CHAPTER-II

REVIEW OF LITERATURE

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2.1 INTRODUCTION:

For years in India and in most of the countries in the world, the actual civil work is executed by the private contractor only under State supervision and management. The mobilization of skilled/unskilled labour and machineries is usually done by a private entrepreneur to cater to needs of various departments of Government in the process of supply of public goods like highways. Frankly, the State of the art has not seen much upheaval for road or bridge building for atleast a decade which can not be managed by Government Engineers. But the present euphoria for Private Sector Participation (PSP) or limitedly known as PPP (Public-Private Partnership) is more in terms of financial dependence on the private sector and thus palliating burden on state exchequers. Basically, Government works by setting up various wings (design unit, supervision unit, testing and auditing unit etc.) to produce the services of this sector for people. Now, under PSP, one by one wing is partly or fully divested of their assigned obligations and supplies of such services are procured from private sector (outsourcing). The Private Sector is now penetrating to varying extent into the arena of public body (e.g. State Public Works Department, PWD) and occupy one or all of aspects of a road project like- planning, designing, financing, execution, supervision, quality assurance, maintenance and operations of services including collection of toll (if it is tolled facility) for decided years. The pinnacle of PSP is there when the pubic road is developed using private funds and the road is handed over to the private party to recover the investments under natural monopoly conditions. This modality of PSP is better known as Public Private Partnership (PPP) because the private sector is invited to share the investments and returns on public roads. The pricing of roads raises issue of Willingness To Pay from road user side and commercial viability of PPP projects. In the literature, this category of PSP or PPP for roads is presently more synonymous with privately financed toll roads on Build-Operate-Transfer (BOT[1]) basis. The BOT projects are very new to Indian road sector and have been only a decade old.

This study postulates private sector participation in financing of road projects as inevitable conceding world over argument for diminishing financial capacity of States to directly finance road projects as compared to growing demand. Since the financing of roads is generally linked to grant of concession rights to collect the tolls (and hence access control on public road) planners are exposed to a gamut of issues which are forming synthesis of this study. The regulating of public utilities (i.e. roads in this case) for viability and public acceptance is presently done through signing concession agreement which itself is a good area of research. The subject matter of this study is multi-disciplinary, involving mainly Transport Economics, Commerce, Management and Transportation Engineering. The literature for study is mostly gathered from various libraries, offices of Corporate entities in toll roads, Government bodies etc and from internet searches. The literature review and hectic discussions with major players (Government officials, International consultants presently working for PSP projects in India, Concessionaires and potential clients for Concessions who are mainly contractors involved in cash contracts etc.) in the field revealed that no text books as such are yet established (nil for Indian context) to cover all aspects under a single shell to guide the investors and policy makers for making a successful PSP toll project. The investors are warmly invited on commercial format for toll projects in India. But project document either from State or Union government in India still shy away to firmly admit roads as a commercial good meant for making profits. The available literature encompasses virtually rhetoric on economics of road pricing and related issues. Again, literature on road pricing is mostly clung to congestion on urban or intercity roads leaving issues related to investment recovery based pricing on regional highways yet to be explored. However, some research papers and project specific reports/presentations from agencies like Asian Development Bank (ADB), World Bank, Infrastructure Leasing and Financial Services (IL&FS), Federal Highway Administration (FHWA, US), Victoria Transport Policy Institute (Canada), NHAI, MOSRT & H and few articles from critics/consultants are found very much useful.

The review of literature is structured in following sections:

2.2 HISTORY OF ROAD DEVELOPMENT AND TOLLS

2.3 ROAD PRICING AND THEORIES

2.4 INTERNATIONAL EXPERIENCE FOR PSP PROGRAMMES IN ROAD SECTOR

2.5 NATIONAL HIGHWAY DEVELOPMENT PROJECT (NHDP) AND FINANCING OF INDIAN HIGHWAYS

2.6 PLANNING AND MANAGEMENT OF TOLL ROADS AND

2.7 WILLINGNESS TO PAY FOR TOLL ROADS

The review of literature within above structure is made as below which is useful in exploring the subject matter in the undertaken study.

2.2 HISTORY OF ROAD DEVELOPMENT AND TOLLS:

2.2.1 Indian Perspective:

Historically LORD RAMA built most critical link between India and Sri Lanka and since eons, kings and Rishis in Aryavat (old name of Indian civilization) had been traveling to farthest colonies. The movements imply roads/links were very much spread over in this country even thousands years ago. Then, the highway between Takshshila (now in Pakistan) to Patliputra (now Patna in Bihar) was a major trade route in Maurya Empire. In 16^{th} century, Sher Shah Suri built a major road joining Agra (his capital) with Sasaram (his home town) for his administration in north India across the Gangetic plains and was called Sadak-e-Azam (i.e. great road). This was transformed in to historical Grand Trunk Road (popularly called GT), a first of National highway for India. The GT was later extended by Mughals and British to cover distance over 2500 kms starting from Peshawar in Pakistan, passing through Attock, Rawlpindi, Lahore, Wagah, Amritsar, Ambala, Delhi, Kanpur to Kolkatta and then enters Bangladesh ending at Sonargaon. The GT has continued to exist since more than four hundred years and now it is buried in some parts under NH-2 between Kolkatta to Kanpur ; NH-91 between Kanpur to Delhi ; NH-1 between Delhi to Wagah border. British also developed routes through western ghats.(Wikipedia, the free encyclopedia 2007). The above reference to Indian Highways discloses historical existence of linkages to important places available to public as a free service under

State ownership. The only mention of tolling in history seems to be tolling the pilgrimage by Mughals which was removed by Akbar the Great.

2.2.2 International Perspective:

The word ROAD has emerged from Anglo-Saxon word "ridan" (to ride). Romans built military highways from public funds which supported long distance traveling. Roman road network covered 53,000 miles (more than today's US network of Interstate Highways and more than Indian NH network at present). Academically Roman roads are of great interest for technological evolution of road building. But they were not recorded as tolled road. The road development in UK and then in US has deep repercussions in recent PSP movement world over.

Unlike India the development of roads in UK and US is more eventful, at least researched and documented so, to lead to ripple discussions for who shall be providing this commodity? At what price? Other wise, literature for other countries mostly narrate recently growing need for infrastructure and initiatives taken to finance large highway projects through private sector participation which is now in a limited sense christened as Public-Private Partnership (PPP). A host of literature across the world is loaded on web sites[2], flooded in transport journals/research reports explaining inadequacy of State provision to cater to needs of road sector leading to congestion and bottlenecks in the development. The literature highlights emergence of facilitating role of state and try to lure the investors in this sector under the auspices of PPP.

2.2.2.1 History of road development: United Kingdom:

In explaining "The Rise and Fall of Non-Government Roads in the United Kingdom" the historical evolution of road (highway) provision in UK is nicely documented by Bruce L. Benson and De Voe Moore (2002) under the argument to prove that roads had never been public goods. Following excerpts from work of Benson and Moore (2002) explain the evolution of road sector though at large scale but not really for public purpose.

- A "Hundred" unit of local administration (like Panchayats in Indian context) of Anglo Saxons was responsible for maintenance of very primitive class of roads during eleventh century.
- Following Norman Conquest in 1066 AD, William seized all land of England and granted use of land to churches for support or to other interest groups for rent and labors. The local communities were directed to maintain roads as did under Hundreds and Hundreds were later abolished to facilitate movements of tax collectors, judges and army.
- The churches also required frequent extensive touring and to facilitate maintenance they promulgated the belief that road caring was a work of Christian beneficence that pleases God. Churches provided technical and financial help for the roads. Similarly, merchants felt it investment in reputation. Thus further period up to fifteen century was handled by voluntary efforts by local parishes, religious and merchant groups.
- English kings dissolved monasteries in .1536-39 AD in the struggle with churches and thus affected road maintenance severally. Now the responsibility was with parishes but without external support hence huge shortfalls in revenue support occurred.
- The Statute of mending of highways (1555) ordered every dweller of parish to contribute four days in a year with two men labors and tools or fines were prescribed. Since actual physical involvement of parishioners remained minimum preferring to pay fines, the local justice of peace (JP) introduced commutation (a kind of user fee) and used this money in hiring inputs for road works. To supplement this, a general highway tax was introduced from mid seventeenth century. However, the JPs and their surveyors were not capable of maintaining roads satisfactorily.
- During Seventh century, King was collecting tolls on some roads and bridges for revenue purpose. From 1663, local private bodies were allowed to collect tolls (at prescribed rates) after approval of parliament and it required annual renewals. The bodies formed were named Turnpike Trusts. They were allowed to operate roads for 21 years but all revenues were directed for spending on roads and for salaries. These trusts were **not allowed to earn profits** but they

could borrow at specified rates if required for operations. This Turnpike movement started fairly from 1700 AD and there were 1116 Turnpike Trusts by 1830 operating 22000 miles of roads. However, too many toll booths on a road irked users and many small trusts were caught in debt trap. Also, toll levels were lower and inequitable (steam carriages pay tolls six times higher than horse carriages and they were prohibited at many places; these discrimination created problems for steam carriages and Turnpikes but helped railways) however many groups managed toll exemptions. The rise in competing modes like rail and water transport and directives not allowing them to merge/consolidate etc. factors led Turnpikes to a halt and financial insolvency. Due to Rebecca riots (1842-43) Turnpikes in South Wales were first abolished, handing over roads to County road boards for toll free operations. The select commission of the House of Commons (1864) concluded that toll mechanism being improper and costly **all Turnpikes shall be abolished and roads shall vest with government authorities.** Dissolving 20 to 30 trusts per year, last trust ended operations in 1895.

