Challenges of Risk Allocation in Public Private Partnerships

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What is the Objective of Policy?

Objectives

1. Award of project
2. Successful completion
3. Successful service provision
   - Is successful service provision the objective?
     - National highways and transfer of toll risk
     - Major Ports/ Airports and bidding on revenue share
     - Telecom USO Funds and a 20,000 crore surplus
     - 3G auction and unit size

- Is revenue generation / reduction in fiscal costs an objective?

- Is risk transfer the objective?
- Illusionary risk transfer
  - Post-award imposition of airport development fee
    - What does one get in return?
  - The Total Project Cost (TPC) game
  - Service provision in social infrastructure
    - What are the output parameters and how does one measure them?

My view on Objectives

- The primary purpose of physical infrastructure, even by a narrow economic viewpoint, is to support economic activity, which in turn will generate fiscal revenue, but not primarily be a source of revenue generation in itself, while that of social infrastructure, such as education and healthcare, is to build and maintain human capital in as equitable a manner as possible to support economic activity
- The objective of PPP is to harness the profit motive of the private sector to improve consumer service rather than government revenue
  - There is a need to distinguish between transferring performance risk to the private sector, which is usually desirable, and transferring revenue risk, which may not be advantageous unless private sector can influence usage

Why PPP?

- The objectives of the PPP policy are as follows:

1. Provide sustainable and efficient services by utilizing the efficiencies, innovativeness and flexibility of the private sector
2. *Leverage government funds to attract private investment for development of infrastructure projects*
3. Delineate roles and responsibilities of institutions, government agency or local authority in PPP projects
4. *Provide financial support for PPP projects*
5. Provide a transparent, consistent and efficient mechanism for procurement of PPP project

- Recent State PPP Policy with IFI support

- The overarching objectives of such partnerships are:

1. Harness private sector efficiencies in asset creation, maintenance and service delivery;
2. Provide focus on life cycle approach for development of a project, involving asset creation and maintenance over its life cycle;
3. Create opportunities to bring in innovation and technological improvements;
4. Enable affordable and improved services to the users in a responsible and sustainable manner.

- Draft National PPP Policy

My approach to PPP

- Rationale
  - **PPP is about efficiency <u>only</u>, not about funding**
  - PPP is about life cycle approaches
    - merging construction and maintenance
- Evaluation
  - **Committed (future) expenditure and foregone (future) revenues need to be approached similarly in fiscal terms**
  - Risk transfer in PPP needs to recognize the possibility of renegotiation
    - Contractual arrangements need to be examined for the possibility of renegotiation.
- Features
  - Government remains accountable for the provision of services
  - Arrangement for service provision, not asset construction
  - Private sector needs to have substantial investment
    - compared to the life cycle cost of the project
  - Payment to the private sector needs to be performance related and outcome based
  - Specificity of context
    - limitations of overly standardized approaches

Regulation

Regulation

- Insulate the sector from politics / politicians
  - Democratically elected politicians will not raise tariffs
  - Bureaucratic / Technocratic agencies will
  - Democratically elected politicians will accept these decisions
- Selling the fiction (?) that it is outside political control
  - Democratic context

- Incorporate politics in sector development in a discursive and transparent manner
  - Attempt to insulate sector from politics is misguided
  - Political Justification of decisions is a necessity in a democracy
- Transparent dispute resolution
  - Building institutional memory to do so

Regulator and the Market

- What role should a regulator play vis-à-vis the market structure?
  - Network and Non-network infrastructure have very different implications
    - Electricity Transmission
    - Oil / Gas Transmission
  - Scarce and abundant resource
    - Distinction is not clear, but exists and varies over time
    - Telecom spectrum, Natural resources, Port sites
- Which regulator?
  - Sector or Competition regulator
- In PPPs
- Ensure that the private sector is adhering to the contract
- Recommend on amending contractual relationships when required
  - Private sector should be allowed to make better returns by improving efficiency but not cut costs by cutting corners
  - Also, over a 15-20 year period, it is quite likely that contracts will need amendments

Experience of Risk Allocation in Indian Infrastructure PPP

(Mis?)Allocation

- Ports and Airports
  - Bidding on highest revenue share
    - Neglecting competition
    - Ignoring renegotiation
    - Overcharging users
- Power
  - Tariff Bidding, with options for indexation
    - Neglecting renegotiation scenarios
    - Over-reliance on market wisdom
- Oil and Gas
  - Non-linear revenue shares
- Telecom
  - Spectrum defined over large Licensed Service Area (LSA)
    - Neglecting character of spectrum
    - Avoiding trading
- Pipeline and Electricity Transmission Networks
  - Bid on tariffs
- Highways
  - BOT (Capital Grant) Concessions
    - Neglecting renegotiation scenarios
    - Neglecting foregone revenues

Port and Airport Policy

Neglecting competition

Ignoring renegotiation

Overcharging users

Key Features of Port Bidding

- Terminal bids
  - Gross Revenue share is the bid parameter
  - Tariffs are determined by a regulatory body restricted to major ports, Tariff Authority for Major Ports
    - Major ports are those under federal control
    - Share of non-major ports rising

