Public Investment and Infrastructural Finance: The Case of the Indian Railways Revisited

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Abstract

Provisioning of infrastructure through alternative modes of state finance, market finance or public-private partnership is an area of key interest within economics. Recent literature on this issue thus reflects the varying concerns of development institutions seeking to support economic growth and human development through increased international capital flows (DFID, 2000; UNDP, 2005; Agénor *et al*, 2006), of global financial markets seeking secure capital returns from FDI in the infrastructure of developing and transition economies (GDF, 2004; 2005; Ramamurti *et al*, 2005), as well of governments seeking to bridge large infrastructural gaps without resorting to fresh taxation or fiscal indiscipline (IIR, 2001; 2007). Several recent empirical studies have also re-examined the historical processes through which public provision of infrastructure had generated technological innovation with significant gains in factor productivity and regional comparative advantage (Munnell, 1992, Aschauer, 1993; Holtz-Eakin, 1993; Boarnet, 1995).

International capital flows and technology transfers to the building of railways in many parts of the world in the late 19th century offer a prior instance of alternative modes of financing the development of infrastructure, from which relevant lessons can still be drawn (Eichengreen, 1996). The reform and restructuring of railways in the modern age once again calls for large-scale capital movements that can propel technological renewal and the resulting economies in scope and scale. The paper examines current difficulties in mobilising railway capital in India in the wake of dwindling budgetary support from the state. Despite being the largest public undertaking in the country, the Indian Railways are seen to have suffered continuously from overregulation and undercapitalisation, which restricts their efficiency as an enterprise. Ultimately, the diseconomies stemming from many decades of state neglect are transmitted as cascading costs through the economy and reduce India's global competitiveness. In the face of growing divergence within the regional development process and the limitations of private capital and enterprise, rejuvenation of the railways in India urgently calls for the renewal of public investment support from the state. However, sweeping financial changes that allow Indian Railways to operate more autonomously will also have to be initiated for their full infrastructural potential to be realised.

Key-words: Regulated railway enterprise; Public capital; Colonial railway finance; Infrastructural finance; Public utility consideration.

Public Capital and Large-scale Railway Enterprise

The capitalisation of large-scale enterprises usually involves strategic decisions regarding the sources, scale and timing of investments as well as the purposes they will eventually to

serve. Even when the sources of capital are private, overriding social concerns usually guide the creation and regulation of large enterprises, especially those that visibly serve a public or tactical purpose. Since the large investment scale makes duplication of enterprise and investment inefficient, the long gestation before large investment projects begin to yield viable dividends limits the scope for trial and experimentation while realising investment plans. In practice, the activities of each large enterprise therefore comprise a series of coordinated investment decisions that must be carefully sequenced and dovetailed into each other. For executing such activities on a large scale, institution of a strong controlling authority also becomes necessary to ensure effective coordination within the enterprise, without investment spillovers and cost overruns.

In the case of large-scale railway enterprise which possesses all the above characteristics, a strong argument has therefore emerged for public coordination and control, at least during the initial phases when the infrastructural foundations are laid. This central proposition has usually been based on one or the other of the following arguments.

a) The *capital efficiency* argument notes that a major part of the initial infrastructural investment in the building of railway networks is either irrecoverable, or recoverable only at some future date when the scale of operations has grown to a level where credible operating profits begin to appear. Moreover, a large part of such capital costs need to be 'sunk' and ignored in future references to 'profit', leaving only incremental costs that are incurred in order to keep the service running open for profit considerations (Lansing, 1966:89). The duration of the period of low returns to capital is determined by the gestation lag between the building and full utilisation of infrastructural facilities. Even in the best of circumstances, the rate of returns remains low because the public good character of transportation makes it necessary to keep user-prices low so as to maximise the stream of social benefits flowing to all users.

b) The *natural monopolies* argument, when applied to railway infrastructure, notes the presence of technical indivisibilities in sunk and fixed capital costs, which generate increasing returns and decreasing unit costs as the scale of transportation services expands (Meade, 1952). Again, the optimum scale for infrastructure provision is too large to be handled efficiently by multiple enterprises which would find the market uncontestable, and therefore a natural monopoly is said to exist (Ivaldi *et al*, 2005). Thus an overriding consideration behind the public provision of railway transportation services is the existence of natural monopolies in such services, where a single service provider can market the

service at lower cost levels than multiple organisations.

c) The *social utility* argument advanced for public provision of utility services essentially seeks that these are provided at reasonable and regulated cost, instead of the costs of service being set at unreasonably high monopoly rent-seeking levels that market-based pricing would inevitably lead to in the case of monopolistic enterprise. The deep-rooted historical rationale behind public ownership of transportation infrastructure also derives from apprehensions that privatised provision would lead to suboptimal supply and inadequacy in services, both in terms of their density and spatial spread. The character of railway services as a public good to society and the lessons learnt about the inadequacies of private handling of this public utility have been studied in the context of US railways in Eichengreen [1995], and in Cain [1980]. Cain in extension, points to negative aspects of the 'public service' image that railways were increasingly forced to adopt, which ignored managerial and operative inefficiencies that the system might be suffering from.

d) The *externalities* argument refers essentially to the public good character of railway services that arises from the social objectives that transportation services seek to fulfil (Seabright, 2003:10). Canonical public goods, which in the terminology of public economics (Musgrave, 1959) are characterised by the externalities of *non-rivalry* and *non-excludability* among their users, can only really exist in market situations where their supply is considerably ahead of demand. Provision of transportation services on non-commercial terms also draws on conceptual definitions of merit goods, which satisfy "wants so meritorious that their satisfaction is provided for through the public budget" (Musgrave, 1959:13), although it may also be noted that the provision of merit goods does not *ipso facto* enjoin that they must be provided under public ownership..

e) The *costing* argument rests on the regional and social obligations carried by large railway undertakings that require the provision of certain services priced well below cost, or the continuance of specific services under conditions where they cannot break even because of the dearth of adequate traffic. Hence for railway operations to be financially viable on the whole, operational costs have to be distributed over the entire scale of the enterprise (Seabright, 2003:21), through the mechanism of cross-subsidisation and pricing principles which are further elucidated below.