- Now the financing of these highways was costly matter due to increased industrialization. To ease parishes/counties, central government began grants in aid in 1876 for maintenance. The counties took over roads completely from 1895 and toll roads were converted in to public authority free roads, financed by county taxes and central government funding. The first petroleum driven car touched the roads of England in 1894. This was followed by introduction of national tax on petrol (1909) and hike in central fees for licenses to cater to increased traffic. The Road transport board was set up in 1918 which became Department of the Ministry of Transportation after world war-II. This keep supervising road development and allotting grants from central revenues.

Thus whole evolution of voluntary and then private provision of roads attracted government intervention causing demise of these non government systems and finally led to State funded provisions which is still largely in vogue in UK. The myth of roads traditionally being public goods is shattered herewith and this underpins ability of PSP in provision of wide coverage of roads even under hostile conditions. But the signals received in referring this work are apprehensive because if private sector develops the network, due to established essence of public good, any road or network

can be de-privatized or de-concessioned under public resistance for level of taxes being paid in this sector or under monopolistic administration of Sovereign. Thus, the agreement of any road built with private funds needs some admonition under such circumstances for sustainable PSP. In fact, a typical concession agreement covers this aspect under *Force Majeure.*

2.2.2.2 History of Road Development: United States:

The America's 100+ year experience with private toll roads offers valuable lessons for policymakers pursuing PPP world over. American toll road history consists of three episodes: (1) the turnpike era of the eastern states 1792 to 1845(2) the plank road boom 1847 to 1853 (3) and the toll road of the far West 1850 to 1902. The historical evolution is noteworthy from work of Daniel B. Klein and John Majewski (2003) as below.

- Prior to 1790 AD US roads were built, financed and managed by town governments. New York State demanded minimum three days of roadwork under road labor tax or worker need to pay a fee of 62.5 cents a day. Needless to say, the system proved discouraging. But the amendments in constitution and success of private toll bridges helped in promoting turnpike companies.
- The first Turnpike in US was chartered in 1792 in Pennsylvania for 62 mile road between Philadelphia and Lancaster. By the end of 1845, 1562 turnpikes were incorporated. The stocks of turnpikes were labeled worthless since they never earned dividends. But the turnpikes were useful in improving land values and local economy. Hence, the stock holders were farmers, land speculators, merchants etc.
- Turnpikes raised more than $24 million from 1800 to 1830 from 10 states which were 6.15% of 1830 GDP for those states. This was quite huge capital as compared to so called biggest State funded Interstate highway project costing $ 330- billions during 1956-1995. The Interstate highway investment was 4.30% of 1995 GDP.
- When compared to a National road which competed with Pittsburgh pike, private road was found less costly per mile and still better quality.

- The toll evasions, too many exemptions, most of constructions being on so far existing free lengths, toll booth location problems, construction of Erie Canal and railways etc. led to departure of turnpikes and few states went for cheaper option of timber plank roads.
- All weather long time utility and lower cost attracted private companies to build plank roads. The financing was done on the lines of turnpikes. But technical failure of planks eliminated this option by 1865.
- The new development in so far untouched Nevada and California needed roads and it was provided by counties allowing private toll road companies to earn return of 20% and provided lots of freedom through 1850 and 1853 laws. Due to unsettled communities in the Western parts, community based voluntary efforts were not seen happening.
- Thus, from 1792 to 1902, more than 5000 incorporations were set up and they operated more than 30000 miles of roads during this century with little or no support from government authorities. Also, US and UK both were in initial stages of development and State provision could not do what private initiative did in managing this sector.
- The passage of act of 1899 permitted counties to acquire toll roads with a sentiment nurtured by the government that toll operations were too inefficient failing to recognize impact of too much regulations and issues of toll evasions. Another argument was need for centralized planning of this sector. The Federal Highway act of 1916 barred use of tolls on highways receiving federal money and private toll roads were totally relieved by 1920. Thus, era of freeways prevailed from 1899 to 1990s (i.e. hundred years) in US. To support the non tolled roads, user-based road transport tax in the form of a one-cent per gallon gasoline tax was pioneered by the state of Oregon in 1919 and within 20 years all states had a gas tax. In 1956 the US Highway Trust Fund was established to finance the federal share of the Interstate highway network (1956 onwards) and to support other federal-aid highway projects. This fund derived revenues from taxes on fuel, tires, truck sales and heavy-vehicle use. Now with edge of technology for road pricing (solving equity and efficiency

issues), private toll roads are returning in US and UK ensuring no toll evasions and no pikes at toll roads to obstruct the users.

Indeed, readings as above for development of the sector itself in these two countries and then encroachment of Sovereign over developed sector and now both nations in search of proper PSP are suggestive of some cycle of nationalization and denationalization. The US case is little variation over UK experience with major difference being the movement was quite delayed in US. Moreover, British turnpikes were incorporated as trusts like non-profit organizations financed by bonds vis-à-vis American turnpikes were stock-financed corporations seemingly organized to pay dividends. In UK, last trust ended operations in 1895 and in US passage of act of 1899 permitted counties to acquire toll roads. All these lessons suggested that roads can be provided by private initiatives if freedom to act and security from government encroachment were ensured to private entrepreneurs. And a rhetoric from economists that government shall provide basic infrastructure (even resorting to foreign aid for this purpose) to lift a society through early stages of economic growth or market fails to provide such public utilities seems defeated. The bitterest fact to be concluded from above review is that any state administration can be safely assumed to be **strongest competitor with coercive power** and if not satisfied, can cause demise of PSP.

United States case is further relevant to refer for its historical Interstate Highway System that linked all important centers of US and India is having likewise National Highway Development Project (NHDP) at present.

2.2.2.3 Interstate Highway System of US:

On July 7, 1919, Dwight David Eisenhower, a army captain and army departed from Washington D.C. in the military's first automobile caravan across the country. Due to poor roads and highways, the caravan took 62 days to reach San Francisco averaged five miles per hour. At the end of World War II, General Dwight David Eisenhower surveyed the war damage to Germany and was impressed by the durability of the Autobahn road network against bombing. This inspired for construction of Interstate highways in addition to existing federal highways. It took two years for approval of this world's largest public works project. The Federal Highway Administration (FHA) of US Government provided federal funding of 90% of the cost of the Interstates

supported by state contributing the remaining 10%.Design wise, lanes were planned to be twelve feet wide, shoulders were ten feet wide, a minimum of fourteen feet of clearance under each bridge was required, grades had to be less than 3%, and the highway had to be designed for travel at 70 miles per hour and most important is strict access control. The plan for the Interstate Highway system was to complete all 42,000 miles within 16 years (by 1972.) Actually, it took 27 years to complete the system. (Rosenberg 2007)

The system was designed as a "pay as you go" system, relying primarily on federally imposed user fees on motor fuels. Though it is just over one percent of the nation's highway system mileage, the interstate highway system carries nearly one quarter (23 percent) of all roadway traffic. (Cox and Love: 1996)

Though Interstate system did admit uncertainty for population projections, it was estimated that population would grow by 63 million to 227 million by 1975 when the system was expected to be complete. The US population actually reached that level in 1980 and another 55 million people were added by the year 2000, and it appears that another 60 million will be added by the year 2030. Yet, there does not appear to be another massive investment to reshape US economy and industry. The taxes do not seem to be raised to fill the deficits and even Toll projects can not contribute beyond one fifth of the network. (Dunphy 2006)

A brief review of US Interstate network above is a story of a nation stuck up due to poor connectivity in early 1900s and compelled to take up this project from public funds (mainly dedicated fuel cess like for NHDP in India) due to just gone through nationalization of roads in that period. Despite PPP euphoria World over during 1990s, US have no future plan to chalk out next mega Programme either from public funds or on PPP route. The US Interstate highways have been and will continue to be a undisputed roll model for nation wide road network programmes with massive investments for any country e.g. in India (Golden quadrilateral and NHDP) , in China (National Trunk Highway System, NTHS) etc. But striking difference between Indian (or China efforts) and US Interstate system is, Inter State system was purely state provision blaming deficiencies in private initiatives, these NHDP/NTHS programmes are desperately inviting PSP conceding inadequacy of state provisions. Now the irony is these Interstate highways are on the roads to commercialization in

want of funds for their future care. Since they were basically built and maintained from federal funds, States at present face problems in imposing tolls through PSP.

2.3 EVOLUTION OF ROAD PRICING THEORIES:

The arena of road pricing has been explored by various economists for efficiency and equity in the society. But it has been observed that there is some chaos in framing consensus for road pricing. The economists do agree to solve highway congestion by road pricing but beyond this primary insight, there is much disagreement over setting of tolls, how to cover common costs, what to do with excess revenue etc. Hence, over a passage of time the questions like -Whom to toll, how to toll and what to do with toll revenues have perplexed the policy makers and economists as well. Meanwhile the decisions and administrations in road sector has remained domain of town Planners and Civil engineers world over.

Over and above, the issue of road pricing drew attraction of many economists world over but there seems no consensus among them at present for continuing tolling of roads.

2.3.1 Diverse Views on Approach to Road Pricing:

Lindsey (2006) has produced intellectual history of road pricing idea starting from Adam Smith and concluded that economists seldom reach to a conclusion on road pricing. He noted that Adam Smith (1937) devoted several pages of The Wealth of Nations to transportation projects (high roads). Smith was very near to idea of project financing and he expected that all such "public works" be so managed as to afford particular revenue for paying their own expenses without bringing any burden upon general revenues of the society. Proposing equity, he asked the vehicles to pay for maintenance in proportion to their contribution to wear and tear to that public asset and hence toll was related to weight of vehicles. He also cautioned to build such infrastructure only where it was required by commerce and their expenses too, their grandeur and magnificence (this was referring to scale of project), must be suited to what that commerce can afford to pay. He opposed the proposal to take over turnpikes by Government. He feared that State would grow dependence on toll revenues (cash cows) and would increase the tolls unduly, encumbering commerce and final

consumers however, maintenance may be neglected. Smith had little cautious tone while private parties are operating toll facilities. He felt that unlike canals, the poor maintenance of roads do not render them impassable and hence management over such operations was needed from State.