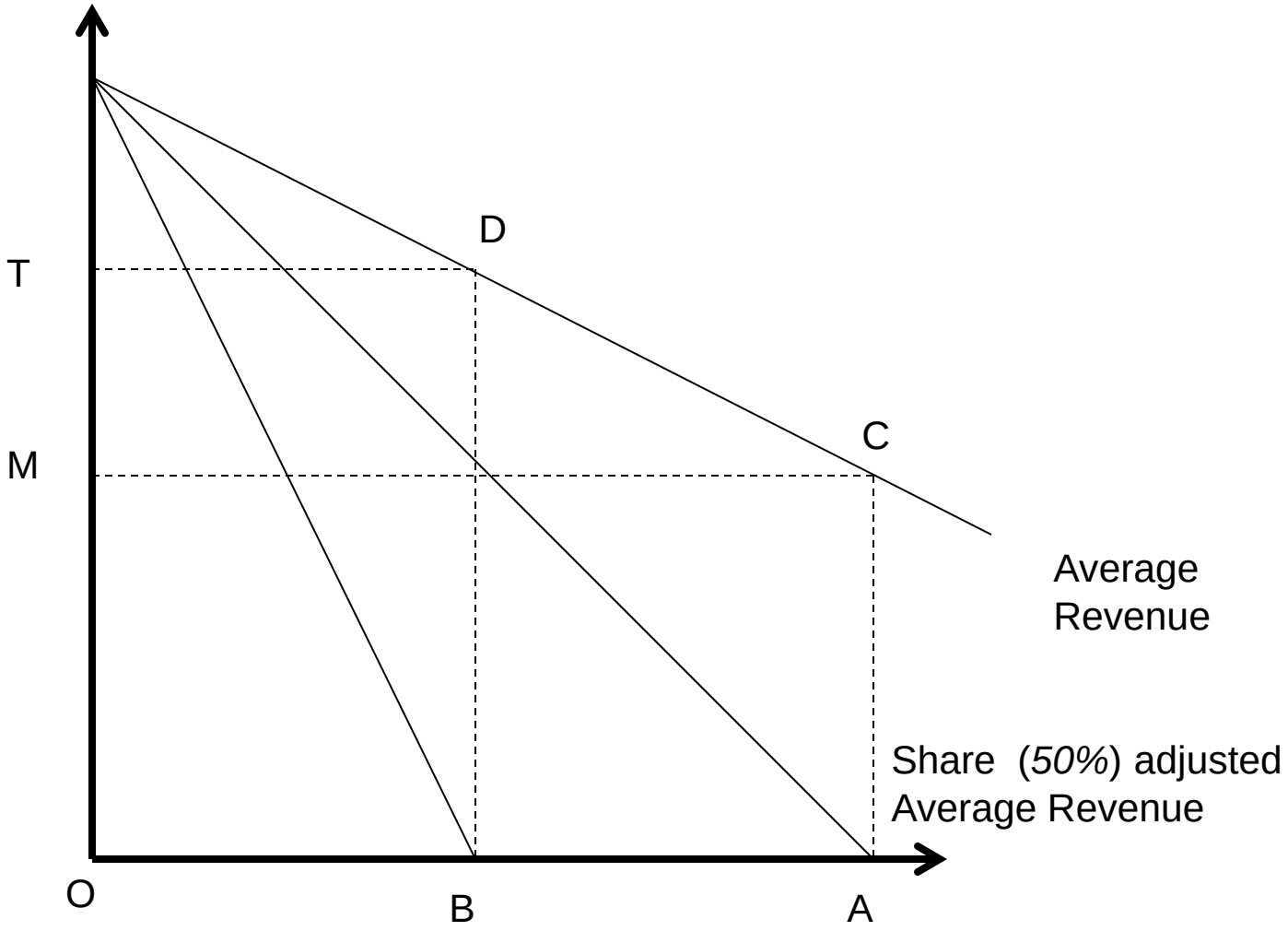
'Major' Ports of India

Source: Tariff Authority for Major Ports

Private Presence in Major Ports

Port	Private Terminal Operators			Public
Haldia	Tata	L&T		KPT
Paradip				PPT
Vishakhapatnam	JM Baxi **DP World**	Gammon		VPT
Chennai	**DP World**	**PSA Sical**		CPT
Tuticorin		**PSA Sical**		TPT
Kochi	**DP World**			KPT
New Mangalore				NMPT
Mormugao	JSW Steel **ABG**			MoPT
Mumbai	Gammon			MPT
JNPT	**DP World**	APM Terminals	**PSA ABG**	JNPT
Kandla	Adani	**ABG**		KPT
Mundra	*DP World*			
Karachi	*DP World*			
Colombo	*DP World (pre 2007)*	*APM (post 2007)*		

Revenue Share Bidding and User Fee



User Fees can be less than half

- Without a (50%) revenue share, user charges could be cut (in half) and port would still generate enough revenue to operate efficiently
- To the extent that the concessionaire prices as a monopolist, user charges could fall even further and usage increase
- Without sharing revenue, a monopolist would set price at OM and quantity at OA
- If s/he had to share 50% of the gross revenue, the quantity supplied would drop to OB and price rise to OT
  - In 2011, actual bid by PSA International and ABG Ports for JNPT'S 4th terminal was 51%

Objectives of Port Policy

- Intra Port competition
  - Multiple firms in a port
- Inter-port competition
  - Road and rail connectivity
  - Coastal monopoly
    - Competition oversight
      - Diversion? http://www.dnaindia.com/money/report_mundra-port-gains-thanks-to-jnpt-pipavav-and-kandla_1699560
- TAMP does not oversee competition
  - Only a tariff fixing body
  - Tariff orders ignored
    - http://www.livemint.com/2012/06/07222923/Port-tariff-regulation-faces-t.html
- Are port auctions about allocating scarcity or creating capacity?
  - Short-term
  - Medium-term
- Is Tariff bidding a solution?
  - Proposal to bid out port terminals after specifying a tariff path
  - Does not treat ports as a possibly competitive sector
- ***Move away from revenue share to concession fee***
  - ***Invest in connectivity to spur inter-port competition***
  - ***Free tariffs and improve oversight of intra port competition***

Airports: same structure - renegotiated

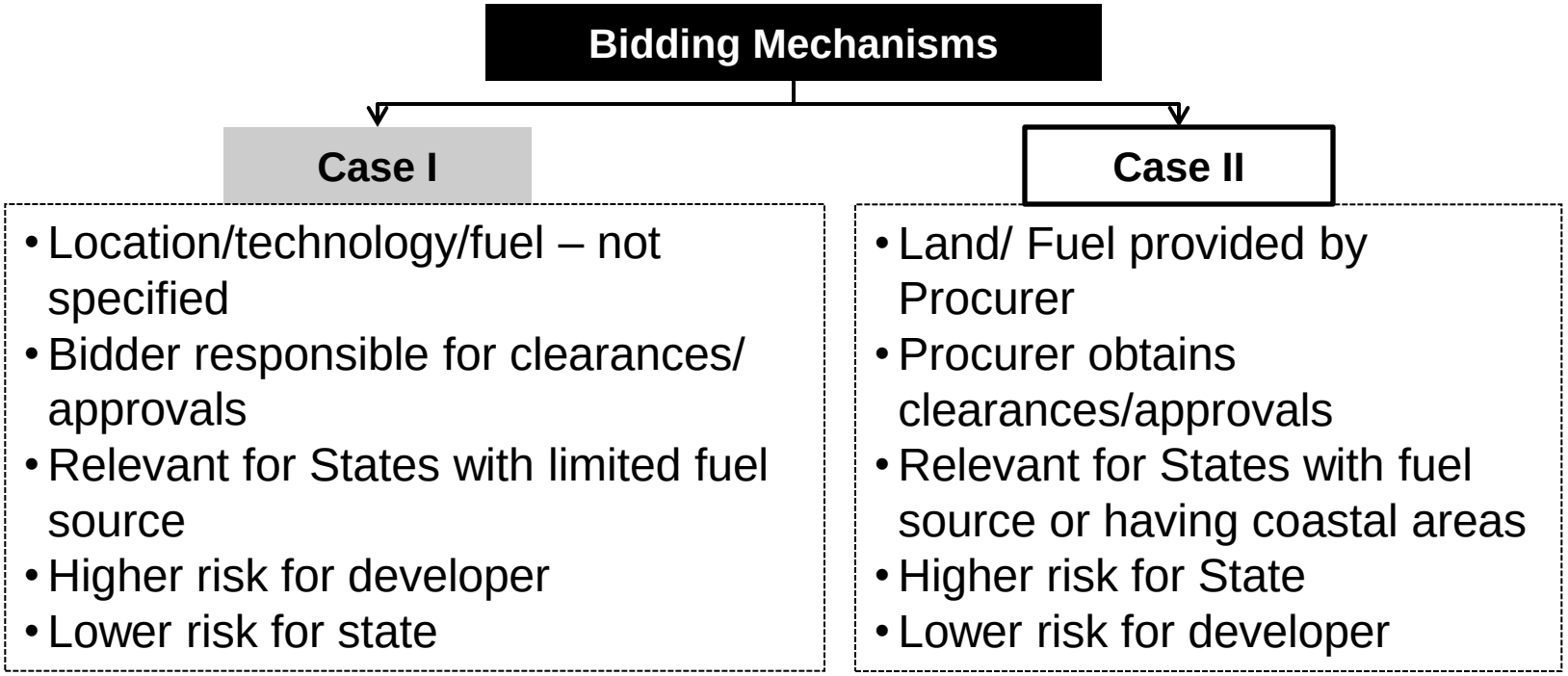
- **January 2006:** GMR consortium sole technically qualified bidder as per Sreedharan Committee
  - Matches Reliance bid of 45.99% (Original bid of 43.63%)
- **February 2009:** The Central Government grants approval for levy of Development Fee (DF) @ Rs. 200/- per departing domestic and @ Rs. 1300/- per departing international passenger under section 22 A of the Airports Authority of India Act, 1994, purely on an ad hoc basis, for a period of 36 months w.e.f. 01.03.2009.
  - About 5 million international and 10 million domestic passengers embarking at Delhi
- An annual cash flow of over USD 170 million a year over and above the agreement
- **April 2011:** The Hon'ble Supreme Court in its judgement dated 26.04.2011 held the letter dated 09.02.2009 of the Central Government (vide which the approval of the Government was conveyed for levy of DF by DIAL), as *ultra vires* the AAI Act, 1994
- **November 2011:** AERA approves the continuance of the levy as a gap filling revenue source
  - "[AERA noted that] neither the OMDA nor the SSA have any provisions pertaining to the levy of DF"
  - But …
    "DIAL have stepped into the shoes of AAI for the purposes of clause (a) of Section 22A. Therefore, the levy and collection of DF is a power statutorily conferred upon DIAL. "