Under natural monopoly conditions, a private monopolist would seek to earn a rent-seeking profit by equating the unit price of the service (MR) to its marginal cost (MC). If instead, in the case of infrastructural services, resort were made to Pareto-pricing at MC = AR = P*, the

service provider would sustain a loss because of average price realisations at levels lower than average cost of the service. The gap between average cost (AC) and average revenue (AR) would thus have to be made up by providing an equivalent state subsidy if continuation of the service was sought. The dominant opinion that favours public ownership in natural monopoly conditions thus argues that the state is best placed to monitor the efficient use of its subsidy, and any other form of organisation would squander public money. The pricing mechanisms alternatively known in economic theory as *average cost* pricing, or *demand-based* pricing, or *second-best* pricing constitute the Ramsey pricing system (Baumol & Bradford, 1970). These allow the consistent determination of welfare-maximising prices that ensure adequate revenue for a regulated multiproduct firm to cover its costs, against recurrent losses due to marginal cost pricing under conditions of decreasing marginal costs and increasing returns to scale. Since fixed costs alone would not lead to Ramsey pricing, the system has often been applied to studies of 19th century railway value-of-service pricing (Baumol & Bradford, 1970), where owing to the presence of scale economies, railways were unable to generate sufficient revenues to simultaneously cover investment and operating costs. The advantages of the Ramsey pricing system are most apparent for natural monopolies which deter entry of other firms to maintain market power.

Origins of Regulated Railway Enterprise

After the initial demonstrations of railway technology by engineers like Richard Trevithick and George Stephenson, development of railways in Britain on a commercial scale commenced with the building of the Stockton-Darlington line. The commission given to Stephenson in 1821 by the new Stockton & Darlington Railway led to improvement of his locomotive design for regular coal haulage, and the trial run of the new locomotive in 1825, with a mixed train of 36 freight and passenger wagons, was a resounding success. Railway development in Britain began in earnest after this event, with parliamentary approval being given to the Liverpool & Manchester Railway Bill in 1826 followed by commissioning of this railway in 1830 (Srivastava, 1971:68-69). Since each proposed line had to secure separate approval from British Parliament, the building of Britain's railway network was carefully coordinated by the state (Murray, 2005), although each independent railway company was privately promoted and financed by private capital mobilised on the London money market. The initial phase of railway development was rapid, with over 6600 miles of railway tracks being laid by 1852. For more than a century till after the end of WWII, the British railways were operated by independent, competitive private companies that grew in enterprise scale through the process of mergers and acquisitions into four large regional

companies under the Railway Act of 1921. However, the lessons of wartime railway coordination made it abundantly clear that there would be no going back to the prewar competition and that railway coordination was there to stay, and the Railway Executive Committee's [REC] opinions in this regard were fully endorsed in 1918 by the Select Committee on Transport, which proposed the unification of railway ownership (Aldcroft, 1961: 5). Although government was thus persuaded to extend the period of control and guaranteed net receipts while a decision was pending, the commercial situation rapidly deteriorated between 1918-21, following sharply increased working expenses and higher compensation being paid out to the companies. The government's eventual intentions had already become clear, since railway nationalisation had occasionally been mooted in Parliament as a possible solution (Aldcroft, 1961: 5). It was however the decline in the financial position of company railways which provided the first avenue for reorganising the railways. Accordingly, a Ministry of Transport was established in 1919, to which considerable powers over the railways and other modes of internal transport were transferred. Most important among these were powers to set and alter railway rates flexibly, with the eventual intent of bringing these into line with working expenses. However, indifferent railway performance over the Depression years and the emergence of sharp competition from roadways prompted the government decision to consolidate the railway companies under the nationalised British Rail, into whose hands they passed on 1 January 1948.

British Rail [BR] thus commenced unified operations amidst the wave of postwar nationalisation under the Labour government in Britain. Although a new phase of public investment in railway modernisation followed, recurrent revenue deficits began to occur from the mid-1950s, which no amount of general subsidies, reinvestments, closures of services and individual subsidies to unprofitable lines could undo. Restructuring of BR in the 1960s under the recommendations of the Beeching Report thus sought to rationalise these deficits through selective service closures. In the 1970s, clarification of the public service obligation [PSO] of BR allowed the commercial restructuring of other railway services, while reformulations of railway management over the 1980s laid the ultimate foundation for the privatisation of British Rail towards the end of the 1990s. The last significant change before actual privatisation was the internal reorganisation of railway management into the management of several business sectors resulting in cost consciousness, investment appraisal and controlled resource utilisation.

Large-scale private enterprise has had an almost permanent presence in the British economy,

except for the short interregnum of nationalisation under the Labour governments that held power immediately following WWII. The railways were nevertheless among the last of the formerly-nationalised British enterprises to be privatised by the Conservative government in the early 1990s, the delay stemming mainly from unwillingness of the proposed privatised managements to subsidise railway operations on uneconomic passenger routes that had to be maintained for sociopolitical reasons. Although a mechanism under which transportation subsidies could continue was ultimately devised to avoid large-scale route closures, this prevented the divestment of state equity in BR from yielding large revenues to the government, unlike those that had accrued from the divestment of other public utilities such as gas, electricity and telecom. The piecemeal process of privatisation has led to major coordination problems in recent times.

In contrast, in France where railway building commenced a little later in 1842, the mobilisation of railway capital was organised under the principle of 'finance by the state and operation by concessionary companies' established in the Railway Bill of 1842. State support for the railways in France did not take the immediate form of direct subsidies, but was rendered in state loans and equity participation. Although the opening of the first railway between Paris and Rouen in 1843 was quickly followed by a construction boom, the problems that could have arisen from railway competition were eliminated through rapid consolidation of the French railways under 6 large monopoly companies (Srivastava, 1971). Following the completion of the trunklines however, railway construction underwent a slump because of investor disinterest stoked by the 40-year charter limitation on private operations, and the lack of competitive stimulus. Consequently, the Railway Plan of 1842 was modified in two important respects by extending the charter duration to 99 years and by providing government guarantees on the minimum rates of return that would accrue to private capital investments. Capital for a renewed railway development phase was also mobilised domestically through bond issues on which the French Government guaranteed 4 percent interest (Srivastava, 1971: 81).