The literary work of various other scholars is summarized below from elaboration of Lindsey.

Table: II-1

Road Pricing Theories over the Time

S. N.	Scholar	Thoughts for road pricing
1	Jules Dupuit (1849)	He was a French Engineer and favoured tolls on average cost pricing for covering long run costs rather than for managing efficient usage. He proposed that tolls can be levied to recover public investment by Government in constructing and maintaining the facility. The congestion was not the issue of concern that time.
2	Arthur Pigou (1920)	He was among first to recommend tolls on public roads to remove the congestion. It was suggested to create differential conditions (making one of them superior) on alternative public routes to reduce the congestion by use of tolling. The toll so derived was named as Pigouvian tax and was equal to difference between marginal social and marginal private costs. The concept of tolling was meant for efficient use of road facility.
3	Frank Knight (1924)	He corrected the idea of Pigou by advocating private ownership of one of alternative route.
4	Ronald Coase (1946)	He advocated that only projects likely to pay for themselves shall be undertaken. Coase recognized that self financing might result into some projects not taken up though desirable still he was firm on his stand. He did not prefer marginal pricing as it required subsidies for meeting deficits as compared to average cost pricing which does not require subsidy. However, he expected some value based pricing while implementing average cost pricing.
5	William Vickrey (1948)	He expected road pricing on short run marginal cost (SRMC), may require subsidy in case of deficits as compared to average cost pricing. He said that random fluctuations in demand shall be met with responsive pricing (like other commodities) where by prices are matched to SRMC. He quoted price dynamics for telephone services to vary charge with time and anticipated appropriate technology for network wide tolling.
6	Alan Walters (1954), Beckmann (1956)	Like Vickrey, they individually supported SRMC pricing. They looked tolls as a means of efficient usage rather than to finance the project.
7	James Buchanan (1956)	It was suggested to make available sufficient supply of alternative routes to prevent monopoly power of privately operated toll road.
8	Herbert Mohring	Though he was strong advocate of SRMC pricing, he gave theory of cost recovery through SRMC by assuming possibility of providing road capacity at optimum (it being perfectly divisible and can be supplied at constant marginal cost) to recover the cost of such optimum capacity.
9	Gabriel Roth (1966)	He was a civil engineer in UK. He expected that roads shall be controlled by a road authority that behaves like provider of competitive market. Roads shall be priced like Pigouvian tax but may recover long term costs.

(Based upon Lindsey 2006)

The ideological difference among economists is found regarding application of Short Run Marginal Cost (SRMC) based pricing for efficient road use versus average cost pricing for cost recovery. The following conclusions are relevant for this study.

- Idea of average cost pricing was disliked by many for over investments and SRMC was found too theoretical. Of course, SRMC based pricing may require host of factors like, demand elasticity, externalities etc. and hence may require sophisticated technology to inform and apply toll variations in smooth manners. This is now getting possible using cameras and satellite based global positioning systems and already in use in UK, US, Hong Kong, Australia etc. known as electronic pricing.
- Knowing the fact that roads contributes to general welfare (externalities) , it can be argued that some public funds collected by taxing the road sector and surrounding real estates e.g. vehicle registration charges, fuel taxes, property valorization taxes etc. shall also flow into the road sector which can bring in equity too in pricing instead envisaging full investments by private sector. The concept may lead to State equity in a project or a segment of road hierarchy may be funded through public funds.
- More or less economists are found clung to rationing of road space and then allowing expansion of network to optimum capacity. (In India, a network based efficient road use is never envisaged by MOSRT & H or their consultants.)
- Even for use of toll revenues, economists diverge either to reduce overall taxation due to efficient toll collection, to replace some of taxations (e.g. fuel taxes) by tolling, to plough back all revenues in the same sector (which is inflexible decision of budgeting in changing priorities) or carry the revenue to general pool.

2.3.2 Public Goods and Externalities: The Case of Roads

Walter Block (1983) has raised basic issue of externalities as an irrefutable part of roads as a public good but has stated that market can internalize such externalities itself. The relevant excerpts are discussed in relevance to undertaken study as below.

- Block says externality argument is based upon a distinction between public and private goods. One claim is that, since provider of road can not reap full benefits(e.g. spill over benefits of increased land value etc.) private party will under-invest and there is a case for government provision or since roads provide external economies (benefits to communities) the users only shall not be charged.
- If it is so then providing other services like electricity shall also be made free/subsidized because they generate similar social benefits to larger interest of society. Block argues, if taken this way, no area will be left for private sector enterprise. The issue of externalities is difficult to quantify for providing subsidy to the actual users of tolled facility by charging the potential external beneficiaries[3].
- An externality attracts attention towards "free riders" who are benefited without paying for the cost. But since the benefits are spilling unsolicited to them, it becomes practically difficult to charge. Instead Block suggests **to adjust tolls as compared to benefits reaching to users.**
- Another externality is diseconomy seen in case of congestion and invites argument for state intervention. But Block thinks if antisocial behaviour is seen on highways (e.g. overcrowding) that is due to visibly non-ownership of this asset. The negative externalities shall be internalized by pricing technique so that the losers are compensated from those affecting.

While discussing the "Overcoming Difficulties in Privatizing Roads" Walter Block (2003) has negated the popular four arguments against the privatization of roads 1. Eminent domain is cheap, efficient, and necessary, but only government can avail itself of their "benefits." 2. Roads are not perfectly competitive, but rather, necessarily, are characterized by monopolistic elements, which only the state can address. 3. Roads are different then everything else; people impose waiting costs on others without taking them into account; this externalities problem is a market failure that, again, only government can solve. 4. Road privatization is unfair to abutting property owners. Block sees main answer in that no privatization has actually occurred to its full capacity and we are in transition. If one allows the privatization to fullest extent, all the above questions are replied by the process. Thus Block has come up as a proponent for private sector participation in roads which is supposedly public

good. The world has seen various forms of PSP including private investments through PPP route amid varying arguments for issue of road pricing.

2.3.3 Regulating Public Utilities: Demsetz Auctioning

In 1968, Harold Demsetz observed that under the argument of- ruinous competition, excessive duplication and durability of original investment many public utility fields (including roads) were wrongly insulated from competitive forces. The natural monopolistic conditions were found being regulated rather than exposed to market forces. He argued that regulations can not do what a market can do. He expected that the public utilities shall be exposed to open competition for taking over the field under natural monopolistic conditions since the bulky scale of investment and scale of operation will not make it advisable to introduce competition in the field. Hence, **competition for the field** (Demsetz 1968) became a motto for installing and operating public utilities in Europe. In fact, Edwin Chadwick proposed this solution to the natural monopoly problem in 1859 as acknowledged by Demsetz, the auctioning and re-auctioning of public utilities are called Demsetz Auctioning.

The auctioning of public utilities referred by Demsetz is basically award of concession for public utilities like roads. In India, concession for development of roads are mostly awarded on competitive basis and hence initial auctioning is essentially Demsetz auctioning but subsequent periodic auctioning is not practiced during long tenure of concession or during useful life cycle of assets for the purpose of controlling monopolistic exploitation of consumers/ users

2.4 INTERNATIONAL EXPERIENCE FOR PSP PROGRAMMES IN ROAD SECTOR:

The available literature suggests many countries including US have resorted to a nationwide programme for development of roads. As emerges from country specific experiences, private sector participation does not relieve Sovereign of financial liabilities due to some kind of undertaking by virtue of public ownership of roads. In fact, in a longer run, Sovereign may end up spending more (deferred payment) though initially private sector bring in required funds and facilities are created under declared programmes.

2.4.1 China: At the beginning of the 1990s, India's highway infrastructure was ahead of those in China in terms of total route km, route km/square km, and route km/head of population. India's road network was more extensive than that of China in 1992, but the quality of the road networks in both countries was severely deficient relative to the standards of modern highways in virtually all dimensions – pavements, road geometry, and traffic management. The available literature for China is highlighting massive investment in the National Trunk Highway System (NTHS) and it is claimed that the programme has helped in removing poverty and boosting Chinese economy. Ministry of Communications of China has planned National Trunk Highway System (NTHS) of 35,500 kilometer requiring $ 504 billion from 1991 to 2010 AD The available revenues are estimated at $ 302 billion from road user charges and $ 29 billion from toll collection, still leaving a financing gap of $ 173 billion or about $ 12 billion per year. The gap is expected to be covered from better private sector participation and some ADB assistance. (The massive investments during 1997-2002 made 77% of NTHS completed by 2002)It is to be noted that most of the private funds have come from foreign investors and little from the domestic private sector however private funds totaling in last ten years less than 10% of total flow (Ojiro 2003). The latest up dates of Chinese highways points out over helming success of their programme. In 1988, China did not have an inch of expressway but the length of expressways in China was 41,000 kilometers at the end of 2005, the world's second longest only after the United States. About 24,000 kilometers were added in 2001-05, or 4,800 kilometers per year. Also, in 2010 the total length is expected to be around 65,000 kilometers. The United States had some 90,000 kilometers in 2005. The Chinese ministry declares that the plan is to increase the total length of expressways to at least 85,000 kilometers by 2020 since it helps in pushing economy up. During the period, some 2 trillion yuan (US$241.9 billion) will be raised for road development from overseas and private investors (China daily dated 5-4-2006). ADB (2001) has noted that present Chinese legal and institutional system for roads is under transition from a State Owned Enterprises (SOEs) to a mixed system. It is stated to be based on share companies to carry out the socialist market economy, seeking outside investments by listing on stock exchange. Thus China has constructed its superior roads at frantic speed but main mode of finance was not BOT. The central government and provinces continue to advance an expressway program which is

almost entirely dependent on equity capital and public revenues without the benefit of long-term project finance (Stanfield2005).