Power Policy

Neglecting renegotiation scenarios

Over-reliance on market wisdom

Bidding Mechanism – Case I and Case II



- Competitive Bidding Guidelines specifies parameters of bid submission, tariff structure, bid evaluation, payment mechanism and security structure
  - **Multi-part tariff structure with separate capacity and energy components of tariff form the basis of bidding**
  - For medium-term procurement of power, a single part tariff or a firm price for each year along with availability is to be used.

Source: Association of Power Producers, presentation to FOIR June 2011

Market 'wisdom' for Case I bids

Domestic Fuel Based

Project Name	Capacity Charge		Fuel Charge		Inland Transportation	
	Non Escalable	Escalable	Non Escalable	Escalable	Non Escalable	Escalable
RJ - Stage I - Adani	✓		✓	✓		✓
GJ - Stage I - Adani	✓		✓			
GJ - Stage I – Aryan	✓	✓	✓	✓		
GJ - Stage II – KSK	✓		✓			✓
MH - Stage I - Adani	✓		✓			
MH - Stage I - Lanco	✓		✓			
MH - Stage II – IB	✓		✓	✓		✓
MH - Stage II - Adani	✓		✓	✓		✓
MH - Stage II - Emco	✓	✓		✓		✓

Imported Fuel Based

Project Name	Capacity Charge		Fuel Charge		Overseas/Inland Transportation		Fuel Handling	
	Non Escalable	Escalable	Non Escalable	Escalable	Non Escalable	Escalable	Non Escalable	Escalable
GJ - Stage I - Essar	✓		✓		✓		✓	
GJ - Stage II – SP	✓	✓	✓		✓		✓	
GJ - Stage II - Essar	✓	✓	✓		✓		✓	

Source: Gayatri Gadag, Ashwini Chitnis, Shantanu Dixit **Transition from MoU to Competitive Bidding** :Prayas Pune March 2011

Consequence and Lessons

- Projects are now stalled since the increase in fuel prices and depreciation of the rupee have made them unviable at the bid tariffs
  - Shift to tolling plants proposed?
- But…
  "*According to power companies…severe fuel shortages, high coal prices and delay in green clearances are hurting the sector*."

- If market wisdom is to be relied on then it is necessary to ensure that private sector bears consequences of its folly
  - Looks increasingly unlikely

- ***If not, minimum/ common mandatory escalation in tariff bids may be needed even at some possible cost of efficiency***
  - ***Counterbalanced by reduction in the costs of renegotiation***

Telecom Policy

Neglecting character of spectrum

Avoiding trading

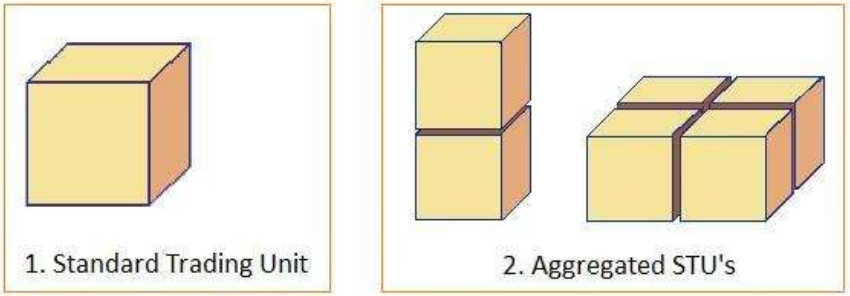
Spatial Features of Spectrum

- Spectrum seems to be scarce in India
- Actually, it is only 'scarce' in a few densely populated urban locations
  - Not clear if scarcity is due to inadequate investment in towers
- Other areas are excess in spectrum
  - Prices should be close to zero
  - Since bidders pay/ expect to pay high prices for spectrum in urban areas, these prices carry over to other areas too

- Licensed Service Areas (LSAs) congruent with telecom circles, i.e., states
  - Mixes areas that are both abundant and scarce in spectrum
  - Does not allow rural spectrum to be separated by trading
  - Determines spectrum availability by availability across the LSA
- ***Auction smaller geographical units***
  - ***Aggregate revenue may remain the same but places with excess spectrum may get more service providers***

Works elsewhere…

Population density area	Map grid	Approximate area
outback	3 degrees of arc	330 x 330 km
rural	1 degree of arc	110 x 110 km
metro and regional	5 minutes of arc	9 x 9 km



- [Standard Trading Units] *may be visualised as cubes of spectrum space that cover a geographic area horizontally and bandwidth vertically. The geographic area is equal to a cell of the* ***spectrum map grid*** *published by the ACMA. Cells of the spectrum map grid vary in size according to the population density area in which they are located*

