

Risk Management of PPP Projects

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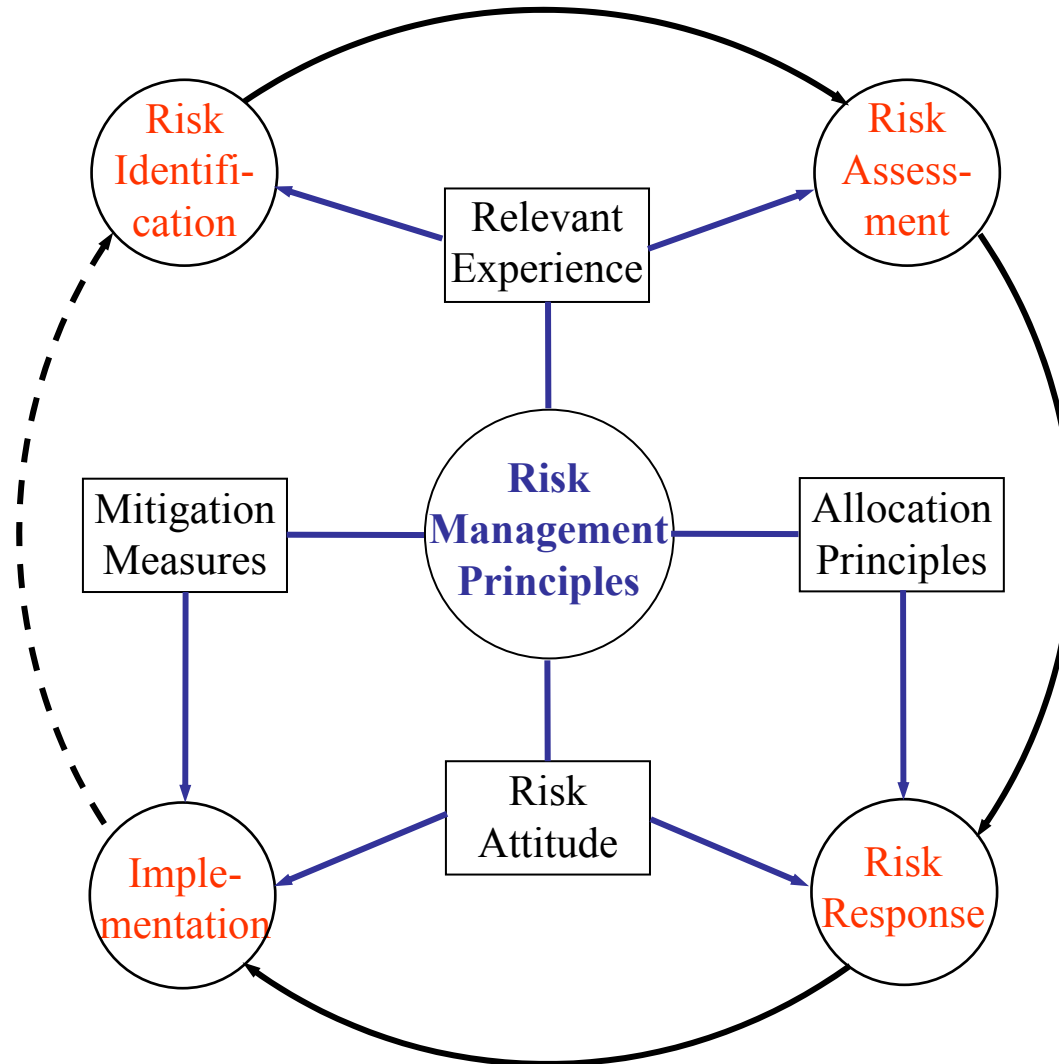
Tariff Design

Risk Definition

Vlek and Stallen (1981) listed six definitions which are all common in the literature. They are

1. **risk** is the probability of a loss;
2. **risk** is the size of the possible loss;
3. **risk** is a function, mostly the product of probability and size of loss;
4. **risk** is the variance of the probability distribution of all possible consequences of a risky course of action;
5. **risk** is the semivariance of the distribution of all consequences, taken over negative consequences only, and with respect to some adopted reference value; and
6. **risk** is a weighted linear combination of the variance of and the expected value of the distribution of all possible consequences.

Framework of Risk Management



Risk Identification

- **Site Conditions**
- **Approvals**
- **Environmental Risk**
- **Cultural Heritage**
- **Design Risk**
- **Construction Risk**
- **Force Majeure**
- **Tax Changes**
- **Changes in Law**
- **Changes in Law**
- **Corporate failure**
- **Technical Risk**
- **Operational Risk**

Principles of Risk Allocation

Max Abrahamson suggests the basic principles of allocating risks are that a party to a contract should bear a risk where:

- The risk is within the party's control;
- The party can transfer the risk, e.g. through insurance, and it is most economically beneficial to deal with the risk in this fashion;
- The preponderant economic benefit of controlling the risk lies with the party in question;
- To place the risk upon the party in question is in the interests of efficiency, including planning, incentive and innovation; and
- If the risk eventuates, the loss falls on that party in the first instance and it is not practicable, or there is no reason under the above principles to cause expense and uncertainty by attempting to transfer the loss to another.