2.4.2 Mexico: Among Latin American countries, Mexico Toll Road programme has noteworthy relevance for India as well as for any country planning a large scale highway investment programme. In 1989, then Mexican President Salinas announced the National Highway Program for 1989-1994 to extend concessions to private Mexican entities to build 10,000 miles of modern, high velocity highways. Between 1989 and 1991, the Salinas administration directed some $4.6 billion of investment toward road development and improvements nationwide, $3.4 billion of which was financed by Mexico's private sector through concessions. By the end of 1994, a total of 50 highway concessions had been awarded, representing 3,300 miles (i.e. 5300 km) of highways and eight bridges (Ruster1997 and Ortiz 2006). The required investment of around $13 billion was financed through the domestic banking sector (50%); considerable concessionaire equity (30%), funded through expensive, limited-tenor, floating rate commercial loans and/or "sweat equity" (an arrangement whereby a construction company builds a facility on behalf of a concessionaire, to be later compensated through the reward of an equity stake in the concession); and a remaining 20% came from public-sector grants/equity. All the lacunae in design of concession and hasty implementation of programme accompanied by drastic under receipt of toll revenues marred the commercial sense of project. Meanwhile Mexican peso (currency) crisis forced the Mexican government to devalue the peso in December 1994 and by the end of December, the peso had fallen by 66%. GDP fell by 6.2%, and the rate of inflation on a 12 months basis climbed to 52% in December 1995. Short-term interest rates reached a level of 71.5% in April 1995. This crisis raised all-in interest rates to 100% and affected cash flow of toll projects in deadly manner. The Mexican Government was forced to assume all the debt obligations and equity investors lost the equity in winding up the programme. The spectacular financial failure of this program is legendary and it is used in academic texts and on finance courses as an important example of what can go wrong with overenthusiastic large scale, national infrastructure concession programs.

2.4.3 Spain: This is the case of free versus toll road provision with change in political agenda of Government. In 1967, Government planned for 3,160 kilometers

of toll motorways in the Program of Spanish National Motorways (PANE). Up to 1972 the sections were franchised to private firms. The possibility of having motorways (even if tolled) raised great expectations, and political and institutional pressures to acquire such roads emerged all over the country (Bel and Fageda 2005). The PANE was up-dated by 1972, included 6,340 kilometers of toll motorways. Promises were high, but results did not meet expectations. The concessions were franchised for total of 2,042 kms up to the end of 1975. By 1985, no more than 1,807 kilometers of toll motorways were operating, along with 1,363 kilometers of free motorways. This is mainly due to economic crisis of seventies that discouraged private investors to go ahead till mid 1980s. In the PANE, Spain did not prefer public management (like in France and Italy) but loan warranties were availed to private concessionaires to obtain overseas funds. But this decision attracted risk transfer on government for exchange rate on external borrowings. Some or other way likewise many risks were ultimately passed on to government and ultimately private toll roads resulted in to a costly affair. During events like oil crisis of 1973 Italy faced less problems because it followed network based management for balancing profitable and unprofitable stretches whereas Spain franchised individual stretches. Politically the decision of choosing model of public financing of motorways for 1984-1991 Roads General Plan was taken by newly elected Socialist party. The new model really clicked to produce additional 3600 km freeways between 1986-92. Fiscally this was seen possible by Bel and Fageda(2005)due to introduction of Income Tax from 1977 and availability of European Community funds on some stretches of European importance. However, during late 1990s with out competitive pricing unprofitable concessions were facilitated by renegotiations for increase in term and in return reduction of toll or investment in such unprofitable stretches. This has resulted in implementing yearly price adjustment formulae wiping off extra ordinary profits of private parties through capping. In survival of private toll ways, National Toll Motorways Program approved by the conservative government elected in March 1996 and 2000 helped without harming development of freeways. Also, it allowed subsidies for poor traffic stretches on private toll ways. The socialist party again gained power in 2005 and is likely to downsize remaining of Toll Motorways Program.

2.4.4 US way of long term private sector participation- Most recent Development:

Samuel and Poole (2005) has discussed recent events of U.S. selling its two toll roads to an Australian firm. This is in contrast to buying out of 91 Express lanes of California. The 91 Express lanes contract was terminated and taken over by public authority to get rid of "non-compete clause"[4] of the contract. As per this clause, State was bound by agreement not to create competitive facility and even adjacent free lanes were not to be improved with out consent of Concessionaire. Here, the above report describes one of this US case and some international precedents. Most relevant content is poor status of public exchequer in advance country like U.S. that forced to sell its assets. A case of one of these sell out is referred as below. This selling of public asset explains remote future of well developed PSP ambience. May be some of the successful toll roads in India at present or after completing original concession term get sold to such giants.

The 99-year lease of the Chicago Skyway for $1.83 billion has led officials in other states started asking whether they should examine the privatization of their toll roads and bridges. It is just 7.8 miles in length and garnering annual toll revenues of $45 million, it is quite down the list in any ranking of US toll facilities. The deal sound unreal for many but a reality at present as it was achieved on January 24, 2005. The sale produced the equivalent of 70 percent of the annual city budget for Chicago. The city used money in paying off earlier debts and creating reserves. Even before the financial close on the Skyway, Mitch Daniels the governor-elect of Indiana, announced that 157 mile long Indiana Toll Road would be considered for privatization (and was sold later).

Chicago Mayor Richard M. Daley explained the Skyway sale: "Running a toll road is not a core function of City government. And as you all know, the City faces financial challenges this year and for the next several years." The Chicago administration did not reveal reserve price but it was believed around $1 to $1.2 billion range. The buyer justified the deal because the sky had established traffic history since 1959 ; the physical structure was good and there was spare capacity for future traffic; free lanes around were less likely to expand.

The authors are in favour of complete privatization and dislike the term PPP stating that the present form of PPP do not resemble with business partnership and the toll projects shall be operated like business only. They see private sector can access all the capital markets and bring equity capital in. Some investor groups have successfully made local initial public offerings, giving local people a sense of ownership they can never have with a state toll authority. Only precaution is prudent use of money from such proceeds.

2.4.4.1 The Chicago Skyway Sale : An Analytical Review:

Enright (2006) has evaluated the bid for skyway reviewing the details of the transaction, its benefits, costs, risks and other options that would have achieved the same results. Was this transaction meant for a public benefit or was it a leveraged buyout for corporate profits? He observes:

- One way, the Chicago Skyway was the perfect candidate for long-term privatization because the seller state gained all the cash and will pay virtually none of the costs.
- Even at the assured floor toll rate increase of 2%, the net present value of increased revenues from tolls alone cover $1.4 Billion or 75% of the upfront franchise price of $1.8 Billion. Otherwise, if the indexes allow 3% rate increases then the full franchise fee is recovered from toll increases alone. The breakeven traffic growth required to recover the franchise fee at the floor of 2% is a meager growth rate of less than 1% per annum.
- Projected Average Annual Return on Equity based on final Equity Investment of $652.6 Million after refinancing was estimated at near 6% for minimum floor increase of 2% with no growth of traffic. This return reaches near 10% if moderate traffic increase of 2% is also considered. Enright is surprised over selling of such profitable cash flow instead of retaining it.
- Arguments for sell include- the availability of "patient capital" that could wait for revenues if they did not develop with out any fixed payment on debt service; otherwise it was difficult for public sector to raise the same level of capital due to the restraints associated with an all debt funding. However, the state could have gone for issuing two series of bonds first to garner $1.8 Billion and second for paying interests (capitalized portion) and at given

market conditions, Enright see it beneficial to state. The private buyer has almost gone similar debt financing series but recovering equity within first 12 years in his plan.

The work of Samuel and Poole (2005) along with Enright (2006) is suggestive of huge potential of long term concession extending over full life of asset and assuring long term secured returns. US has no plans (like NHDP) to establish platform for private investment in roads due to heavy dependence on fuel taxes and existing huge network of Interstate highways constructed from public funds. But the limited cases of too much of privatization are eye catching for future prospects of PSP world over. It is also necessary to note that PSP programmes are found world over but not necessary through private investments. The public investments in such programmes (through fuel taxes, excise etc.) has remained phenomenal despite every nation's aspirations to involve more and more private funds.

2.5 NATIONAL HIGHWAY DEVELOPMENT PROJECT (NHDP) AND FINANCING OF INDIAN HIGHWAYS:

The Indian Highways have seen first ever mega highway programme (NHDP) so far which has stemmed out of some task force created by GOI. A land mark in this is infrastructure report by DR. Rakesh Mohan. This section encompasses historical development of NHDP and related issues.

2.5.1 Major Recommendation in Dr. Rakesh Mohan Committee Report (1996) on Roadways :

The New Economic Policy (NEP) of the Government of India (GOI) has culminated in far reaching reforms including fiscal consolidation, trade and industrial licensing liberation and permitting private sector participation in infrastructure development. In October 1994, the Department of Economic Affairs, Ministry of Finance, and GOI established an Expert Group on Commercialization of infrastructure projects under the chairmanship of Dr. Rakesh Mohan. The highlights of the report are:

- So far connectivity is emphasized and thus rural roads have increased. But now National Highways and State Highways shall expand in matching manner

considering pace of traffic growth. The main roads shall also improve in quality.