Source: http://www.acma.gov.au/scripts/nc.dll?WEB/STANDARD/1001/pc=PC_300235

Oil and Gas Exploration

Skewed Incentives

Neglecting renegotiation scenarios

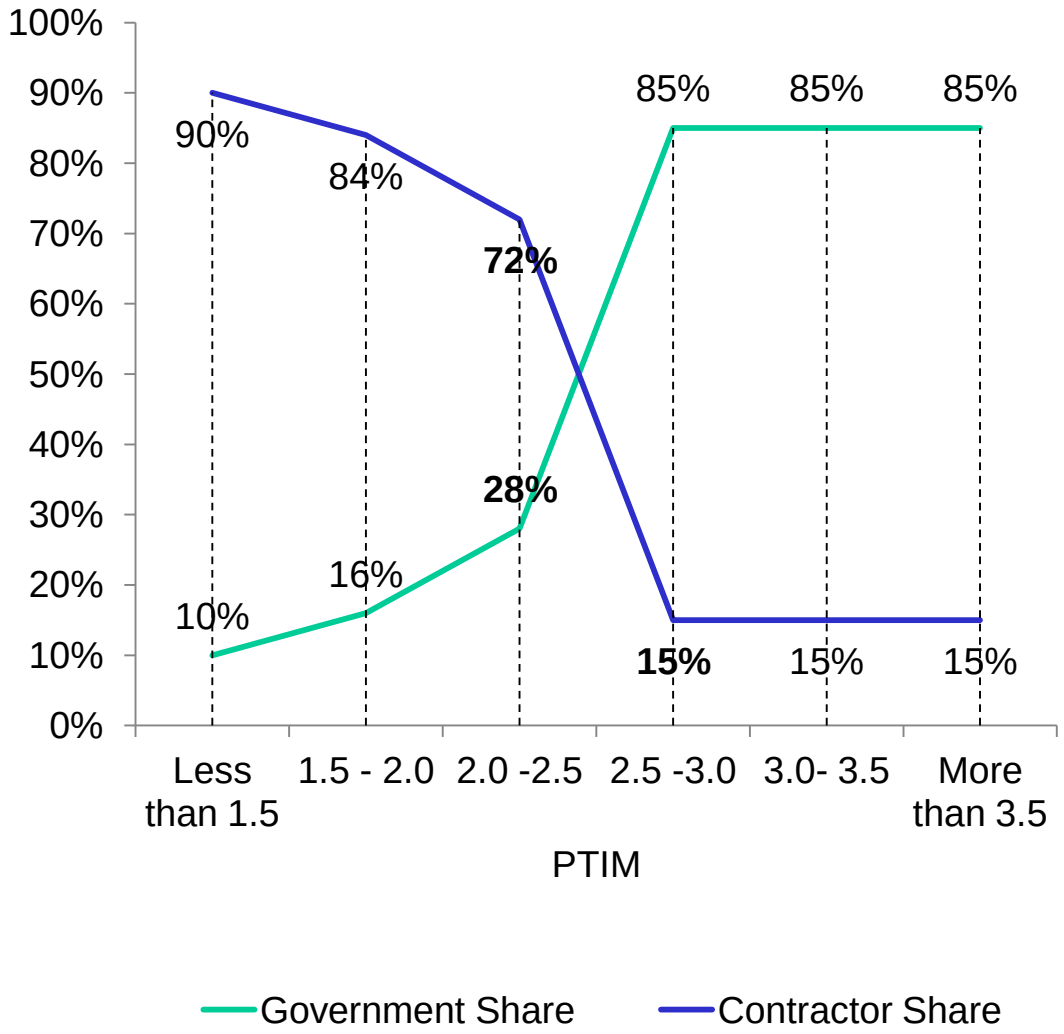
Production Sharing Contracts

Pre-tax investment margin (PTIM) is related to cumulative investment by operator relative to net profit

If PTIM is less than 2.5, operator gets 72%, if it is greater than 2.5, operator gets 15%

What is the incentive for the operator?

Since then, Indian bid structures have been modified to make the relationship more linear



Network Infrastructure

Tariff Bids vs. Revenue Bids

Bidding for Transmission

Tariff Bids

- Linking revenue to usage may not be a good idea
  - Network usage insensitive to tariffs on sections
  - Usage inherently difficult to forecast
    - Private sector may at best bring in some forecast efficiency
  - Little benefit, but a significant addition to both financing and institutional costs

Revenue Bids

- Availability Payments on the revenue
  - Only based on capacity, not on usage
  - **Risk**: Regulator determines capacity, not market
- Alternative is LPVR bid structures
- Controllable and Uncontrollable Risk
  - Only those risks should be transferred to the private sector that it is better able to manage

Highway Policy

A Special Case of Network Infrastructure

Neglecting renegotiation scenarios

Neglecting foregone revenues

October 24, 1998

"The Government will start, within this year and from twenty different places across the country, work on a major 7000 km road project. It envisages a six-lane North-South corridor connecting Kashmir to Kanyakumari and a similar East-West corridor connecting Silchar to Saurashtra. The project, which is expected to cost Rs. 28,000 crore, will have the scope for maximum private sector and foreign participation. This project also has the potential to create as many as three crore man-years of employment, which will be a major contribution to the realisation of the national goal of "Berozgari Hatao". Cement concrete pavement will be the preferred technology in this, as well as other ongoing projects for four-laning of our national highways. We expect the move to give a big boost to our cement industry, which is facing the problem of excess capacity and also to the construction industry."

– Speech of Prime Minister at Annual General Meeting of FICCI

October 24, 1998

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– Speech of Prime Minister at Annual General Meeting of FICCI

Reactions at the time

"*How can a feasibility study of such a huge project be done within a few hours? At present we do not even have four-laned national highways*

… Just because a populist announcement has to be made and the cement and construction business have to be given a boost, they ask us to prepare a plan for cross-country highway at a few hours notice."

– Ministry Official

"Frankly, I've reached a stage where until it happens, it hasn't taken place." The Rs 28,000 crore highway project, for example, he said had not really been worked out as yet -- no feasibility or any study had been done on it by anyone so far -- and was more a wish than anything else."

– Senior Industrialist

Moving Beyond Skepticism

Overall Status of NHDP (June 2011)

Sl. No.	NHDP Component	Total length (km)	Completed 4 lane (km)	Under Implementation		Balance for award of civil works (km)
				Length (Km.)	No of Projects	
1	NHDP Phase I	7522	7384	138	19	-
2	NHDP Phase II	6647	4934	1267	100	446
3	NHDP Phase III	12109	1968	5373	75	4768
4	NHDP Phase IV	20000	-	765	5	19235
5	NHDP Phase V	6500	443	1857	16	4200
6	NHDP Phase VI	1000	-	-	-	1000
7	NHDP Phase VII	700*	-	41	2	659
8	Miscellaneous	615	159	456	5	-
	Total	55093	14888	9897	222	30308

* Stand alone Projects

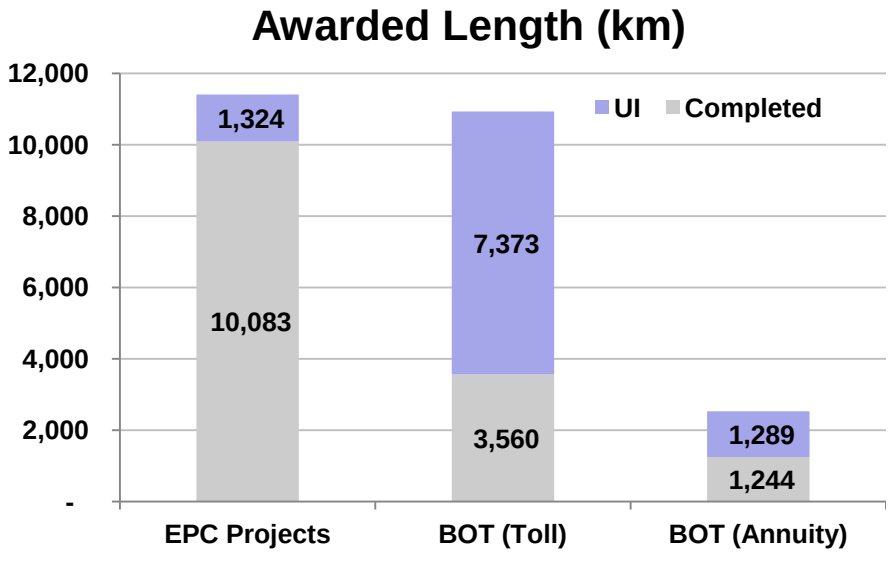
Source: http://www.pppinindia.com/pdf/Workshop_Jaipur_2011/raghav_chandra_nhdp_june2011jaipur.pdf