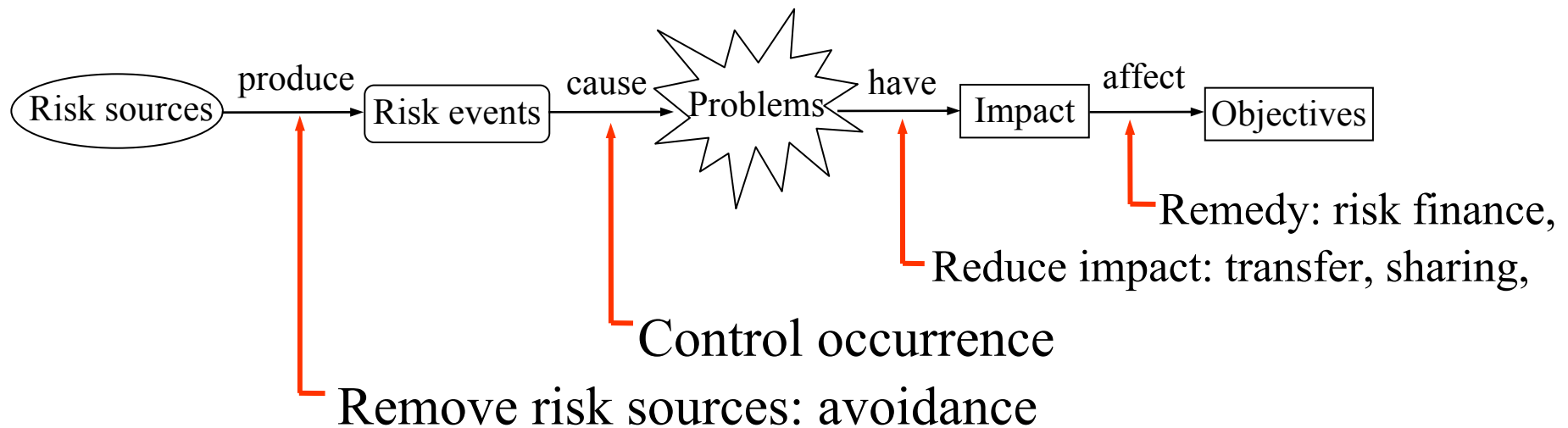
Principles of Risk Allocation

Similarly, **Robert J. Smith** (1995) thinks the generally accepted principles of risk allocation are:

- Risks belong with those parties who are best able to evaluate, control, bear the cost, and benefit from the assumption of risks;
- Many risks and liabilities are best shared;
- Every risk has an associated and unavoidable cost which must be assumed somewhere in the process;
- Proper allocation of risk will reduce the overall cost to the project and promote a much more positive working relationship between the parties. This can be accomplished by assigning each risk addressed in the contract to the party that (1) has a comparative advantage in regard to the risk bearing ability, and (2) has control over the risk.

Strategies vs. Risk Process

Different strategies are used at different points



Availability of Site

Availability of site: The risk that tenure/access to a selected site that is not presently owned by Government or the private party cannot be negotiated.

Consequence: Delay and cost.

Preferred allocation: The private party, as it makes the decision to bid on a non-preferred site.

Mitigation: This can be mitigated by requiring bidders to secure access to the site prior to contract signing.

Site conditions

Site conditions: The risk that unanticipated adverse ground conditions are discovered which cause construction costs to increase and/or cause construction delays.

Consequence: Additional construction time and cost.

Preferred allocation: Generally this risk will be allocated to the private party. However in certain circumstances it may be appropriate for Government to accept some site risk.

Mitigation: The private party can mitigate and manage this risk through site inspections, testing and due diligence.

Approvals

Approvals: The risk that necessary approvals may not be obtained or may be obtained only subject to unanticipated conditions which have adverse cost consequences or cause prolonged delay.

Consequence: Delay in works commencement or completion and cost increases.

Preferred allocation: The private party, unless Government assumes this risk

Mitigation: Refer to Section 3.2.4 for ways of mitigating planning approval risk.

Environmental (1)

Environmental (1): The risk that the project site is contaminated requiring significant expense to remediate.

Consequence: Clean-up costs and delay (recognising that the ultimate responsibility for clean-up remains with the polluter, if available).