- The inadequate and congested road network has severely eroded the international competitiveness of the economy and led to huge economic loss along with higher transportation costs. Commercial vehicles are able to run only 200-250 km on an average per day as compared to 500-600 km per day in developed countries. The economic losses due to poor roads were estimated at Rs. 20,000 to 30,000 crore per year and cost of avoiding these losses were estimated at Rs. 120,000 crore in terms of improving/building/maintaining network of National and State highways. It was estimated to provide Rs. 32,000 crore in 1996-2001 and Rs.63,000 crore during 2001-2006 for construction of NH, SH and Expressways. For these two periods, provision for maintenance required was estimated Rs. 9000 crores and 11,500 crores respectively.
- The proper and timely maintenance of existing roads was emphasized heavily using modern techniques.
- Ribbon development shall be undone and continuous national highways shall be constructed using bypasses at town junctions. Utility obstructions shall be shifted out by coordination with local authorities.
- Highway development should be on the basis of corridor development. A 20 year master plan should be prepared. A comprehensive Highway act to facilitate private projects shall be enacted to serve all India.
- Record says, the road ministries at both levels have incapacity to spend even the allocated budget money and this is mainly related to use of labour oriented methods. The contracting industry shall be properly developed and modern equipments shall be deployed. The administrative delays and problems in case of NH shall be undone by entrusting sole responsibility of planning, developing and maintaining NH and Expressways in India to the NHAI only. Thus, state authority shall be separated out of NH activities.
- All over the world, four sources are used in financing highways: 1. Allocation from existing user taxes collected as part of general revenue 2. Creation of earmarked funds through levy of specific user tariffs 3. Through user pays

basis by raising commercial and multilateral loans (ADB, WB etc.) and repaid from tolls collected 4.Private sector participation. In India last three sources are untapped. Looking to massive backlog, all sources like public, private, domestic and foreign shall be tapped and a Highway Development Fund should be created as an assured extra budgetary source of funding highways. At some parts of world, efforts are made in creating Highway Development Fund involving three steps: 1. Introduction of road tariffs 2. Depositing proceeds into a Road fund 3. Establishing a Road Board to oversee operations of roads.

- It is proposed that a Highway Development Fund be created in India by levy of a cess of Rs. 0.50 per liter of diesel and Rs.1.0 per liter of petrol; a cess on automobiles at Rs.10,000 per commercial vehicle and Rs. 5000 per car and one percent cess on automobile components. It was estimated that Highway Development Fund and budgetary allocations will provide Rs.11,000 crores; private sector would provide Rs.10,000 crores; Rs.4,000 crores would be extra budgetary loans to be repaid from budgets; and Rs.2,000 crores from tolls and commercial loans totaling Rs.27,000 crores which is estimated fund requirement for NH and Super NH during 1996-2001.
- Like NSS, a Highway Infrastructure Saving Scheme should be started. All mega industrial projects should include a provision of 1% of project costs for highways and money shall go to NHAI

This is a major relevant event for Private Sector Participation (PSP) in the field of roads and its major role in financing Indian highways. The report is basically on need based estimation and does not really accounts for demand perspective. However, the recommendations are the genesis of earmarked fund (at present only fuel cess) creation and tolls which users pay and thus multiple taxes established for using the road. The major action taken by GOI is delinking State PWDs from development of NH sector as suggested by Dr. Rakesh Mohan But this action removed the oldest player of the game and recently NHAI itself is asking services of experienced engineers from State PWDs.

2.5.2 Financing of Indian Highways So Far And NHDP:

The present level of road pricing and its capacity to finance the Indian highways is well explained by a World Bank (2004) research report. The WB report discusses requirement of enabling environment for PSP that is relevant for study undertaken herewith. The Bank says Private sector participation (PSP) in funding is increasingly perceived as the answer to highway finance (panacea?) but concedes that internationally, at most only 5-10% of highway networks have been financed by the private sector. Thus world over the public funding will prevail for the highway sector and India can not be an exception. The Bank sees that PSP depends on a sound framework for overall sector funding. Importantly, public acceptance of tolls may be partly determined by perceptions of the entire road charging regime. Basically the WB report is designed to review scope for establishment of efficient and equitable road pricing under given taxation and user charges on roads. It also discusses scope for PSP in terms of financing and management of the network. The report imparts interesting statistics on transport sector and present charges on them. The report seems having two distinct foci (a) focusing on how much the road sector is earning revenues to the government and what is spent back on this sector, what are the road use based and fixed costs to the road users in India and how to remove inherent inefficiencies in these charging regime including looking for equity in charging.(b) This is more relevant and is about PSP issues under international as well as Indian perspective. The some of the conclusions / recommendations put up by Bank relevant to undertaken study area is as below:

1. GOI's Vision 2021 sets out the investment needs of the Expressways, National Highways, and State Highways, in ten years 2001 - 2011, estimated as Rs.300, Rs.1,200 and Rs.750 billion respectively (1999 prices). Considering the current proportion of road-user charge revenue is returned **(56%)**, funding gap is estimated to Rs. 1,760 billion and it is misbelieved that only private funding can make up the funding gap. In fact this gap will be met from road users only. Several countries have found that, in order to make additional user charges acceptable to road users, some different institutional governance structures are desirable whereby representatives of road users and other stakeholders are brought into the decision-making process and make some influence on how

their user charges are spent. A Strategic Roads Authority (SRA) is recommended to be set up in proper garnering of road user charges in acceptable manner. (e.g. European Conference of Ministers of Transport (ECMT), and the International Fuel Tax Association in the USA and Canada)

2. There is need to raise user charges and see that heavy vehicles are no further charged less as compared to Buses and public transport is favoured.

3. The road user charges shall be more in form of direct on use and shall be separated from being considered general revenues. The tolls shall be decided on economic principle like congestion pricing, weight-distance pricing or short run marginal pricing. For recovering investments, fixed costs prevailing under present user charges may be preferred.

4. Though presently only one percent revenue comes from tolls, it will be a dominant instrument in coming days. **Bank suggests using NHDP as a proper event to introduce state level and national level tolling schedule with uniform policy.** Though internationally, toll rates are low in India but probably due to low affordability index, Indians have low willingness to pay tolls.

5. Like telecom, a **Highway Regularity Authority** is suggested to be established and a comprehensive road development policy incorporating various aspects of PSP is felt necessary for giving confidence to investors. The network financing and detailed risk sharing calculations shall be work out for viability of PSP.

6. Constraints to PSP are- lack of flow of private funds, long gestation periods, high cost of restructuring, questions for value for money (like, NHAI went for eight projects under annuity agreements but it cost NHAI at 17-18% while NHAI has own fund costing around only 11% indicating flaws in preparing projects), lack of information for investor perspective, lack of simple and supportive legislative, regulatory and institutional environment for sustaining PSP. All these constraints and issues like lack of framework for project identification, feasibility studies, project approval, etc. coordination between various government agencies involved with road sector projects, absence of a statutory, autonomous, regulatory authority (at arms' length from government)

for dispute resolution, toll fixation/revision and for ensuring a level playing field for all participants , delays in decisions regarding government support (land for example) are required to be analyzed for further improvement in PSP

7. Corporatization and securitization to access the retail equity market is felt one option for enhancing PSP.

8. The GOI is envisaging PSP in the next phase of National Highway development with 10,000 km of roads being expected to be funded substantially through BOT. Bank also sees opportunity at the state level in varying capacity of private sector and varying % of state support is offered opening flood gates for BOT.

9. Internationally, most of the countries use revenues from road sector as general revenue and very less returns back to the sector. (exception is US which returns back 90%).

10. From 1992 to 2003, globally private investment in highways had a median value of $4.2 billion/year and most countries have entrusted less than one-tenth of their main road network to the private sector. Japan has one of the longest toll-road networks in the world (9,200 km) Latin American countries have had the highest share of their national roadway funded and operated by the private sector (it is 53%) during 1992 to 2002. Also, two-fifths of the main roads in Chile, and about a third in Argentina are toll roads with private participation. In UK, Holland, Norway, Portugal, Poland and the Czech Republic state pays to concessionaires based on traffic levels (shadow tolls) or availability of the road i.e. toll volatility is shunned.

11. A recent review of cancelled private infrastructure projects between 1990 and 2001 from around the globe revealed that about 6% of toll roads (mostly in Mexico and Hungary) were cancelled during this period representing about 16% by value of the private investment in the sector. The main factors behind these cancellations of toll road projects were misforecasting traffic and flaws in agreement preparations.

12. A concept of toll pooling to mitigate traffic risk is being adopted in Switzerland, Germany and Austria where additional network wide weight distance toll systems recover new funds from the trucking industry. This has

better public acceptance. A portfolio investment approach is also used, like toll pooling where risk is shared among various toll projects of the concessionaire. For example, as of 2002, Road King Infrastructure Limited (RKI) of Hong Kong. RKI had a portfolio of 22 toll road projects in China covering about 1,000 km, mainly operating with joint venture partners for specific projects.

The need for agency like Highway Regularity Authority is required to be understood in study undertaken. Bank depicts a host of risks associated with BOT project and theoretically Bank has recommended who will share what risk and this is interesting to be seen for selected cases in the undertaken study.

2.5.3 Indian Issues in Infrastructural Investment: National Highway Development Programme

Knowing the fact that National Highway Development Programme is the unprecedented massive investment programme for development of (National Highways and influencing development of State Highways as well) literature on highways in India is mainly focused on this programme, National Highway Authority of India (the implementing agency) and related policies. The critics keep on reviewing so far achievement of this programme and found generally in agreement that the intentions are very ambitious and appreciable but there is outcry over slow progress and various implementation issues.

Mihir Rakshit (2006) has provided insight in understanding issues in planning and implementing NHDP.