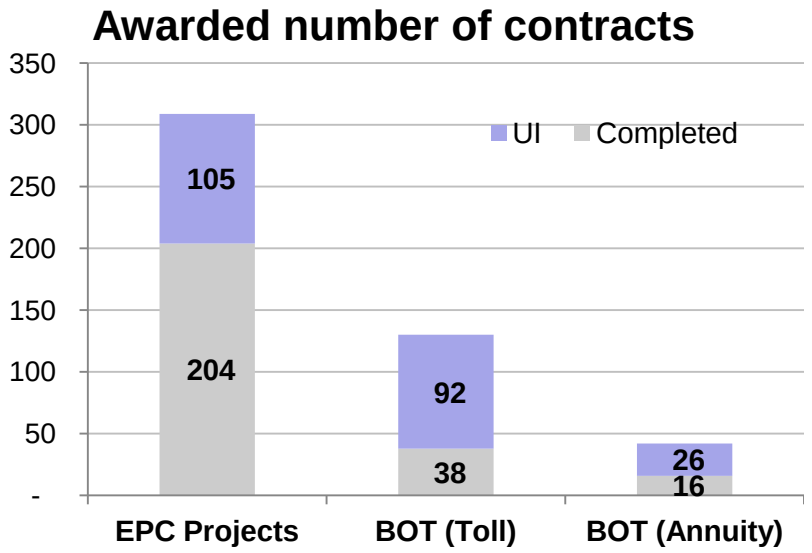
…but, many right actions taken

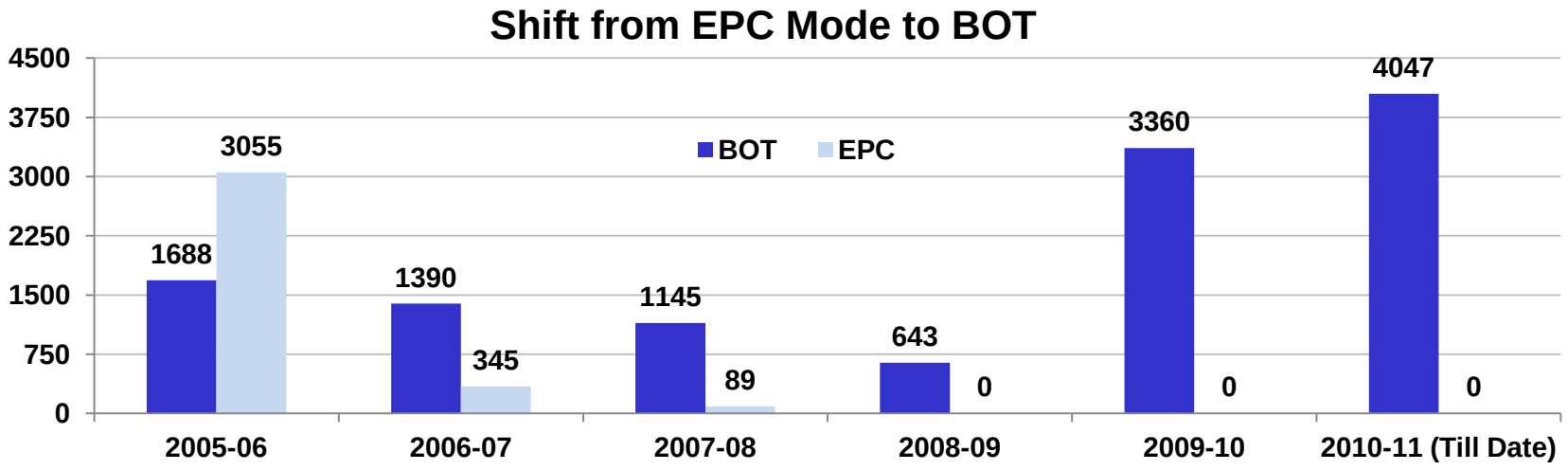
- Doable beginning
  - Golden Quadrilateral
- Designated agency and program approach
  - NHAI
  - EFC clearance for GQ as one project
- Dedicated funds
  - Road Fund
- Design of new contracts
  - BOT Concessions
- Development of domestic capacity
  - Many new contractors

Implementation Models

Choice of Three Models







Source: http://www.pppinindia.com/pdf/Workshop_Jaipur_2011/raghav_chandra_nhdp_june2011jaipur.pdf

BOT (Toll – Capital Grant)

BOT

- Well built and easily maintained highways
  - The merging of construction and maintenance responsibilities provides an incentive to the construction firm to build a good road to reduce its maintenance cost later

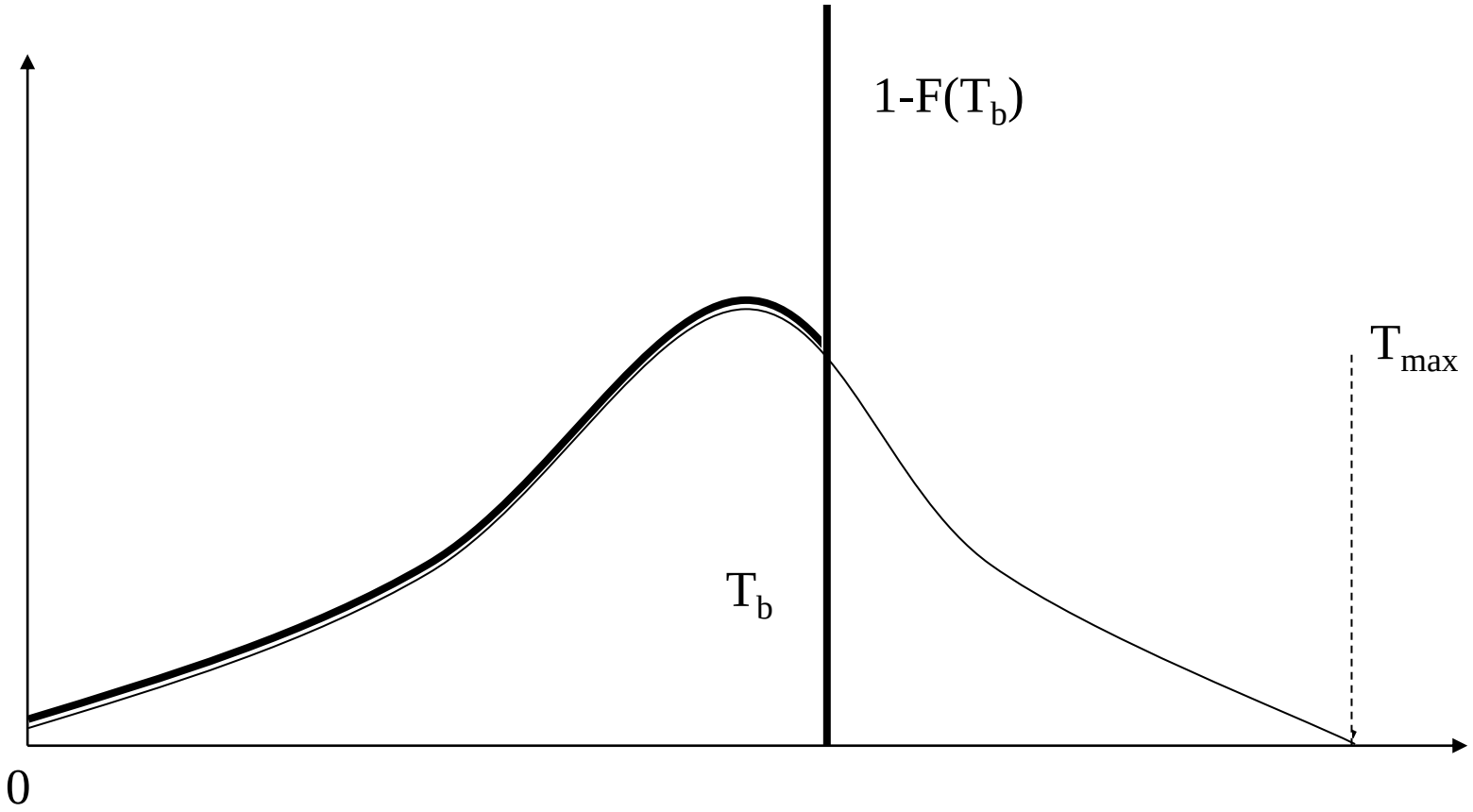
Toll (Capital Grant)