Preferred allocation: Generally this risk will be allocated to the private party. However in certain circumstances it maybe appropriate for Government to accept some contamination risk.

Mitigation: The private party can mitigate this risk by commissioning expert reports and possibly through insurance.

Environmental (2)

Environmental (2): The risk that prior to financial close offsite pollution has been caused from a Government preferred site to adjacent land.

Consequence: Clean-up liability (recognising that the ultimate responsibility for clean-up remains with the polluter, if available).

Preferred allocation: Government may assume responsibility by way of indemnity or obligation to compensate for unidentified off-site pollution pre-financial close where the site is a Government site.

Mitigation: Government can mitigate this risk by commissioning contamination reports, given that Government should also have greatest knowledge of the past uses of its site

Environmental (3)

Environmental (3): The risk that prior to financial close (in the case of a non-Government site) or after financial close (for either a non-Government or Government site) off-site pollution is caused to adjacent land.

Consequence: Clean up liability (recognising that the ultimate responsibility for clean-up remains with the polluter, if available).

Preferred allocation: The private party.

Mitigation: The private party can manage this risk by controlling activities on the site after financial close.

Clean-up and rehabilitation

Clean-up and rehabilitation: The risk that the use of the project site over the contract term has resulted in a significant clean up or rehabilitation obligation to make the site fit for future anticipated use.

Consequence: Financial liability on residual owner (recognising that the ultimate responsibility for clean-up remains with the polluter, if available).

Preferred allocation: Generally this risk will be allocated to the private party (whether Government is to resume possession of the site or not), except to the extent that Government has accepted contamination risk.

Mitigation: The private party can mitigate and manage this risk by managing the use of the asset.

Government may require sinking funds if it is to resume the site and its use is liable to result in significant clean-up / rehabilitation cost.

Cultural heritage

Cultural heritage: The risk of costs and delays associated with archaeological and cultural heritage discoveries.

Consequence: Delay and cost.

Preferred allocation: Government will usually accept this risk on Government preferred site. Where the private party chooses the site, this risk will be allocated to the private party.

Mitigation: This risk can be managed and mitigated by searching relevant registers, making enquiries if appropriate and where required obtaining expert advice.

Design

Design: The risk that the design of the facility is incapable of delivering the services at anticipated cost.

Consequence: Long term increase in recurrent costs – possible long term inadequacy of service.

Preferred allocation: The private party will be responsible except where an express Government mandated change has caused the design defect.

Mitigation: The private party can manage this risk by trying to pass the risk to its builder/architects and other subcontractors, although it will continue to remain primarily liable under the contract with Government.

Construction

Construction: The risk that events occur during construction which prevent the facility being delivered on time and on cost.

Consequence: Delay and cost

Preferred allocation: The private party will be liable unless the event is one for which relief as to time or cost or both is specifically granted under the contract.

Mitigation: The private party will generally manage this risk by entering into a fixed term, fixed price building contract to pass the risk to a builder with the experience and resources necessary to satisfy the private party's construction obligations under the contract.

Commissioning

Commissioning: The risk that either the physical or the operational commissioning tests which are required to be completed in order for the provision of services to commence, cannot be successfully completed.

Consequence: For the private party and its financiers -delayed/lost revenue for Government – delayed service commencement.

Preferred allocation: The private party, although Government will assume an obligation to cooperate and facilitate prompt public sector attendance on commissioning tests. The private party will not be able to earn revenues until the facility is commissioned.

Mitigation: The private party will manage this risk by using an expert design, construction, operations and project management team.

Force majeure

Force majeure: The risk that inability to meet contracted service delivery (pre or post completion) is caused by reason of force majeure events.

Consequence: Loss or damage to the asset, service discontinuity for Government (may include inability to deliver core service) and loss of revenue or delay in revenue commencement for private party.

Preferred allocation: The private party takes the risk of loss or damage to the asset and loss of revenue. Government takes some risk of service discontinuity both as to contracted service and core service, subject to insurance availability, and will need to arrange alternative service provision the cost of which will be met from redirected service payments and (if insurable) any shortfall made up from insurance proceeds.

Mitigation: The private party is given relief from consequences of service discontinuity. If uninsurable, private party may establish reserve funding. Government to establish contingency for alternate service delivery. If insurable, private party must ensure availability of insurance proceeds towards repair of asset and service resumption and Government is to be given the benefit of insurance for service disruption costs.

Tax changes

Tax changes: The risk that before or after completion the tax impost on the private party, its assets or on the project, will change.

Consequence: A negative effect on the private party's financial returns and in extreme cases, it may undermine the financial structure of the project so that it cannot proceed in that form.

Preferred allocation: Private party.

Mitigation: The private party can mitigate against this by ensuring that its financial returns can withstand such change.