The author analyses National Highway Authority of India (NHAI) portfolio and its operations. NHAI's cash inflows have so far consisted of current receipts like cess, government grants, external assistance in terms of loans and market borrowings but mostly dominated by cess plus government funding that explains why capital expenditure of the Authority has remained modest (around total Rs. 35000 crores for 1999-2006 and Rs. 29,000 crores of it done through cash contracts) so far. The exorbitant need for substantial increase in investment over the period 2005-15 (estimated Rs. 2,20,000 crores) can take recourse to two modes of financing the

required expenditure. The first is market borrowing and the second relying on private entrepreneurs to invest in highway projects. NHAI does contemplate debt financing of expenditure on highways. Since NHAI is required to operate under a hard budget constraint, it has to be ensured that (expected) current receipts are sufficient to meet current costs on account of maintenance and operation as well as debt servicing. The Core group (GOI) has suggested limit on borrowings to be set by the Finance Ministry should be such that debts can be serviced out of the projected cess revenue. The Core group estimates 67% of investment to flow in terms of BOT (Toll) projects and 14% in terms of BOT (Annuity i.e. instead of direct tolling, Government pays annuity for 15 years) i.e. a lion share of 81% through PPP for 2005-2015. If likely investments in already undertaken and committed phase I and II are separated, this share of PPP is expected to be 98.5% (83.5% in terms of BOT (Toll) and 15% in terms of BOT (Annuity)) for 2005-2015 (NHDP phase III to VII). Hence the issues pertaining to PPP (rather BOT (Toll)) are most vital; author addresses issues concerning- the optimality of the scale and pattern of investment; modes of its financing; options relating to recovery of costs; and efficiency in project implementation and risk management. The major arguments are:

- Since the tolls are not mopping up all benefits of a road project, not even user benefits are fully mopped up, the scale of investments from private sector will turn out to be socially suboptimal. The profitability criterion will inhibit the private sector from taking up many projects socially beneficial. The toll levels are not set considering economic benefits and that is most important reason in loss of social welfare[5].

- The prospective yield from a toll road will be higher at later stage and this will have very significant effect on anticipated discount rate by private investors and hence most Greenfield projects turn out to be unattractive for them. The author notes that private builders have shown willingness to undertake BOT (Toll) projects against negative grants[6] when the projects are for widening of existing highways already burdened with heavy traffic and connecting important commercial centers. But there are few takers for projects in the North East and relatively backward areas.

- The NHDP is chalked out based on social rate of returns whereas PPP is governed by private returns. But upfront grant being offered by NHAI and fiscal incentives do help to small extent in attracting PSP. The viability gap funding is limited by budget constraints on NHAI and the fiscal incentives are too meager to raise the flow of private funds to socially optimal level.

- NHAI is going against golden rule of public finance which says government shall meet current expenditure from revenue receipts (cess and tolls) and capital expenditure from borrowings. NHAI has no borrowing plans and if it thinks, the Ministry limits borrowings (including annuity payments) such that they can be serviced out of the projected cess revenues. Absence of deep private bond market and uncertainties of project outcomes, lumpiness of project assets tend to raise anticipated private discount rate much higher than the rate at which NHAI can borrow. **PPP in highway construction may have a number of advantages, but financing is not one of them.**

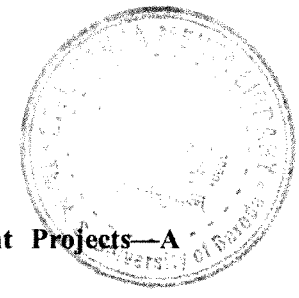
- A network based dynamic tolling is felt necessary which may require some links toll free for some period. Also, concession period shall not be too large otherwise NHAI loses the flexibility in setting tolls. Tolls are not only appropriate means of cost recovery. Other modes of user charges (in addition to cess and project land development lease) shall be explored for cost recovery of road investments. Issues related to cost recovery and financing of projects have to be resolved for the package as a whole, rather than for each project separately.

- Efficiency and allocation of risks under PPP seems not designed optimally. What is lacking is **Public Sector Comparator** like UK for ex ante and post evaluation BOT projects. It is suggested to lessen burden of demand risk on toll projects while for annuity projects, escalation clauses may be added. The 15 % rate of return given for 15 years in annuity projects seems to be baseless.

- Whatever the reason, most people intensely dislike paying taxes—something which also must be counted as social disutility. It constitutes costs of taxation and the burden to the society of an increase in government's current expenditure which is not covered by an associated rise in non-tax revenue.

- If the NHDP is financed by government, the interest savings and cost saving due to lesser taxes to be collected accrues to the treasury. Considering conservative estimate of the private rate of discount for highway projects at 15-20 per cent, the gap between the private rate of discount and the government's borrowing rate exceeds 8 per cent and the annual saving in government's interest payments on account of NHDP 2005-15 would be more that Rs. 14,400 crores which is illustrative short sighted policies for reducing fiscal deficit turning up seriously counterproductive.
- One way is for the government itself to supply the required finance to the concessionaire, but at the market rate of interest so that the gains due to government's lower borrowing rate accrue to the Treasury. But it is necessary that the builder's own fund (i.e., equity capital) should form part of total finance and that the government would provide the loan against some guarantee(s) from reputed financial institutions. The type of financial arrangements outlined above is in fact similar to the Credit Guarantee Finance (CGF) used in the UK for funding some of the infrastructural projects under recent Private Finance Initiative (PFI).

Thus author has apprehension for the socially suboptimal investment in highways under NHDP owing to flaws in planning and managing this programme. The emphasis on BOT (Toll) can be understood looking to the percentages of share expected from BOT projects in overall NHDP and justifies study of BOT (Toll) projects in the study undertaken.. The arguments for scale of project in terms of investment and concession period are debatable. Author suggests bundling of projects and this requires checking capacity of NHAI and private sector if they can handle this scale? Of course inadequacy of tolls and supplements in terms of user charges (may be congestion charges?) or credits can be tested for making a BOT project viable. Author sees, if BOT projects are turning up commercially viable under given risks and market conditions, the mode selected for NHDP may serve the purpose considering all the stretches under NHDP are socially desirable. Thus the study under taken for viability of BOT (Toll) projects can be guiding in pursuing social goals contemplated in NHDP.



2.5.4 Potential For Refinancing of NHDP Private Investment Projects—A Credit Perspective:

Mukherjee (2004) sees very good possibilities for refinancing the existing debt in case of private investment toll projects under annuity mode by securitizing future annuities receivable from NHAI. Mukherjee expects some of the annuity projects scheduled for completion to come up for refinancing shortly. In annuity projects, concessionaire takes on the construction and Operation & Maintenance risks but market and political risks are underwritten by NHAI. The concessionaire is paid for 15 years by the NHAI annually at agreed sum hence there is a secured stream of cash inflow.

Since the refinancing of existing debt would take place after completion of construction, the new debt investors would not be exposed to completion risks. The NHAI has put some fair requirements for carrying out O & M works and thus new investors are exposed to performance risk on O & M. Since these are all experienced builders and O & M requirement are modest, this risk is negligible. However, ICRA suggest appointment of a trustee to see that annuity does not suffer on part of O & M norms. Also, to deal with flaws if any, in design of main work (which will heavily increase O & M) the trustees shall be allocated more funds for O & M.

Second is counter-party risks associated with NHAI. In Mukherjee's opinion, the counter-party risks associated with NHAI for its ability to meet the contractual annuity payments over a 15-year period, are very low looking to meager size of annuity projects and huge funding from cess, tolls, support from multilateral agencies etc. The following clause of concession agreement is relieving original lenders (mostly commercial banks) -Where there has been a default by the concessionaire, the termination payment would amount to 70% of the book value of the assets as on the termination date. If there has been a default by NHAI, the termination payment would amount to the discounted value of future net cash flows, determined on the termination date. Mukherjee hints at availability of a "reasonable" surplus to be generated from operational cash flows for the new debt investors; from reduction in the amount of debt raised; from the building up of an up-front cash collateral/debt service reserve account, or from external credit support like bank guarantee/stand-by Line of Credit. Apart from the high leverage, interest rate risks could affect to these

transactions. Hence, Mukherjee suggests a fixed rate debt structure for such transactions to improve credit quality.

This is good reference to see credit perspective of refinancing which is in this report is for annuity mode. Looking to cash flow problems and risks with BOT (toll), if the annuity mode is taken up on larger scale, the refinancing from all the perspectives as above will not be attractive for new investors. Any way, the annuity mode is not a favoured business since the mode does not distribute the risks to private investors for utilizing efficiency of PSP. Though the above paper attempts to evaluate the credit quality of transactions under annuity mode but the concept is equally applicable for BOT (toll) projects if the project reaches to stable cash flow after initial cashflow deficits. The undertaken study is intended to link up such refinancing with some renegotiations of contract (e.g. toll rebates) for stabilized BOT (toll) projects.

2.6 PLANNING AND MANAGEMENT OF TOLL ROADS:

Literature regarding tolling of road facility and financial implications for investors as well as planners is covered in this section. Here, the issues related to project formulation and project management are explored at micro level.

2.6.1 Evaluation of Financial Viability of BOT Transport Infrastructure Projects:

In Indian perspective, structure of a BOT project with various factors of concern for planners of private sector participation in roads is nicely discussed by Esther (1997). She enlists uncertainties and hence the risks associated with surface transport project and present a stochastic simulation model for evaluating a proposed hypothetical BOT project. For simulation, basic inputs are: policy parameters (construction period, concession period and toll rates and these are endogenous to project), macro economic indicators (interest rate, discount rate, inflation rate, D/E ratio, traffic growth rate these are exogenous to project) and stochastic variable (construction cost, maintenance cost, operation cost and traffic volume). For a given data of policy parameters and macro economic indicators, financial indicators namely NPV, IRR and PBP are found out by random selection of stochastic variable assuming they are random variables. NPV and IRR are derived for 150 to 200 simulation runs (Monte

Carlo Method) for various values of stochastic variables. A sensitivity analysis is also performed assuming change in one of policy or macro economic indicators. This study is expected to give most useful risk profile for the promoter and sponsor of the BOT project.