- Assumption that toll collection by government agency is likely to be lower than that of the private concessionaire
  - Assuming toll leakages similar to commercial losses in electricity
- Grant can be negative too

Electronic Tolling

- Rationale for Toll - Capital Grant model is affected once a move is made to electronic toll collection
  - difference between toll collection by the government and the private sector will reduce substantially and could even disappear
- New models of contracting become possible
- Makes a unified barrier-free national network feasible
  - Report on selection of ETC technology
- Increases benefit to road users
  - Reduces stoppages
    - Reduces informal imposts
- Improves revenues
  - Reduces cash transactions
- Generates network traffic flows

Renegotiation => Expected Revenue Loss



Why Expected Revenue Loss?

- **If grantors decided to collect its own tolls, its expected revenue would have been $\int t\, f(t)$ over the range [0, Tmax].**
- **Under the renegotiation-adjusted situation. The expected revenue, $\int t\, f(t)$ over the range [0, Tmax] can be separated into:**
- **$\int t\, f(t)$ over the range [0, Tb] and $\int t\, f(t)$ over the range [Tb, Tmax],**
  - i.e. E(t) over the range [0, Tb] times F(Tb) plus E(t) over the range [Tb, Tmax] times (1-F(Tb)).
- **This second component is more than Tb (1-F(Tb)) since E(t) over the range [Tb, Tmax] is more than Tb.**

- **Symmetric collection costs between the grantor and private operators**

So, Government loses money on every BOT (Toll – CG)…

- Government loses money on every BOT (Toll – CG) concession
  - If the toll revenues exceed forecast, the private operator keeps the surplus, which would have come to government
    - MCA has a few tweaks to mitigate this possibility
  - If the toll revenues are less than forecast, the private operator renegotiates or quits
    - Either way, government has to spend more money
  - Government still has the downside, but does not get the upside
- If foregone revenues are counted, it is a fiscal negative
  - Acceptable trade-off when public collection efficiency was low
- Projects become too risky for insurance and pension fund money
  - Limited access to long term funds

Proposal

Choosing a Model

Four Costs

- Transactions Cost
- Agency Cost
- Monitoring Cost
- Foregone Options Cost

Four Characteristics

- Maintenance Integrated/ Separated
- Toll Integrated/ Separated
- Periodic Traffic Integrated/ Separated
- Project Revenue Integrated/ Separated

Four Costs

- Transaction cost
  - contract negotiation
  - renegotiation
  - dispute resolution
- Monitoring cost
  - Monitoring compliance of the contractor during construction
  - Monitoring compliance with maintenance requirements
- Agency cost
  - Gaming possibilities during (i) bidding and (ii) construction
- Foregone Options cost
  - Missed opportunities to:
    - Add capacity
    - Build alternative facilities
    - Introduce electronic pricing systems
  - Important for high-growth countries

Comparison of Costs

	Transaction	Agency Cost		Monitoring	Option Cost
		Bid Related	Construction Related		
BoQ/EPC	High	High	High	High	Low
OMT	High	High	N.A.	Low	Medium
BOT – CG	High	High	High	Medium	Very High
BOT – AP	Low	Low	Medium	Medium	Low
LPVR	Medium	Low	Medium	Medium	Low

BOT – AP and LPVR

- Does not transfer either traffic or tolling risk, which drives the renegotiation, bid gaming and foregone option cost for the others
- How important is it to transfer these risks to the private sector?

Traffic Risk

- Transferring traffic risk may not be a good idea
  - Only those risks should be transferred to the private sector that it is better able to manage
  - Private concessionaire has limited ability to manage traffic risk
    - network and corridor traffic are insensitive to tolls on sections
  - Traffic is inherently difficult to forecast
    - Private sector may at best bring in some forecast efficiency
  - Little benefit, but a significant addition to both financing and institutional costs
- Inflexibility of Tolling is a separate issue
  - State may need toll flexibility in developmental facilities

- But, traffic dependence may be needed to mitigate governance problems in project selection
  - Without this restraint, the investment programme can lead to unproductive public spending

Four Characteristics

- Maintenance Integrated/ Separated
  - Private concessionaire has responsibility for both construction and maintenance, usually over a substantial part of the design life
- Toll Integrated/ Separated
  - Responsibilities of toll collection transferred to the private concessionaire
  - Toll integrated BOT concessions are also revenue integrated
- Periodic Traffic Integrated/ Separated
  - Periodic revenues of the private concessionaire depend on the number of vehicles using the facility
- Project Revenue Integrated/ Separated
  - Revenues of the private concessionaire depends on the overall project revenue
    - Project traffic and revenue can be integrated without periodic traffic being integrated

Desirable Characteristics

- Maintenance integrated
  - Combination of construction and maintenance contracts provides self-reinforcing incentives for good construction
- Toll separated
  - Should not foreclose the option of changing the tolling mechanism
  - Transferring tolling risk also transfers traffic risk
- Periodic Traffic separated
  - Transfer of periodic traffic risk increases cost without benefit since private sector does not manage traffic better
- Project Revenue integrated
  - Project revenue dependence needed for oversight of private sector due diligence on the public sector's project selection

Classification by characteristics

	Toll-Integrated	Toll-Separated
Periodic Traffic Integrated	Lump sum Toll Contract Direct Toll BOT concession	Annual percentage Toll Contract Shadow Toll Concession
Periodic Traffic Separated	Long-term Fee Toll Contract Direct Toll LPVR Concession	Construction Contract BOT (AP) and Shadow LPVR Concession
Colour Legend **Blue** : Project Revenue Integrated **Black :** Project Revenue Separated **3-D Legend**		**Maintenance Separated** **Maintenance Integrated**

Maintenance Integrated

	Toll-Integrated	Toll-Separated
Periodic Traffic Integrated	Direct Toll BOT concession	Shadow Toll Concession
Periodic Traffic Separated	Direct Toll LPVR Concession	BOT (AP) and Shadow LPVR Concession
Colour Legend **Blue :**Project Revenue Integrated **Black :** Project Revenue Separated **3-D Legend**		**Maintenance Separated** **Maintenance Integrated**