Historical review of railway development in France would divide the prenationalisation period into four distinct phases. The first of these between 1845-67 covers the grand period of railway construction, when the railway network was being created. The ideological battles between free traders and protectionists on the question of state participation in financing infrastructure leading up to the Freycinet Plan marked the second phase of railway development between 1867-83. As no enduring arrangement for financing railway development could be reached, minimal investment was made on network expansion over

the third phase from 1883-1914, despite rising costs. But as traffic expansion continued nonetheless because of increasing efficiency in railway operations, the period also saw growing control of the state over railway operations and the imposition of unrequited social burdens on the railway companies. The final prenationalisation phase between 1914-37 saw listless railway investment on account of the war, financial depression, and the rise of road competition which retarded the recovery of the French railway system from the destruction of WWI. The response to this further amplified the regulatory presence of the state through the Railway Convention of 1921, and culminated in nationalisation of the French railways under the Convention of 1937 which reconstituted them as the Société Nationale de Chemin de Fer [SNCF], or French National Railways, from 31 December 1937 (Caron, 1973).

The history of railway development in France was thus marked by periodic and lengthy debates between the merits of private ownership and commercial operation versus public utility arguments drawing from the Saint-Simonian formulation of social ownership. The first phase of infrastructural investment which focused on the construction of mainlines and a rudimentary secondary network was financed by private companies against guaranteed minimum rates of return on their capital investments. The frenetic pace of railway construction during this phase inevitably caused the emergence of 'excess' transport capacity, which was however soon absorbed by traffic development during the subsequent period. Falling profits and pricing anomalies nevertheless laid the foundation for government intervention and eventual takeover of private concessionary interests.

Nationalisation which followed a period of sustained operating deficits for the railway companies, also represented a situation where the companies did not want to bear, at very limited profit, organisational responsibilities for an enterprise whose costs depended on government pricing-decisions outside their direct control (Caron, 1973). Wartime exigencies after the outbreak of WWI temporarily brought the French railway companies under the compulsory control of government. The nationalised French railways subsequently began functioning as the Société Nationale des Chemins de Fer [SNCF] in a favourable commercial environment following the end of the global depression.

The immediate impact of nationalisation on the French railways was largely positive. The injection of new capital support from the French Government under the postwar Monnet Plan enabled the technological renewal of railway assets and encouraged commercial and marketing innovations, which allowed SNCF to compete aggressively with the roadways by focusing on the natural strengths of railway transportation, namely volumes, economies of

scale and advanced technological specialisation. The Monnet Plan for postwar reconstruction of the French economy thus laid the foundation for concentrated flow of investment into key economic sectors for a period of three decades or the 'Trente Glorieuses' between 1945-1975. While this scale of priorities included the French railways, 38 percent of initial railway investment between 1947-1950 went into the restoration of the SNCF network and only 8 percent into railway modernization (Mioche, 1987: 162). Only after the First Plan (1947-53) did planning emphasis shift towards intensive modernisation of SNCF. Particular thrust was thus laid uptil the end of the Fourth Plan (1962-65) on the electrification of major SNCF arteries (Parès ,1974).

The key to the success of this package after unification of the French railway network under the unified administration of SNCF lay in organisational innovations that allowed the state-owned network to introduce a commercial focus in its freight services, which had been lacking under the monopoly companies. With the role of the state being pronounced at the outset, the debate around social ownership of railways and nationalisation first originated in France.

Railway enterprise in the United States had a comparatively slower start but was organised on a gigantic scale after the conclusion of the US Civil War, with the support of capital privately mobilised from London. The continental scale and strategic importance of US railroad operations however meant that direction had to be provided by the US Federal Government, which was accomplished through the liberal provision of land grants and franchises to the railroad companies (Eichengreen, 1996). While the first railroads built in the early 19th century had been small, locally-financed enterprises that provided branch services to the US waterways, the latter half of the century saw rapid extension of transcontinental lines, combined with the consolidation of smaller lines into much larger corporate systems (Ivaldi *et al*, 2005)..Because of size and scale, the US rail network has since been predominantly based on large-scale freight operations, where the pace of innovation has been sharp. While the control of the railroads has always remained in the hands of private corporates, the system was regulated since 1887 by the US government through the agency of the Interstate Commerce Commission [ICC] established to prevent the abuse of monopoly pricing powers by private operators and ensure the setting of fair carriage rates. Nevertheless, after severe freight competition from roadways began to hit US railroad operations, state regulation has lessened under the Staggers Rail Act of 1980 and is now limited primarily to anti-trust matters.

Commencing shortly after the introduction of railways in Britain, colonial railway building in India naturally drew upon experience and technical skills gained by railway enterprise in the home country. However, the anticipated size of the proposed railway network was much larger in India and also served the two strategic objectives of strengthening military control and preventing the recurrence of famines. Therefore unlike Britain, where the state had primarily regulated and coordinated railway enterprise, in India the role envisaged for the state was much more proactive. The initial government policy on railway construction executed under the supervision of the Public Works Department therefore operated through the principle of *guarantee* companies i.e. privately-held sterling companies which executed railway construction works on free land grants provided by the state by sinking their own capital (Thorner, 1955). A return of 5 percent interest on their capital investment was guaranteed by government at the fixed conversion rate of 22 pence to the rupee, well above the interest yields on the London money market at the time. Surplus profit returns, if any, over and above 5 percent were to be equally shared between government and the private party. Under guarantee arrangements, government also reserved the right to repurchase the constructed lines after periods of 25 or 50 years, at the mean valuation of the company on the London money market (Singh, 1975).