She concludes: **1.** while evaluating BOT project, in addition to threshold values of financial indicators, cash flow (liquidity) adequacy shall also be checked. **2.** The simulation results derive most important conclusion that unlike public sector projects time overruns can prove fatal for the financial viability of the project.**3.** Determination of toll structure is a complex task as it is a trade off between user acceptability and financial viability of the project. Toll-traffic elasticity plays important role in making of NPV and IRR.

She has extended the conceptual simulation model to incorporate impact of corporate tax, Debt service terms and D/E ratio on financial viability of BOT Projects in a separate paper. The same hypothetical case study with little changed input data is discussed in this separate paper (Esther 1998).

The period of writing this paper (in fact it is based on own Ph D work) is around year1996 when BOT was a strange word for road sector. She has relevantly explained various operational theoretical aspects of BOT project and assessed factors affecting viability (NPV, IRR and PBP) of a BOT project. The BOT projects are now more structured since feasibility studies are undertaken and conditions of concession agreement are often modified to suit to site conditions. A major new aspect now a day is definition of tollable traffic which is quite project specific. It is different than observed traffic before taking up project and hence alters traffic census based viability of project adversely. The leasing of tolling rights, income from development rights of project area, grant support/negative grant and fees levied on revenue on individual project basis, inelastic supply of road space as compared to need of growing traffic leading to congestion, toll capping/toll compensation etc. affect viability quite big way. These aspects were not envisaged by Esther in her study.

2.6.2 Traffic Risk in Start – Up Toll Facilities:

Standard and Poor's research (2002 and updated in 2003) on traffic risks in a privately financed road project depicts problems with forecasting of traffic and credit implication of such projects. The authors caution bond holders and lenders to check traffic forecasts in terms of some parameters identified in this paper while analyzing cases of 32 toll roads. The excerpts are:

- Out of 32 projects, 28 overestimated traffic (overoptimistic) and only four underestimated (in case of shadow tolls mostly). On average traffic volumes were 70% of predicted. A Traffic Risk Index is suggested for evaluation of such project prospects. When an update (2003) was made increasing sample size to 68 case studies then also the mean of actual to forecast traffic ratio remained around 70%.
- Level of toll tariffs and subsequent adjustments, misunderstanding willingness to pay, recessions and macro economic growth, particularly lower turn out of trucks, future land use plans actual time savings, information of existing and planned toll free options, tolling history/culture, scale and duration of ramp up period/ catch up period, who has prepared forecasts (sponsors or lenders), is it toll on point of use or shadow tolling, forecast horizons (shorter the time horizon , more reliable predictions), toll payment mode used etc. and hence it is not merely mathematical exercise to fore cast based upon past trends on then un tolled conditions.

This is guiding research work intended for investors who generally get carried by traffic forecasts published in the prospectus of toll projects. The authors also expect the planners to develop case wise models taking above aspects in mind. The most important aspect discussed in this work is "Ramp Up" period. Ramping up of cash flow of a toll road to stability during initial few years is most cumbersome that affects viability of the project. This is the period where issues of guarantees surfaces to survive the condition of lower than expected traffic and fixed obligations like debt servicing.

2.6.3 Renegotiation of Infrastructure Private Projects - Key Aspects:

Since toll roads are much complex projects than cash contracts (where payment is linked to predetermined milestones in civil construction work), often the there is conflict of interests between project sponsors and concessionaires leading to dispute and sometimes termination or renegotiation of contract. This section is most vital for understanding sustainability of private sector participation in roads. Guasch (2004) has explored issue of disagreement over agreed terms while actually managing the contract. Guasch's main objective in his work is to aid in the design of future concessions/regulations and to contain the incidence of inappropriate renegotiation. He explores the aspects of the concession award process, the contract design, the regulatory framework, and the overall governance structure and their ability to drive the success of any reform effort and the likelihood of contract renegotiation.

Guasch has reviewed over 1000 concessions mainly executed in Latin America and Caribbean region during 1985-2000 for various infrastructure facilities including roads (276 number were for transport sector) mainly dealing with the regulatory risks.

Guasch argues:

- Often investments in infrastructure are sunk costs, that is, costs that cannot easily be recouped or salvaged if the economic atmosphere deteriorates. After investments by private initiative, high sunk costs may tempt governments to behave opportunistically, taking regulatory actions that expropriate the available quasi-rents once costs are sunk. This can discourage potential investors from investing, or an additional premium is required. That possibility is the main source of regulatory risk, affecting levels of investment, costs of capital, and tariffs, because additional premiums are required to cover that risk.
- The government, however, is not the only entity that may behave opportunistically. Once an enterprise has been granted a concession or franchise that enterprise may take actions that "hold up" the government, for example, by insisting on renegotiating the regulatory contract ex post, or by

regulatory capture to extract super normal rents from the users, to the detriment of efficiency.

- The 30% of total sample of 1000 concessions were found renegotiated. For individual sectors, it is observed that 74% of concessions in water and sanitation works and 55% of transportation projects were renegotiated. But in case of more competitive sectors like telecom and energy this was in lesser extent. Though the concessions were awarded after competitive bidding, the renegotiation was not done so. The 85% of renegotiated concessions underwent renegotiation within first four years after award of the work (that is observed for total samples) and this average for transportation sector was 3.1 years after award of work.. Almost 75% renegotiation was related to investment obligation on the part of operators. When the bids were focused on lowest tariffs, almost 60% went for renegotiation. The occurrence of renegotiation was 46% for concessions finalized with competitive bidding and this was only 8% for directly negotiated bids. The 56 percent concessions were regulated through a price-cap regime and about 20 percent of the concessions were regulated through a rate-of-return regime, while about 24 percent had a hybrid regime. Based on these pricing regulations, the concessionaires were leading in demanding renegotiation in 83% of cases when the pricing was based on price cap. The Government was found leading in demanding renegotiations in 34% of cases when pricing was based on rate of return. In hybrid pricing, concessionaires demanded in 44% of case to lead the renegotiations. In total samples, concessionaires requested renegotiation in 61 percent of cases, whereas Government initiated renegotiations in 26 percent of the cases. In the remaining 13% of cases both the concessionaire and the government jointly sought renegotiation. Mostly, the operators managed to fetch commercial benefits as an outcome.

The high incidences of concession renegotiation are attributed to weak regulatory governance, politics (political cycle and opportunism), flawed contract design, and external shocks. The requirements for a successful PSP for any infrastructure project are concluded by author as:

- Competitive concession award process
- Proper concession design
- Proper regulatory framework
- Proper sector restructuring
- Regulatory credibility
- Clear rules for and limits to government and regulator discretion
- Respect for and enforcement of the sanctity of the bid at the time of the auction
- Minimal opportunities for frivolous and opportunistic renegotiations
- Dissuasion through financial incentives of opportunistic renegotiations and development of a credible commitment to the non renegotiation of opportunistic petitions
- Costly unilateral changes of the agreed-upon contractual terms of the concession
- An incentive-based regulatory framework
- Appropriate regulatory and antitrust legislation
- Autonomous regulatory institutions, well-trained and well-compensated professionals, and effective enforcement
- An appropriate set of regulatory instruments, such as a regulatory accounting system, cost and financial models, and benchmarking referential data
- Competition in the provision of services in as much as it is feasible.

Harris et al. (2003) have reviewed cancelled private infrastructure projects that is similar to above work of Guasch, briefly reviewing cancelled infrastructure projects based on PSP during 1990-2001. The developing countries rushed towards PSP from 1990s and during 1990-2001, 2500 projects reached financial closure attracting US$750 billion for various area of infrastructure. Only 48 projects were cancelled among them but 15 of them were from Mexican toll road programme. The water and sewerage projects confronted controversies over price increases and collection from consumers as earlier public run systems were charging very low and had poor rate of recovery leading to cancellation of projects. For toll roads, traffic forecast were fatally overestimated and it worsened the viability when users showed less willingness to pay and alternate free roads were overused. For example, more than half of the Mexican toll roads reached less than 50 % of the forecasted volumes and some guarantees

offered by Mexican government led to selection of those roads which were otherwise unlikely to be selected. The authors however see the proportion of failure a meager one, since many others have survived by renegotiations and expect better prospects for PSP.

Engel et al. (2001) suggest a renegotiation-proof criterion: the least present value of revenue (LPVR), an extremely attractive mechanism that awards concessions to bidders who submit bids with the LPVR. Under this approach a concession agreement has a flexible end point that comes when agreed level of revenue is secured. Any event that leads to a shortfall in revenues is automatically handled by extending the length of the concession (which may not be acceptable to financiers) and is suited to concessions in which service quality does not affect demand, as with roads, bridges, and dams.

The work by Guasch (2004) Harris et al. (2003) and Engel et al. (2001) guides to accept scope of renegotiation as eminent for concessions granted on road projects. As seen above, the renegotiation could be taken up from either concessionaire or Government. In the Indian context, concession agreements provide steering group mechanism to sort out such issues with out resorting to legal proceedings. The steering group is consisted of one member each from State and Central Governments and one from Concessionaire. The Indian concession agreements also provide further steps of dispute resolutions where claims and counter claims are settled through semi legal proceedings. Though *de jure* renegotiations for concessions is not yet known in Indian literature, many BOT projects are under various steps of such mechanism as found from discussions with State Government and NHAI offices. Any renegotiation or reference to dispute resolution mechanism is indication of change in working conditions that are not covered under agreement and basically they are indicators of incomplete contracts.