Toll Separated

	Toll-Integrated	Toll-Separated
Periodic Traffic Integrated		Shadow Toll Concession
Periodic Traffic Separated		BOT (AP) and Shadow LPVR Concession
Colour Legend **Blue** : Project Revenue Integrated **Black :** Project Revenue Separated	**3-D Legend**	**Maintenance Separated** **Maintenance Integrated**

Periodic Traffic Separated

	Toll-Integrated	Toll-Separated
Periodic Traffic Integrated		
Periodic Traffic Separated		BOT (AP) and Shadow LPVR Concession

Colour Legend
Blue : Project Revenue Integrated
Black : Project Revenue Separated

3-D Legend

Maintenance Separated

Maintenance Integrated

Project Revenue Integrated

	Toll-Integrated	Toll-Separated
Periodic Traffic Integrated		
Periodic Traffic Separated		Shadow LPVR Concession

Colour Legend

Blue :Project Revenue Integrated

Black : Project Revenue Separated

3-D Legend

Maintenance Separated

Maintenance Integrated

Shadow LPVR concessions

- All the benefits of LPVR Concession
  - No protection needed from competing facilities
  - Well-structured renegotiation, if needed
  - Present value of revenue (as bid) is protected (not guaranteed)
- ‘Shadow Tolls’ specified in the concession agreement and actual traffic determine revenue
  - Actual toll collected can differ from ‘shadow toll’
- Contract can include penalties for non-performance
  - Deductions made from shadow toll payments due from contracting authority
    - Performance parameters objectively specified and independently measured
- Tolls collected separately by Government
  - Separate fee-for-service toll collection contracts
    - Can incorporate incentives

Risk Allocation in Different Structures

	Build Operate Transfer (BOT) Concession				Construction Contract	
Risk Type	**Direct Toll**	**Shadow Toll**	**Shadow LPVR**	**Availability Payment**	**Fix Price EPC**	**BoQ Civil Works**
Toll Collection	**Yes**	**No**	No	**No**	**No**	**No**
Traffic	**Yes**	**Yes**	No	**No**	**No**	**No**
Revenue	**Yes**	**Yes**	Yes	**No**	**No**	**No**
Maintenance Cost	**Yes**	**Yes**	Yes	**Yes**	**No**	**No**
Construction Cost	**Yes**	**Yes**	Yes	**Yes**	**Yes**	**No**
Performance Monitoring	**Market Based**	**Output Based**	Output Based	**Output Based**	**Input Based**	**Input Based**

Implications for Railways

Implications

- Facilities like Multi-modal terminals
  - Avoid mistakes of ports and airports and oil and gas
- Manufacturing facilities
  - They are not PPPs, they can be joint ventures
    - May be a long-term contract with a supplier
    - What are the terms of Metro Railways with rolling stock manufacturers?
- Network infrastructure
  - Carefully consider options before transferring traffic risk
    - Is LPVR an option?

find purpose, the means will follow

Thank You

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Hyperlink Slides

BoQ/EPC Contract

- The preparation of detailed quantity estimates for the particular section to be contracted.
- Bidders are then asked to quote individual unit prices for the item involved.
- The selection process involves multiplying the unit prices into the estimated quantities to arrive at the estimated cost for each bidder.
- The tender is then awarded to the bidder with the lowest estimated cost.
- Payment is based on actual material used and the quoted unit prices in the contract

BoQ/EPC– Transactions Cost

- Inputs have limited ex-post observability
  - Several sources of variation from the original works contract that need to be negotiated
    - Drawings and technical specifications may not perform as expected in the field
  - Change of scope
    - Contractor prefers an alteration that maximizes his profits while the grantor prefers one that minimizes cost
    - Contractor can conceal information about design flaws and bid low, making profit from the change in scope
- Hence, there is considerable room for dispute

BoQ/EPC– Agency Cost

Unbalanced Bidding								
	Quantity		Bidder		Estimated Cost		Actual Cost	
	Est.	Act.	1	2	1	2	1	2
A	10	9	20	20	200	200	180	180
B	2	1	100	50	200	100	100	50
C	8	30	10	15	80	120	300	450
					480	420	580	680

Poor Quality

- use poorer quality or less of the material than specified in the contract because the person who is responsible for construction has no responsibility for maintenance

BoQ/EPC: Monitoring and Foregone Options

- Since payment is by quantity, there is significant monitoring costs,
  - Both the quality and quantity of items used are of limited observability after the road has been built
  - Limited incentive for the supervising engineer or consultant to undertake high quality inspections
- Since there are no deferred commitments to the contractor BoQ/EPC retains all options
  - Expenditure on toll plazas, if built may become stranded
  - Auctioning Tolls may limit some of these options

BOT (CG) and BOT (AP)

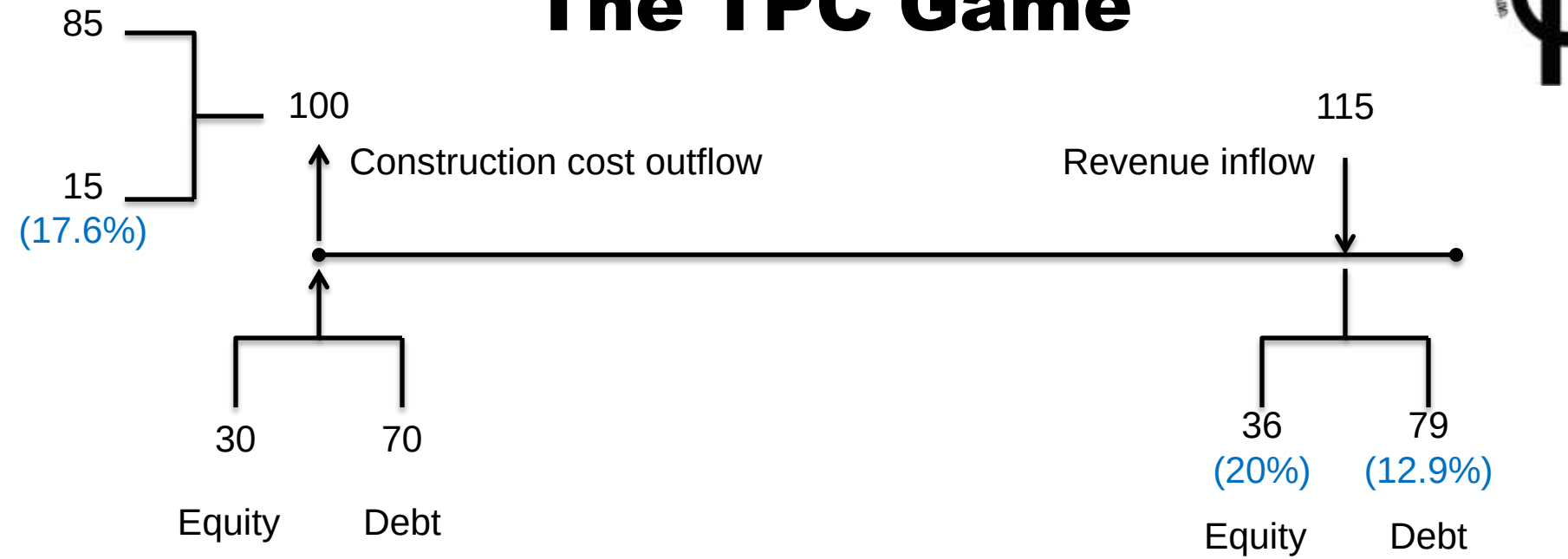
- BOT (Toll - Capital Grant)
  - Up front Capital Grant bid, which may be positive of negative
  - Responsible for construction and maintenance
  - Toll collection primary source of revenue
  - Adjustments to concession period based on traffic growth