Although till 1869, railway construction in India was generally carried out on these guarantee terms, the system soon proved uneconomical since government found itself paying out substantial sums as interest to construction companies which had incurred massive cost overruns on line construction, while virtually no operational profits accrued. Hence the system was abandoned and the Indian state began the experiment of constructing railway lines entirely on its own between 1869 to 1879, after securing the authority in 1867 to raise loans from the London money market to finance its own public works. As a means of railway finance, the system of state guarantees had assured plentiful supply of capital during the building of India's arterial broad-gauge [BG] railway network, and Thorner has noted that 'capital which moved from England to India under these terms formed the largest single unit of international investment in the nineteenth century.' (Christensen, 1982) With the abandonment of the guarantee system, the onus of raising railway capital passed to the state and had significant consequences on subsequent railway development and the building of feeder networks on the Indian railways.

Despite historical differences in the manner in which railway building was constructed, financed and regulated in these different countries, the technical problems associated with railway financing and operations are thus seen to have remained broadly similar between

them. These may be categorised as

a) long-term problems resulting from creation of infrastructural capacity ahead of demand, i.e. from investment in sunk costs
b) long-term capital liabilities arising from the long gestation periods of railway investment
c) problems of short-term inadequacy of returns to railway capital
d) problems relating to long-term depreciation and renewal of railway assets.

The subsequent discussion examines these issues contextually in terms of their current implications for the Indian Railways [IR]. Attention is initially drawn in section 2 to specific investment problems that arise in the context of infrastructural finance. This is followed in section 3 by a brief historical review of railway financing in India. Section 4 takes up problems in railway finance that arise from the social and commercial objectives that have to be fulfilled by IR operations. Finally, the problems associated with are discussed in section 5. The concluding note considers the cumulative implications of these problems in the light of current financial difficulties faced in augmenting IR infrastructure. A few suggestions are also made regarding the need for railway organisational reforms if such longstanding problems are to be resolved.

Special Considerations in Infrastructural Finance

Investment in large-scale infrastructural enterprises like the railways is characterised by the fact that a major part of the capital invested in the building of primary infrastructure remains irrecoverable until some distant date because of low initial returns to capital and economies of scale. Even when the scale of operations has expanded sufficiently to allow moderate operating profits to appear, the primary investment that represents sunk costs is irrecoverable. Thus 'profits' from infrastructural enterprise are more in the nature of accounting profits that cover the marginal costs of providing infrastructural services. Technical indivisibilities in sunk and fixed capital costs generate decreasing unit costs and increasing returns as the scale of infrastructural services expands. However, while the optimum scales for capital investments in infrastructure is usually too large to be financed efficiently from internal resources, infrastructural services cannot be provided efficiently by multiple enterprises because of market uncontestability and natural monopolies. This therefore argues for public ownership since such services have to be provided at reasonable and regulated costs. The period of suboptimal returns to capital coincides with the long gestation lag between building and operating phases of a service utility. However, in the best

of circumstances, the rate of returns still remains low because of the social need to keep user-prices low. Most infrastructural services thus have to be priced at marginal cost so that only incremental operational costs are actually recovered. Along with this, the 'lumpiness' of the initial investment required for building infrastructural capacity, and the recurrent need for subsidiary investments thereafter in order maintain capacity at optimum levels also act as disincentives to private investors. The unattractiveness of investing at such low rates of return thus adds to the difficulty of mobilising commercial funds for the development of infrastructure.

Because infrastructural enterprises have traditionally been run as state-regulated utilities in most countries, their services are treated as public goods even though they are otherwise expected to operate on commercial principles. In the case of IR in India, such social priorities are reflected in their having to provide subsidised inter-city, medium-distance and long-distance passenger services and mass rapid transit to the urban metropolises, as well as low-cost freight haulage to several agricultural commodities and vital industrial raw materials. General subsidies on such prioritised services have to be recovered from revenues drawn on other commercial services, raising industrial costs in the economy. Another public utility aspect particularly visible in regional planning contexts in India is the use of infrastructural investments as a development device to encourage flows of investment to backward and undeveloped areas of the country. In face of low infrastructural capacity overall, the pressure to provide socially-preferred services has to be accommodated at the expense of commercially-preferable operations, leading to general loss of operational revenues and profitability. Such problems have constantly afflicted IR both in revenue and resource terms, culminating in their current inability to fund the creation of railway network capacity well ahead of demand. The cross-subsidisation dilemmas presently faced by IR thus manifest themselves at several operational levels, such as in competition between passenger and freight services for limited network capacity, and also between different freight service categories.

Another important public utility consideration in the operation of infrastructural services relates to the setting of service tariffs that reflect distributional and regional equity. Thus IR in India is required to charge uniform kilometre-rates and tonne-rates throughout the country, irrespective of the actual costs of sectional carriage and of haulage over various railway gauges. Since the basic tariff rates are moreover pegged low, this encourages the pricing of certain railway services well below cost and increases IR revenue deficits.

Impediments to infrastructural development also arise because of the opportunity costs of

investment, i.e. the scarcity-determined choice criteria by which investors select between alternative investment opportunities. In situations where the scarcity of capital resources is acute, the ability to offer competitive rates of return to capital is diminished by limited investment flows into essential infrastructure. The infrastructural sector is therefore caught in a trap of government indecision on whether to use scarce public resources in building infrastructure or using them to augment other spheres of economic activity. Similar dilemmas are also faced by potential financiers on whether to invest in infrastructural sectors which offer low rates of return but stretch their capital yields over a considerably long period, or in other investment activities which offer more attractive returns but for shorter durations. While both dilemmas can be resolved theoretically through the principle of yield-maximisation, the presence of greater levels of uncertainty and high risk premia in infrastructural investment eventually turn the tide against it. Similar perceptions also guide the choice of investments between alternative transport modes, e.g. between the railways and roadways.

Because of the social and developmental roles that impinge on railways as a vital constituent of modern transportation infrastructure, assessments of comparative performance of a railway system across time and space must simultaneously cover both operational and financial aspects since commercial objectives and the maximisation of capital returns and profit cannot be the *sine qua non* of railway operation. Thus although railway development and the evolution of railway economics has broadly followed the same sequential course across the systems just studied, a range of policy experimentation has also been witnessed on each national railway system, which has had the object of bringing about the best working results given the resource endowment and the economic milieu of each country. The basis of all such experimentation has generally been the need to improve operational performance of the railways within a socially-constrained cost structure.

