be scope for awarding regional passenger concessions through competitive tendering.
- Given the size of the freight market in China there should be scope for competition on the tracks between a number of freight operators operating nationally.
- Given the relative lack of competition from road and shipping in the transport market competition in rail freight markets is desirable and could advantageously replace some of the monopoly pricing controls exercised by government.
- Ownership of the tracks is likely to be mixed given the mix of operators and a hybrid system of some separate track management and some integration with various passenger and freight operators might be the optimal outcome in the long term.
- The efficiencies of vertical integration should be given up only where significant benefits can be reasonably demonstrated.
- There is a balance to be struck for the government between imposing highly effective but potentially expensive structural remedies (vertical separation) and behavioural remedies (regulatory oversight and intervention to rule on a case by case basis).

Neutral Conditions for Inter-modal Competition and Investment Project Assessment

The importance of ensuring a level playing field for competition between road haulage and rail freight services for policy in Sweden and the United Kingdom has been noted, and this is a recurrent concern in many other countries in Europe and elsewhere, notably Australia. Coherent policy for all modes will become increasingly important in China as the road and motorway network expands and rail passenger services also face increasing competition from airlines. The main policy issues are charges and taxes related to the use of infrastructure, methodologies for project evaluation and coherence in safety policies. Sharp differences remain in the safety standards and procedures applied to road, rail, air and shipping in Europe, but there has been some progress in the other two areas.

Pricing systems in Europe have evolved over the years more in response to a variety of government concerns — not all related to transport — than as the result of economic logic, and were conditioned to a great extent by the organisation of the rail and road sectors rather than by the nature of the services provided. Railways were structured as companies and in most cases expected to show a financial (as opposed to economic) return, with the government intervening to support investment and cover deficits as many railways frequently failed to cover costs. Some countries devised taxes for road vehicles that were designed to raise revenues to cover the costs of road construction, but others saw taxes on the use or possession of cars as a convenient way of raising revenues for other purposes (e.g. paying war pensions in France). All viewed fuel taxes as a robust source of general tax revenues due to the relative inelasticity of demand. A number of countries decided to accelerate motorway construction by introducing tolls to cover their costs.

Cost coverage, or more importantly raising revenue to finance the long term marginal cost of infrastructure development, is only one criteria for a rational design of charges for using

transport infrastructure. The other is efficient use of existing infrastructure, which as noted already is promoted by charges set at the level of short run marginal costs (the costs in terms of maintenance, management, congestion, pollution) of operating an additional vehicle. Prices at this level would be the outcome of a perfectly competitive market, if such a thing could be achieved. In Europe, neither of these criteria holds in the structure and level of current taxes and charges for the use of transport infrastructure. The political and academic consensus is that Europe would benefit from moving towards charges for the use of infrastructure that reflect short run marginal costs, incorporating as far as possible the social costs of pollution and congestion. In any case road and rail modes should be charged in similar ways if an efficient outcome is to be achieved in terms of which mode carries what traffic. Recent EU policy papers[xx] and Laws[xxi] promote this approach, as does a recent ECMT Resolution[xxii].

Perhaps even more important, and especially in China where government intervenes so extensively in investment and pricing, the distortions in existing pricing systems must be accounted for when investment projects for rail and road are evaluated. A recent report to the Government of the United Kingdom[xxiii] provides both a definitive discussion of the issues and a methodology to account for major distortions in existing transport markets. This begins with the identification of whether transport services are under priced or over priced in relation to marginal costs and whether the markets to be served by a project are characterised by local monopolies in the supply of products and (non-transport) services, which the transport project would overcome. The methodology developed goes on to address regional development issues — whether a project is likely to have a positive or negative impact on the development of the local economy, acknowledging that jobs can be sucked out of a region just as effectively as new opportunities can be generated by creating better transport services. The final part is concerned with assessing the results of transport projects in terms of contribution to the overall priorities of Government policy in terms of social inclusion, equity etc., as well as economic performance.

The assessment technique can equally well be applied to policy initiatives, notably price regulation. The fundamental conclusions are that unless you take account of distortions, the real economic impact of transport investments and policy initiatives is impossible to predict, and judgements on the desirability of investment in road versus rail or another mode impossible to make reliably. Awareness of these issues will be essential to guide Chinese policy makers in allocating resources to the railways and the road and motorway development programs in ways that are rational and mutually supportive rather than mutually destructive and wasteful.

Final Remarks

There is no single ideal model for railway reform. Every model will have costs, weaknesses and problems. Does this mean that there should be no change in the structure and organisation of China's railways. Certainly not. There are problems with the existing set up. And the economy of China is changing rapidly, which will put great strains on the existing model. Doing nothing is thus a recipe for failure. The answer is to make changes in steps to overcome problems clearly identified in the present set up, and problems that can be predicted as a result of changes in the external economic conditions.

There is a second recipe for failure: where government gives instructions to the railways at too detailed a level. This not only prevents the railway from adapting to market demands and pressure from economic factors outside its control, but changes management's purpose form developing the railways to perform optimally in economic or financial terms to exploiting the maximum benefit from the rules laid down. This generally has perverse and unexpected effects unless the rules are simple and designed to mimic market incentives.