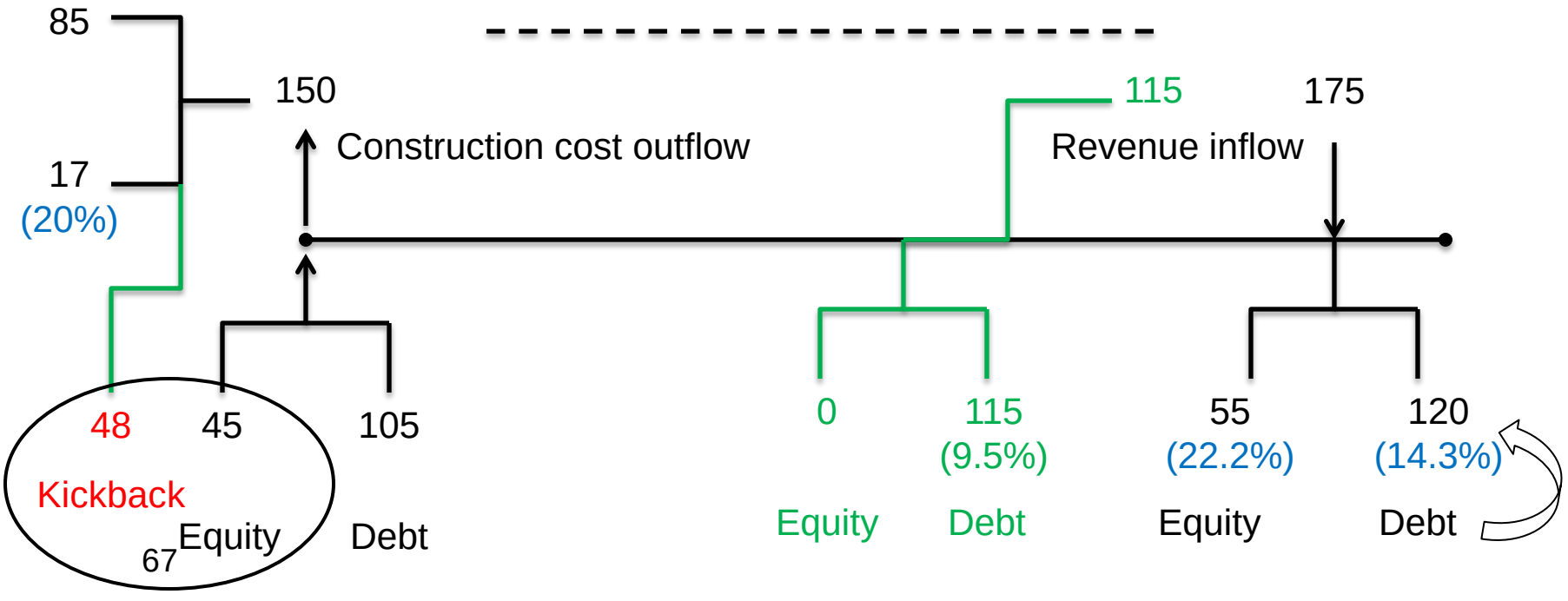
- BOT (Availability Payments)
  - **"BOT (Annuity)"**
  - Periodic Availability Payments
    - Conditional on meeting Verifiable Maintenance Parameters
  - Responsible for construction and maintenance
  - Toll collection done separately by government

BOT (CG) - Transaction and Monitoring Cost

- Can be initially lower than BoQ/EPC
  - Negotiations over the concession contract can be prolonged, especially for initial concessions
- But can be substantial if contracts are renegotiated
  - BOT concessionaires much keener to renegotiate because they are locked in for much longer
  - Toll roads seen as very renegotiation prone projects and often end in government takeover
    - Latin America, East Asia
- Monitoring costs are lower than BoQ/EPC since inputs do not have to be monitored
  - Based on assumption that sponsor has significant stake
- But performance would have to be monitored
  - No intrinsic incentive to maintain standards

The TPC Game


85
15
(17.6%)
100
Construction cost outflow
30
70
Equity
Debt
115
Revenue inflow
36
(20%)
79
(12.9%)
Equity
Debt


85
17
(20%)
150
Construction cost outflow
48
45
105
Kickback
67
Equity
Debt
115
175
Revenue inflow
0
115
(9.5%)
Equity
Debt
55
(22.2%)
120
(14.3%)
Equity
Debt

BOT (CG) – Agency Costs

- The lower expenditure on the road is likely to result in poorer quality and as a result, the road is likely to degrade faster and require more maintenance.
  - Sponsor is not too concerned since he is likely to earn a substantial return on its investment in the first few years and can thus afford to abandon the project.
  - The lenders left holding the bag and the grantor is left with a low quality road, after disbursing the grant.
- Grantor should be careful about aggressive bids
- Failure of due diligence on part of financial institutions,
  - Careful about projects accompanied by aggressive traffic projections and high construction cost estimates presented by sponsors who are also construction companies

BOT (CG) – Foregone option costs

- Usually includes Non-compete clauses
  - Affects Possibility of Expansion
- Usually specifies Toll Rates and Escalation
  - Affects toll flexibility
- Tolling technology decisions are locked in
  - Decision about the location of plazas, technology to be used, etc. is a decision of each individual concessionaire
    - Could vary between concessions
  - Not possible to establish an integrated national tolling system without substantial renegotiation of contracts
    - Many concessionaires makes this very unwieldy

BOT (AP) - Low Costs

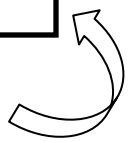
- Transaction Costs
  - Lower than BoQ/EPC and BOT (CG)
    - Negotiations over the concession contract can be prolonged, especially for initial concessions
  - Low probability of renegotiation
    - Unforeseen maintenance costs
- Low Agency Costs
- Monitoring costs are lower than BoQ/EPC since inputs do not have to be monitored
  - Monitoring costs may be higher than BOT (CG) since payments are conditional on performance
- No foregone options

What is LPVR (Least Present Value of Revenue)?

- The Bid is a discounted PV of gross revenue
  - The discount rate is specified upfront
  - Concession ends when discounted revenue collections equal bid by concessionaire
    - **Revenue monitoring is the key issue**
  - Makes any required renegotiation transparent
  - Can be used for both shadow and actual tolls

Key Benefit: Uncertainty in traffic is transformed into uncertainty about duration of the concession

- This type of risk (similar to an asset-liability mismatch) can be handled more easily by lenders



BOT (LPVR) - Low Costs

- Transaction Costs
  - Lower than BoQ/EPC and BOT (CG) but higher than BOT (AP)
    - Initially, may take some time because of new structure
  - Low probability of renegotiation
    - Well-structured mechanism for renegotiation requests
- Low Agency Costs
- Low Monitoring costs
  - Construction monitoring lower than BoQ/EPC since inputs do not have to be monitored
  - Performance Monitoring costs similar to others since payments are conditional on performance
- No foregone options
  - Well-structured mechanism for competing facilities