Colonial Railway Finance in India

Since the time that sterling companies built the earliest railways in India, several metamorphoses in railway capitalisation occurred until the system finally settled into the eventual mode of budgetary finance through the plan and non-plan components of the General and Railway Budgets. The first guarantee arrangements were made with two sterling companies as early as 1849, at a time when railway development in Britain was also in its heyday. However the extension of guarantee only became *de rigueur* from 1856 onwards, when Dalhousie observed in his famous 'Railway Minute' that the conduct of commercial

undertakings did not properly fall within the purview of government (MacPherson, 1955). From 1858-59 until 1918-19, when the ownership of the railways in British India was repurchased by the state against the payment of capital-at-charge and subsequent operating responsibilities entrusted to management companies, cumulative losses to the public exchequer on the payout of guarantees amounted to nearly £6.8 million. The mounting burden of guarantee payments had already aroused public criticism earlier, and for several years after 1869, capital expenditure on railways was in a large proportion being met directly by the state. An alternative experiment with 20-year subsidies that was tried out with two companies in 1862 failed to attract private capital. Nevertheless, following the Great Famine of 1878, which had led the Famine Commission to stress the need for rapid development of railways in India, reliance was again placed on private railway capital without conceding guarantee terms.

After 1893, by which time the BG trunk network had already been constructed, railway development mostly focused on construction of the metre-gauge [MG] branch and feeder network where the scope for operating profits was limited. Hence, terms of the individual construction contracts were frequently amended with the overall object of sustaining capital inflow. While the major initiative for railway development by stimulating private capital inflows devolved on colonial government, some of the Indian princely states also built railway networks of their own either under state or company ownership, while District Boards also contributed to railway capital through special cesses - both cases demarcating an alternative cost-sharing mode. Although by the time the Indian Railway Committee [IRC] reviewed the position in 1920-21, only around one-seventh of the track network (or around 41,000km) remained under company control, extensive public pressure for state ownership of railways prompted the government to take over major railway systems like the East Indian Railways [EIR] and Great Indian Peninsula Railways [GIPR], while letting other lines revert to state ownership through efflux of time. Since this period coincides with similar amalgamations between railway companies in Britain, this reflects the extension of similar thinking on the part of the state.

The period thereafter saw a partly exogenous slump in railway capitalisation levels because of wartime wear and tear and depreciation, which deepened with world depression. However, no further change in railway financing modes occurred until Independence marked the return to state finance through railway nationalisation and the formation of IR (Roy Mukherjee, 2002). The capitalisation needs of IR have since been met through budgetary provisions made by the Union Government of India. However, unlike other nationalised

railway systems such as SNCF which were able to reap the benefits of the postwar revolution in railway technology, IR could not successfully maintain the pace of infrastructural investment set during the early Five-Year Plans [FYPs] and have consequently surrendered their former role as prime movers of the economy to increasing inroads from the roadways. Certain reasons to which this is attributable are now explored.

Current Commercial and Social Constraints

It must be stated at the outset that the character of transportation demands in the Indian economy has also changed dynamically over the planning period. The major aspects of change most visible in this process have resulted from growing population and urbanisation, vastly altered industrial location patterns and regional transportation demands, and the changing commodity-character of freight flows across the country. From this perspective, no infrastructural plan can be framed in perpetuity since transportation infrastructure must remain adaptable to predicted as well as evolutionary changes within the economy. However, a peculiarity of IR is that, even while multiplying manifold both in size and scale of operations over the era of planning, it has remained a departmental undertaking of the Ministry of Railways without acquiring separate corporate identity. Complaints in public media about the dearth of professionalism, management discretion and work culture might in fact be rooted in this outmoded form of organisation which - at least at operational levels - is viewed as the manifestation of monopolistic attitudes within a public utility. In some sense therefore, the successful freight competition from roadways not only reflects economic differentials but also quality-of-service differentials vis-a-vis railway services.

Even though public-utility orientation will remain paramount for the railways in India so long as they operate in the public sector and the priorities of national development remain unredirected, the major adaptation to policy that has to be made immediately is the restoration of profitability of railway operations, through competitive cost-reduction rather than monopolistic tariff revisions. As pointed out earlier, a clash between social and commercial objectives is often inevitable in infrastructural operations. While the pace of railway development in the long term would depend upon fair returns being provided to capital investments in IR, the scope for such returns is in practice circumscribed by the extent of social subsidies. In this aspect, state-operated railway systems everywhere operate as the antithesis of commercial monopolies. Nevertheless, the sustainability of social objectives in railway enterprise depends on constant ability on the part of the railways to operate efficiently and competitively by bringing down unit traffic costs.

The operation of IR as a quasi-bureaucratic undertaking proves an obstacle to this because of the addition of the tacit social constraint of maintaining the railway workforce at currently unrealistic levels. While wage components in railway costs become consequently high, the scope for inducting cost-reducing technology is also affected. Even with upgraded railway technology having been incorporated in recent years, the rate of factor application per unit traffic (i.e. input-output ratio) thus remains high on IR. For IR to turn this around and to function on more commercial lines, the disadvantages of monolithic and monopolistic organisation have therefore to be overcome, even as the efficiencies and economies of scale resulting from that organisational mode are retained. Sufficient scope exists to improve the coordination between IR and the major railway users both in institutionalising present operations and in planning capacity expansion, and also in the integration of railway development into regional planning exercises. Once again, the degree of coordination called for requires that IR shed its departmental attitudes of balancing budgets, and acquire a forward-looking professional mindset. It is fairly obvious that the first result of such a shift will be the planning of railway infrastructural capacity well ahead of demand and the creation of an ability to engage the government ministries and PSUs constructively when seeking capital funding.