The third route to failure to avoid, is inflexibility and absolutism in the structures imposed. Many different models of ownership, structure and competition can probably co-exist on a railway system the size of China. Different parts of the network may benefit from different arrangements. There will always be trade-offs and on occasion it may be worth foregoing some potential benefits to avoid costs, or indeed bearing certain risks in the pursuit of potential benefits.

The set of regulatory reforms most likely to bring success in terms of the economic performance of railways in China will be unique to China. Transferring wholesale, models adopted elsewhere is not a realistic course, as each model has been developed to meet the unique circumstances of each country. Reforms adopted at the level of the European Union are particularly unique as they have to satisfy the complicated political and economic compromises involved in managing a regional co-operation institution. Moreover the goal of the European Commission is, naturally, to create a single market in rail transport services. China is fortunate in enjoying a single market as its point of departure.

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[i] *Coal in the Energy Supply of China*, International Energy Agency, Paris 1999.

[ii] See, *The Australian Black Coal Industry*, Inquiry Report, Productivity Commission, Government of the Commonwealth of Australia, 1998 and the National Competition Council website listing of Applications for Certifications and Declarations of Regimes for Access to Rail Services and Facilities, http://www.ncc.gov.au .

[iii] Regulatory reform across Europe, particularly in regard to freight, is summarised in two ECMT publications *Railway Reform*, 2001 and *Rail Restructuring in Europe*, 1998.

[iv] http://europa.eu.int/comm/transport/rail/newpack/np_en.htm

[v] *Railway Reform in China: The Great Railway Challenge*, Lou Thompson, Hennie Deboech and Richard Spero, World Bank 2001.

[vi] *Railway reform in China*, Jian Hong Wu & Chris Nash, Transport Reviews 2000 Vol 20 No 1.

[vii] See for example, *Implementing Sustainable Urban Travel Policies, National Peer Review of the Netherlands*, ECMT 2001, and *Implementing Sustainable Urban Travel Policies, National Peer Review of Hungary*, forthcoming and the ECMT website on Urban Travel and Sustainable Development http://www1.oecd.org/CEM/UrbTrav/index.htm .

[viii] See for example, *Competition and Co-operation in International Rail Freight Services*, ECMT forthcoming.

[ix] See *CEH, CEM and Forum Train Europe*, in Rail International, November 2001 and the website http://www.FTE-rail.com .

[x] *Railtrack placed in administration*, Department for Transport, Local Government and the Regions, News, http://www.press.dtlr.gov.uk/0110/0416.htm .

[xi] See for example the 1999 RFF Annual Report that describes the company's functions in some detail, *Reseau Ferre de France, Rapport d'Activite 1999*, and for more recent annual reports the website http://www.rff.fr .

[xii] See the proceedings of the ECMT Seminar on Public-Private Partnerships, January 1999, http://www1.oecd.org/CEM/online/ppp99/index.htm

[xiii] http://www.dtlr.gov.uk/trans2010/plan/index.htm .

[xiv] See Promoting the Transfer of Freight from Road to Rail in the UK, ECMT forthcoming as part of the report Developing a Sustainable Balance between Substitutable Modes of Transport.

[xv] The UK Railways Act 1993, HMSO, and the UK Competition Act 1998, application to railway services, HMSO, http://www.rail-reg.gov.uk/docs/applirailsrv.htm .

[xvi] *Review of Freight Charging Policy: Final Conclusions*, Office of the Rail Regulator, October 2001, http://www.rail-reg.gov.uk/freight.htm .

[xvii] See *The Situation in Holland is Critical*, Railway Gazette International, January 2002 and *Competition and Innovation have Not been Improved as a Result of the Reform of the Netherlands' Railways*, Alfons Schaafsma, Railned (company responsible for safety and allocation of infrastructure capacity), the Netherlands.

[xviii] See for example *A Rational Approach to Rationalisation, developing future rail policy in Britain*, Professor David Begg, Chairman of the Commission for Integrated Transport and Dr Jon Shaw, published by the Centre for Transport Policy, June 2001 and *Phoenix from the Ashes, re-discovering the business-led railway*, Chris Green, CEO Virgin Trains, Sir Robert Reid Lecture to the Institute of Logistics and Transport, UK, February 2001.

[xix] Idem.

[xx] COM(1998)466, Fair Payment for Infrastructure Use: a phased approach to a common transport infrastructure charging framework in the EU, July 1998 and COM(2001)370, European Transport Policy for 2010 : time to decide, http://europa.eu.int/comm/energy_transport/en/lb_en.html .

[xxi] Directive 2001/14/EC on the Allocation of Railway Infrastructure Capacity and the Levying of Charges for the Use of Railway Infrastructure and Safety Certification.

[xxii] Resolution No. 2000/3 on Charges and Taxes in Transport, particularly in International Road Haulage, http://www1.oecd.org/CEM/topics/taxes/taxdocs.htm , see also Efficient Transport Charges and Taxes, ECMT 2000.

[xxiii] *Transport and the Economy*, The Standing Advisory Committee on Trunk Road Assessment, Department of Environment Transport and the Regions (now DTLR), UK, 1999, see also *Assessing the Benefits of Transport*, ECMT 2001.