2.6.3 Operation of Toll Roads, Bridges and Tunnels in Selected Places:

Lam (2006) has made a desk research study of five toll projects selected in consideration of the special features of their operations, particularly the toll adjustment mechanisms and forms of ownership. The study covers aspects like-background of the project; terms of concession and the mode of private sector

participation; financing of the project; toll policy, toll rate levels and adjustment mechanism; cap on profits or rate of return (if any); financial performance and financial reporting; and dispute resolving mechanism and re-negotiation framework (if any). Lam is neither deriving any generalized policy implication nor giving any analytical inferences but provides good cross sectional comparative analysis of selected five toll projects in terms of planning and management issues.

Among these five cases, three are briefly referred hereunder. The first case is about 91 expressways in California (US). It is found most referred in literature as a case of renegotiation by State to protect public interest (reflecting public nature of roads) just because of a clause embedded in agreement that prevented improvement of free ways around expressway for protecting commercial interests of private concessionaire. After taking over by public authority in January 2003 (private sector had started tolling in December 1995), the expressway has remained tolled continuing tolling based on congestion pricing. Basically all of these cases are evidence of various risks borne by private sector under agreed set of conditions for that project.

Similarly, second case of The Dulles Greenway of the State of Virginia (US) is also interesting to refer. The main feature of the project is it is initiated by a group of private entrepreneurs based on area development potential but with out area development rights. In absence of "non- compete" clause, and recession in Virginia hampered early years of operations leading to refinance the debts and temporary slashing the toll rates to half in 1996. After two refinancing, the increased project debt also pushed concession term from 2036 to 2056. Lam has observed that project has not yet seen any profit but is estimated to make after 2010. This project is classic example of private enterprise in green field conditions taking up project risk[7] with out guarantee on returns.

The third case of The Eastern Distributor in Australia is a six-km expressway including two tunnels and mostly three-lane in both directions which is built keeping Sydney 2000 Olympics in view, on a Build-Own-Operate-Transfer (BOOT) basis. The project was financed by over AUS$500 million of tax-free infrastructure bonds. The main feature is, apart from the construction cost, Concessionaire must pay Public body concession fees in accordance with a schedule (an annual fee of AUS$15 million payable for 24 years starting from 1997 wherein some installments can be

deferred until reaching a specified level of return and an annual cash payment equal to 10% of its cash surplus for the remaining term of the 48-year lease) in lieu of the right to levy tolls. This was possible due to estimated high potential of project. A feature that generated criticism was regarding increase of toll rate at 1% every quarter of year or increases in inflation which ever come higher.

All five cases are reflection of current PSP practices world over and main lesson is, a contract between Government and private investor is most likely to meet various risks specific to project and Government is likely not to behave like business partner owing to public nature of roads.

2.7 WILLINGNESS TO PAY FOR TOLL ROADS:

This is most critical part of study on toll roads since every country is envisaging users to pay for use though reforms required concurrently are still pending. The concept is derived from classical theories of consumer surplus and establishing savings to road users (Heggie 1972). The viability of any toll project hinges on fulfillment of this aspect overcoming political risks during the long period of toll operations.

2.7.1 Willingness To Pay for Access Control Expressways:

Senbil & Kitamaru (2004) take changes in consumer surplus into account and describes compensating variation (CV), which is the amount of income that an individual is ready to pay to keep his utility as it was before a change; the other is the equivalent variation (EV), which is the money individual is ready to accept alongwith low level utility. They are termed as willingness to- pay-WTP (to attain the gain) and willingness-to-accept-WTA (to accept the non-occurrence of the gain) respectively. In this study, they try to estimate willingness-to-pay for expressway service by using a stated preference survey[8] with hypothetical settings. It is a part of large size congestion pricing survey for users of the Hanshin Expressways network wherein some hypothetical questions were asked. The respondents were asked to choose between a toll road and surface streets with different travel times (duration) and travel time variability. The stochastic regression analysis confirmed existence of concealment of WTP, i.e. difference between real WTP and reported one. Secondly, WTP for expressway was found structurally changing with risk level on the surface

streets. Also, commuters who use the expressway daily, value the use of it higher than less traveling respondents, females appreciate it better than males.

2.7.2 Estimating Willingness To Pay with Random Valuation Models - An Application to Lake Sevan, Armenia:

Basically willingness to pay surveys are found having genesis from study of Environmental economics. But they are used by transport planners also using same conceptual framework in framing of questionnaires of such studies for roads. Wang et al. (2004) have presented a case study of willingness to pay (WTP) estimation using random valuation models. A contingent valuation survey is presented for the estimation of WTP for people of Armenia for the protection of Lake Sevan. An open ended, closed ended and stochastic payment card (SPC) approaches with split random sampling is tried and the results are used in constructing WTP models with heterogeneous errors. It is concluded that the SPC approach produces a higher result than others viz. open and closed ended while latter both produces similar results. Also, the mail surveys were found estimating higher WTP than with personal interviews.

Both of these studies referred above are useful in exploring user's preferences in a road development project undertaken on direct tolling basis. As seen in above literature, the preferences and their attributes are statistically verified for their significance in explaining WTP and it forms basis of acceptable policy framework.

2.8 CONCLUSIONS:

The review of literature is concluded with following observations.

1. The review of international literature brings in light that PSP or its financially depending format of PPP is not a new paradigm for supply of roads. The private sector had been developer and provider of this utility on its own initiative which saw demise on the eve of nationalization of roads. The diminishing financial capability of Governments (including US) has brought back private sector participation in development of roads world over. But present investment needs in road sector are unprecedented and two important

aspects of PPP namely viability of private investment projects and public acceptance of road pricing are most important for planning and managing such projects. The externalities associated with roads create many issues in regulating private provision of this public utility.

2. The PPP for any road project is long term investment made by a private investor assuming certain risks under given set of conditions of agreement (representing role of government) and since the returns are directly linked to road users, the interface with public (representing role of public) forms very important third dimension of this process. A basic requirement for a successful toll road project is that it should attract sufficient traffic (establishing traffic worthiness) so that project benefits will exceed project costs. But the traffic for the future is never projected reasonably and hence all three pillars of PPP i.e. private sector, sovereign and users suffer in such projects.
3. The uncertainties attached to the long term concessions of public utilities attract high rate of renegotiations instead of cancellations. The Government also initiates such renegotiations but in all the cases the concessionaires generally snatch good financial benefits.
4. The unprecedented level of private investment envisaged by Government of India seems to be most difficult task as the international experience of such nation wide programme is discouraging and suggests about 10 % of privately financed toll roads.
5. The literature review in general leads to conclude that the objectives of study undertaken are very much contemporary and Indian PSP aspects at planning and management level of road project are worth attending. The anticipated mega level private sector participation under the lovely term "Public-Private Partnership (PPP) " for development of highways specifically by Central Government of India (including NHAI) is very much in congruence with international thrust for similar action in respective countries (including affluent nations) which is perhaps late in this country.

To enter the very arena of study, next chapter explains frame work of PSP in a limited case of basic tenets of PPP and thus design of Concession for road project. The Concessions were developed and explored by European countries and hence

international experience of PPP is also explored to build up understanding of Concession based road projects.

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End Notes:

1. Under Build- Operate- Transfer (BOT) format, a private entrepreneur not only builds the road/bridge with own funds but extending the role beyond a typical construction firm, he also recovers investments through users' charges on agreed terms. In such projects, mainly the risk of earning through tolls under uncertainty of traffic is key aspect for bidding except in cases wherein returns are assured.
2. The subject matter search made on Google.com for Public- Private Partnership (PPP) in highways (roads), Private Sector Participation (PSP) in highways (roads) or Toll Roads lists enormous literature and further linkages on the subject.
3. How ever, the present approach of consultants engaged in PPP in India allowing toll rates based on two third of savings to the users owing to improved service level of a facility and involvement of public funds up to 40% of project cost seems working on this concept. In this case, the share from externalities for project cost is believed to be covered under involvement of public funds or through general taxation. A best remedy that can be suggested would be applying zonal or corridor development approach which will spread the cost and benefits over a wider group of population.
4. Such clause is like support agreement for not creating any competing facility that can attract tollable traffic of concerned concessionaire. It is however noteworthy to mention that many concessions in India are still having such "non- compete" clause but without mechanism to compensate if such case arises.
5. This argument by Rakshit seems like externalities discussed by Block (1983).
6. The negative grant means bidder of a BOT project offers some share of anticipated profit in lieu of right for concession which is unusual since PPP is always discussed for some viability funding or agreement support like no parallel free routes shall be developed during tenure of concessions. The

recent example is Six Lanning of Vadodara- Bharuch stretch of 70 km on NH-8 where L&T bagged the BOT project at estimated project cost of Rs.660 crores with concession period of 15 years (i.e. up to Year 2021 including 2.5 years of estimated time for construction) offering negative grant of Rs. 471.0 crores.

7. The project is designed with estimates of benefits to users and with assumption of takers of such benefits. Here, the area influencing the commercial viability of project did not pick up expected growth and thus traffic was not generated to expected level. A similar case is found in State of Gujarat where considering development potential of Dahej port area, State PWD put up a BOT project for bridge (year 1999-2000) in lieu of level crossing on a State Highway. The PWD had no role to accelerate or influence the development of Dahej port neither it was within purview of Concessionaire. The Concessionaire could not recover investment within stipulated toll period due to delayed development of Dahej port. Now actually Dahej picked up, State PWD has taken up (2007-08) four lanning of complete stretch including that bridge connecting Dahej with NH-8. Again the recent project is not sharing any project risk or traffic risk.

8. State preferences & Revealed preferences are two specific type of surveys performed in assessing willingness to pay for a commodity/service wherein first case is applicable when preferences are straightway asked in monetary terms as they are quantifiable. However, both cases actually belong to Environment Economics wherein subject matter is not a market commodity.

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