While railway operational performance of railway systems is usually assessed on the trends in certain well-identified financial and operational indicators in common use all over the world to analyse the working results of transportation enterprises, this evaluation has been made elsewhere (Roy Mukherjee, 2002) and is beyond the scope of the present paper.. The present study therefore draws attention to the analysis of financial returns and liabilities to railway capital which hold diagnostic importance in determining the viability of large-scale railway enterprise, and to the long-term consequences of historical policy decisions have consistently plagued IR, leading to the problem of inadequacy of returns to railway capital-at-charge.

Capital Returns and Dividend Liabilities

It has already been noted above that many of the special problems associated with the capitalisation of large-scale railway enterprise arise because of the technical indivisibility of railway assets that lead to joint costs of service, the scale and lumpiness of railway-capacity investments that render these beyond the means of private investors, the 'sunken' character of railway infrastructural costs and the inadequacy of capital returns. This does not however detract from the importance of improving the efficiency of supply of railway services.

Within the overall policy directives in which IR currently operate, the emphasis on the social objective of achieving allocative efficiency in railway services can often be an impediment to the generation of adequate capital returns in line with other large commercial enterprises.

Capitalisation of railway enterprise requires the continued inflow of capital merely to sustain the existing railway establishment. Investment on new capital projects that expand railway operations is liable to be undertaken only when incremental capital outlays are also assured. The initial investment that is 'sunk' into building the railway network is followed by investment demands for track and asset renewal, maintenance of railway inventories, etc. Thus an increasing trend in incremental capital outlays is imperative for the creation of railway network capacity ahead of demand. When such incremental investment is not forthcoming, this proves detrimental to railway development because of capital inadequacies and the consequent deterioration in operational performance. Because of increasing returns, repeated-dose capital investments thus form the backbone of sustained profitability in railway operations.

Study of the flow of railway capital in India can help identify the slack and peak investment periods that have affected the operational performance of railways. A preceding study of investment trends and the financial position of IR reveals that periodic replenishment of capital stock becomes imperative both for maintaining operational levels of railway services as well as for tuning transportation capacity to the momentum of development generated within the economy (Roy Mukherjee, 2002). While exogenous factors have from time to time been responsible for deterioration in the finances of the railways, policy attitudes towards infrastructural investment in general also assume a decisive dimension. Besides the limitation of a part of IR revenues having to be mandatorily deposited towards general revenues of the government, interest charges on railway capital borrowings lower net earnings and the scope for further incremental investment. As a result, the depreciation reserves which are statutorily maintained for the renewal of railway assets have periodically been drawn upon to tide over a financial crisis, such as for instance, during WWII when withdrawals from the Depreciation Reserve Fund [DRF] were made towards meeting railway working expenses and contribution from the railways to general government revenues had to be deferred (Kulkarni, 1991). The importance of the relative modes adopted for financing renewal and net investment on the railways in India hardly needs further emphasis.

The most interesting aspect of railway reforms in the period after WWI relates to revision of the modes for financing replacement investment. Till that period, all profits from state-

owned railways went directly to the public exchequer and all financial resources for railway operations were allocated by the government. Separation of railway finances from general government finances was made in 1924 under recommendation of the IRC or Acworth Committee, with the purpose of rendering the Indian railway administration independent of the Finance Department, and for introducing in-house railway accounting procedures accompanied by annual contributions from current railway revenues to a reserve fund explicitly set up to finance the renewal and replacement of railway assets (RCC, 2006:7). Railway finances have been administered since 20 September 1924, by the Financial Commissioner, Railways, in separation from the Accountant-General, Public Works Department. The first of the above purposes in fact indirectly acknowledged the need to delink railway capital flows from the trends in economic activity which define the size of government budgets. The IRC recommendations in general sought to professionalise railway management while maintaining constant internal capital support for railway operations. It needs to be noted that most of the pre-Independence railway network was already in place in 1924 when the IRC recommendations were made. Thus the object of the recommendations was not primarily to finance railway expansion, but to maintain existing operational levels without capital drawback - a position which remained fundamentally unchanged until the inception of planning in independent India necessitated the sinking of new capital into railway construction and upgradation.

In order to compensate government for the loss of direct revenues that would ensue from the separation of finances, the two substitute concepts that arose were that of a contribution or dividend from working surpluses earned by the railways, and an interest against railway capital-at-charge. The first of these, as an annual contribution to the general revenues of the government, was to be payable as first charge on net railway receipts, and would be secured against the reserve fund. The annual contribution was later reviewed and revised under the Railway Convention of 1943 into a specified sum payable as dividend. Since the contribution over and above interest on capital has been payable to general revenues in all years since 1924, with the eventual railway surplus or deficit only being accounted after its settlement, the dividend provision has become the bone of contention ever since IR began to suffer shortfalls on the capital account and in budgetary support.

A Reserve Fund had also been created for the Indian railways through the Separation Convention of 1924, to which credits were liable to be made from net revenues after the contributions to general revenues had already been made. The proportion of surplus that could be so credited was scaled by a sharing formula between the railways and government

on the total magnitude of surplus earned in any given year. After the nationalisation of the Indian railways in 1950, the fund was renamed the Revenue Reserve Fund [RRF] and appropriations from the railway surplus could be credited to it subject to parliamentary approval. The RRF was to serve as security for dividend contributions to be made to general government revenues, and could also be tapped to meet any current deficits that might occur against railway operations. However, the introduction of the principle of deferred dividend liability from 1978 onwards led to dissolution of the RRF since its original purpose had been lost.

The review of railway conventions made in 1949 after Independence, endorsed the nationalisation of the Indian railway companies, according the general taxpayer the status of sole shareholder. The Government of India gave effect to this recommendation on 1 April 1950. Although - after slight modifications in their spirit - dividend contributions were liable to continue, dividend reliefs were given on certain exempt categories of capital including losses on strategic, new or unremunerative lines, and a part of current railway works-in-progress. On the latter works however, and on shortfalls in net railway revenues, the payments due would cumulate into a deferred dividend liability payable against future surpluses. Total payments made by the Indian railways to general revenues of the government between 1924-25 and 2005-06 amounted to Rs.38920 crore, or 74.25 percent of total railway capital-at-charge at that point (RCC, 2006). Till the Railway Convention of 1949, railway payments had also included the concept of an annual contribution from surplus, and a contribution of Rs.474.86 crore over and above normal dividend had been committed on this count between 1924-25 and 1949-50, before the concept went out of force.

Dividend payments by IR accrue as a first charge against a perpetual liability on non-repayable capital loans sourced through budgetary support from general government revenues, bearing interest in perpetuity. Together, all such loans are accounted as railway capital-at-charge. Since IR capital-at-charge has risen from Rs.827 crore to Rs.52417.69 crore between 1950-51 and 2005-06, the dividend payment on this has also mounted considerably. A supplementary source of capital funding approved by the Railway Convention Committee constituted by Parliament in 1991 had credited some part of net IR revenues to a Capital Fund which could be used to finance capital projects. However, these contributions could not be sustained by IR subsequently when the revenue position deteriorated. The Capital Fund has been revived since 2005 under recommendation from the Railway Convention Committee constituted in 2004. All other railway investments made by

IR are to be met from internally generated resources, including expenditure on renewal and replacement of railway assets, which may be met from the Depreciation Reserve Fund [DRF]. Except over the depression years between 1930-31 and 1939-40 when there were temporary defaults in dividend payments, the railways were able to make regular dividend contributions to government revenues until the end of the 3FYP in 1965-66. Thereafter as net railway revenues slipped sharply, regular dividend shortfalls began to appear which were made up either by withdrawals from the RRF under which they were secured, or through current borrowings from general revenues, or else were carried forward as deferred dividend obligations. The largest shortfalls in dividend payments occurred towards the closing years of the 4FYP, and at the commencement and the end of the 6FYP.

An Expert Group on the Capital Structure of Indian Railways was accordingly constituted by the Planning Commission preparatory to the 6FYP to explore the capital requirement for meeting the technological challenges and alternative means to raise it, and quickly submitted its report in 1978. The need for a comprehensive revision of transportation policy with particular emphasis on intermodal infrastructure, which had also become simultaneously apparent, was entrusted to the National Transport Policy Committee [NTPC] set up the same year to advise the Planning Commission in this respect.

A major task accomplished by the Expert Group related to outlining the need to enhance the internal provisions made by IR against asset depreciation that are incorporated in the Depreciation Reserve Fund [DRF]. This was deemed to be as essential as meeting dividend payments to government from the perspective of internal resource mobilization. Another aspect in the Group's recommendations that merits contemporary attention relates to the financial overburden being carried by IR on account of its having to make additional contributions from its operating surpluses to the revenues of government, over and above its perpetual dividend liability. In the view of the Group Report, annulment of this requirement could effectively provide relief to IR and raise internal capitalization at a time when budgetary support was consistently dwindling (RFFC, 1993). A different perception within the Finance Ministry led to rejection of the recommendation, on grounds articulated in the dissenting note attached to the Group recommendations by its Member (Finance). A reading of this note is fairly indicative of the mindset of the Ministry, since the grounds cited include prior endorsement of the surplus payment practice by previous Railway Conventions, and most importantly, the plea that with financial arrangements of the Government of India having been made all along under expectation of certain revenues, a departure from past practice would not be well-advised (RFFC, 1993). Thus, in recent years, as budgetary support has dwindled, capital investment by IR has had to depend increasingly on lease-

financing through funds mobilised by the Indian Railway Finance Corporation [IRFC] (RCC, 2006).

Indian Railway Capital Depreciation and Replacement

Other special-purpose capital funds maintained by IR at different points of time included the Development Fund [DF], the Accident Compensation, Safety & Passenger Amenities Fund [ACSPF] and the Pension Fund. Another source of extra-budgetary bond financing was created more recently with the establishment of the IRFC in 1986 to organise leasing of railway rolling stock. Since the primary source for renewal and replacement funding had shifted in 1924 under IRC recommendations from current railway revenues to the DRF, a few words might be said about evolution since then of the depreciation provisions. The 1924 Convention had first laid down as a scientific principle that replacement and renewal of railway assets should be financed by funds specifically laid by for that purpose rather than by drawing upon current revenues (RCC, 2006:19). Although the amounts to be credited to the DRF initially covered the original cost of renewable assets, it was decided after 1936-37 that drawals from the fund could be made on the basis of either original or present cost, depending on which of these was greater, even though any excess replacement expenditure over original cost remained chargeable to capital. Only after 1949 did the depreciation provisions become more realistic, since they now allowed the securing of railway assets at full replacement costs, allowing also for improvement and inflationary components. Annual contributions to be made to the DRF by the railways had, before nationalisation, been estimated either by accounting or *ad hoc* provisions against the depreciation of wasting and non-wasting assets. The principle of fixed appropriations was continued between 1950 and 1983, until the practice was changed under recommendations of the Railway Reforms Committees [RRC]. Contributions to DRF since then have been made at around 2.6 percent of the current replacement cost of assets, with allowance of 8 percent for inflation upto 1992-93, which was subsequently raised to 10 percent.

The RRC recommendations had basically been made after the Committee was confronted by huge physical arrears in renewal and replacement of railway assets which would require consolidated investments of Rs.26,000 crore (estimated at 1981-82 prices) to wipe out, and the 2.6 percent provision was calculated against the current replacements costs of these worn-out assets (RRC, 1982). The practice before this had been to subjectively fix the depreciation appropriations in line with the estimated withdrawal for every given year. Also, though DRF was not included within overall plan resources till the end of 4FYP, its inclusion thereafter had left IR powerless to decide its own priorities for replacement and

renewal, leading to a paradoxical situation where as DRF balances rose steadily, the arrears in physical renewal also mounted. A certain amount of accounting jugglery between the Finance Ministry and the Railway Board was associated with this circumstance, which arranged that additional capital support to IR from the government's general revenues would be scaled according to the balances accumulating within the DRF. Although, superficially, the arrangement should have had no effect on capital expenditure by IR, what resulted in practice was that the additional capital grant attracted perpetual dividend liability, which would have not been the case if the IR had been allowed to finance renewals from internal resources which had been vested in the DRF (RFFC, 1993: 48-49). Another RRC recommendation designed to ease unfair capital pressures on IR stated that appropriations to the DRF should not be given the go by in attempts to meet dividend obligations during years when the revenue performance of IR had been bad. Previous occurrences of this practice had often bled IR of its internal resources.

Summing up the foregoing, the asset-renewal position on IR has hardly changed since the time when the IRC was constrained to make caustic observations on the bad accounting practice of allowing old, overaged and fully-depreciated railway assets to remain on the books, instead of writing them off from Revenue (IRC, 1921). Since the practice has since continued through deferment of capital expenditure on renewals and replacement, and as just stated, through payment of dividends ahead of making DRF appropriations, the railways in India have often been able to present an 'unreal, rosy financial picture' in the Railway Budgets (RFFC, 1993: 48-49) hardly reflective of their dire assets position.

The fact that no separate compensatory provisions have been made at any given time against the arrears of depreciation arising from the deferment of renewal expenditure in preceding years has been another disturbing feature. High levels of such arrears have existed on the Indian railways system during the two world wars, the depression years and again, during and after the 1970s. Even the RRC recommendation requiring that special budgetary support of Rs.260 crore p.a. be extended as a subsidy for wiping out arrears has not been assented to. The RRC also noted specifically that tariff revisions should not be made against these arrears - which actually represent costs that should have been written off - since this would penalise current railway users for past omissions (RRC, 1982). It may also be noted from the above that perpetual dividend liability has worked to the long-term detriment of railway finances, since no consideration has been given to revenue shortfalls while requiring the dividend to be credited compulsorily. Hence in such cases, the RFFC recommended waiver of the dividend shortfall for a maximum period of 5 years, over which Indian Railway would be

required to nurse their operations back to health. Although no occasion has arisen to seek support, after the uptrend in rates and revenues following the recent IR tariff revisions, the evidence of the past makes a strong case for inclusion of this provision.

Conclusion

Strangely, the reordering of infrastructural priorities which led to pressure on IR to raise capital support from internal sources did not reduce dividend and other associated obligations. For one thing, renewed expansion in IR capital-at-charge without overaged assets being written off raised interest liabilities. With dividends from net revenues to the state being accorded the status of first charge, commitments to dividend were made ahead of reserve fund appropriations leading to substantial deferments of replacement expenditure at times when IR revenue performance was poor. The practice of carrying dividend liabilities in perpetuity, as noted earlier, was instituted by the IRC in 1924 and was designed to compensate the state for the loss of direct revenues which followed the separation of railway finances from the general exchequer. To this day, dividend payments still remain a major assured contribution to the revenues of the Government of India. Thus despite considerable debate over the issue and recommendations of several Railway Committees for either lessening or abolishing dividend charges, the Government has been reluctant to accede.

The net impact on the capital position of IR has been damaging in at least three ways. Firstly, the dividends paid out are not necessarily matched by equivalent current injections of railway capital by the state. Secondly, since in bad years dividend charges have had to be paid ahead of contributions to the depreciation reserve, IR replacement and maintenance suffer and lead to a backlog of dead stock - this has been highlighted, in preceding studies, particularly in the context of the IR wagonfleet where substantial backlogs in replacement have been created. Thirdly, the annual outflow of railway revenues against dividends weakens the operating surplus earned by IR and has in recent years forced greater dependence on borrowing and lease-finance for capital mobilisation.

An appeal that has been made on several occasions by IR which was also echoed in a recent White Paper relates to the social burden carried by the railways on uneconomic services and sectors. This burden, which exists on most major railway systems across the world because of the public-good character of railway services, was estimated by IR to amount to Rs.3282 crore in the year 2000-2001 (GOI, 2002). The practice of fully subsidising national railways for such losses, as followed in most countries, does not exist in India. Thus IR in essence carry dual social obligations: firstly, they have to absorb operating losses on uneconomic

sectors within the operating surpluses earned from others and yet show positive surpluses overall; secondly, they also have to support the general budgetary resources of the government by contributing dividends and additional amounts when their financial performance is positive. The joint operation of these dual obligations deeply affects the viability of internal resource mobilisation for railway development. IR are at a relative disadvantage in this respect when compared to other major state-owned railway systems like SNCF. Moreover, the fact that subsidisation of a segment of railway operations in India is in effect made by IR rather than by the Government of India speaks rather poorly of government attitudes towards maintaining the 'public-good character' of railway services. In practice, it is neither government nor IR which subsidise unremunerative services. It is instead the captive users of IR's bulk-freight services who carry this liability in the form of the cross-subsidisation. In a sense, IR is again forced to misuse its monopoly position to pass on social burdens in the form of inflated freight charges adding to the eventual costs of producer goods. The reality is even more disturbing: this shrinking number of bulk transporters have to carry not only the burden of subsidising low rated freight traffic such as in foodgrains, but also of subsidising passenger services, unremunerative lines, as well as IR contributions to the finances of the Government of India.

IR has therefore appealed - so far without result - either for the writing-off of dividend obligations on historical investments after a fixed period of 40 years or for full offsetting of the notional subsidy that has to be borne on account of social burdens. This claim has been endorsed subsequently by the Railway Commission Committee set up by Parliament in 2004 to look into the question of IR dividend rates (RCC, 2006). The present financial arrangements under which IR operates have only promoted higher and higher freight tariffs without competitive cost reductions, leading to substantial losses of traffic in the highly-rated freight segments. Clearly therefore, the frequent tariff revisions have exceeded the standard railway rate-setting principle of 'what the traffic will bear', and have rendered railway services uncompetitive in many freight segments while making privately provided roadways services appear more cost-effective than they really are, thus promoting cascading cost escalations across the Indian economy. For railway services in India to be restored to competitiveness and for their infrastructural potential to be fully realised, thorough financial review and reforms are therefore needed.

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