With respect to specific infrastructure taxation particularly that relating to transactions with Government, the private party will be required to obtain a private tax ruling from the ATO.

Changes in law (1)

Changes in law (1): The risk of a change in law of the State Government only, which could not be anticipated at contract signing and which is directed specifically and exclusively at the project or the services and which has adverse capital expenditure or operating cost consequences for the private party.

Consequence: A material increase in the private party's operating costs and/or a requirement to carry out capital works to comply with the change.

Preferred allocation: Government, although the parties may share the financial consequences of capital cost increases in an agreed way, for example by the private party meeting a percentage of the cost up to a specific limit and Government meeting any excess.

Mitigation: Government may mitigate its liability for such change by monitoring and limiting (where appropriate) changes which may have these effects or consequence on the project and via mechanisms in the contract allowing the sharing of some of the financial consequences of a change in law or where appropriate, in a user pays model based on a regulatory regime which allows pass-through to end users.

Changes in law (2)

Changes in law (2): In some cases, the risk of a change in law (at whatever level of government it occurs) which could not be anticipated at contract signing which is general (ie not project specific) in its application and which causes a marked increase in capital costs during the operations phase and/or has substantial operating cost consequences for the private party.

Consequence: The requirement on the private party to fund and carry out capital works or meet a marked increase in operating costs to comply with the change.

Preferred allocation: Government, although the parties may share the financial consequences of capital cost increases in an agreed way, for example, by the private party meeting a percentage of the cost up to a specific limit and Government meeting any excess.

Mitigation: Government mitigates its exposure to this risk by excluding compensation for changes in tax law or changes for which the private party is compensated under a CPI adjustment.

Further Government usually specifies a regime for the sharing of financial consequences of changes in law up to a specified threshold after which Government meets any excess and where appropriate, in a user pays model having in place a regulatory regime which allows pass-through to end users.

Regulation

Regulation: Where there is a statutory regulator involved there are pricing or other changes imposed on the private party which do not reflect its investment expectations

Consequence: Cost or revenue impacts.

Preferred allocation: Private party.

Mitigation: Private party to assess regulatory system and may make appropriate representations.

Corporate Failure

Corporate Failure: The risk that after execution of contracts the private party becomes insolvent or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure.

Consequence: Possible cessation of service to Government, forced change in ownership and/or possible corporate failure causing financial loss to private party.

Preferred allocation: Government ultimately bears this risk because it can affect the provision of adequate public services. This is despite the fact that Government would have the right to terminate the private party in such circumstances.

Mitigation: Government may mitigate this by ensuring the project is financially remote from external financial liabilities, ensuring adequacy of finances under loan facilities or sponsor commitments supported by performance guarantees; and by due diligence on private parties (and their sponsors). Contractual provisions will allow the Government to ensure continuity of physical delivery of essential services.

Interest rates (pre-completion)

Interest rates (pre-completion): The risk that prior to completion interest rates may move adversely thereby undermining bid pricing.

Consequence: Increased project cost.

Preferred allocation: Government usually takes interest rate risk up until financial close and during the operations period but not during the construction period(s). The private party takes this risk during the construction period(s).

Mitigation: Both Government and the Private Party would manage this risk by hedging interest rates.

Financing unavailable

Financing unavailable: The risk that when debt and/or equity is required by the private party for the project it is not available then and in the amounts and on the conditions anticipated.

Consequence: No finance to progress or complete construction.

Preferred allocation: Government ultimately bears this risk because it can affect the provision of adequate public services. This is despite the fact that Government would have the right to terminate the private party in such circumstances.

Mitigation: Government will try to mitigate this risk by requiring all bids to have fully documented financial commitments with minimal and easily achievable conditions.

Technical Risk

Technical Risk: The risk that the private party is unable to deliver the required infrastructure and/or operational systems in the required timeframes.

Consequence: Non-delivery or cessation of service to Government.

Preferred allocation: Government ultimately bears this risk because it can affect the provision of adequate public services. This is despite the fact that Government would have the right to terminate the private party in such circumstances.

Mitigation: Government will mitigate this risk by assessing the experience and technical competence of the private party to deliver the required infrastructure and operational systems. Contractual provisions will allow the Government to ensure continuity of physical delivery of essential services and to abate service payments for non-performance.

Operational Risk

Operational Risk: The risk that the private party is unable to effectively manage the service delivery operations.

Consequence: Cessation or reduced quality of service to Government.

Preferred allocation: Government ultimately bears this risk because it can affect the provision of adequate public services.

Mitigation: Government can mitigate this risk by assessing the experience and competence of the private party to manage and deliver the required services. Private party may be required to provide performance guarantees during the operation phase. Contractual provisions will allow the Government to ensure continuity of physical delivery of essential services and to abate service payments for nonperformance.

Risk Allocation Matrix

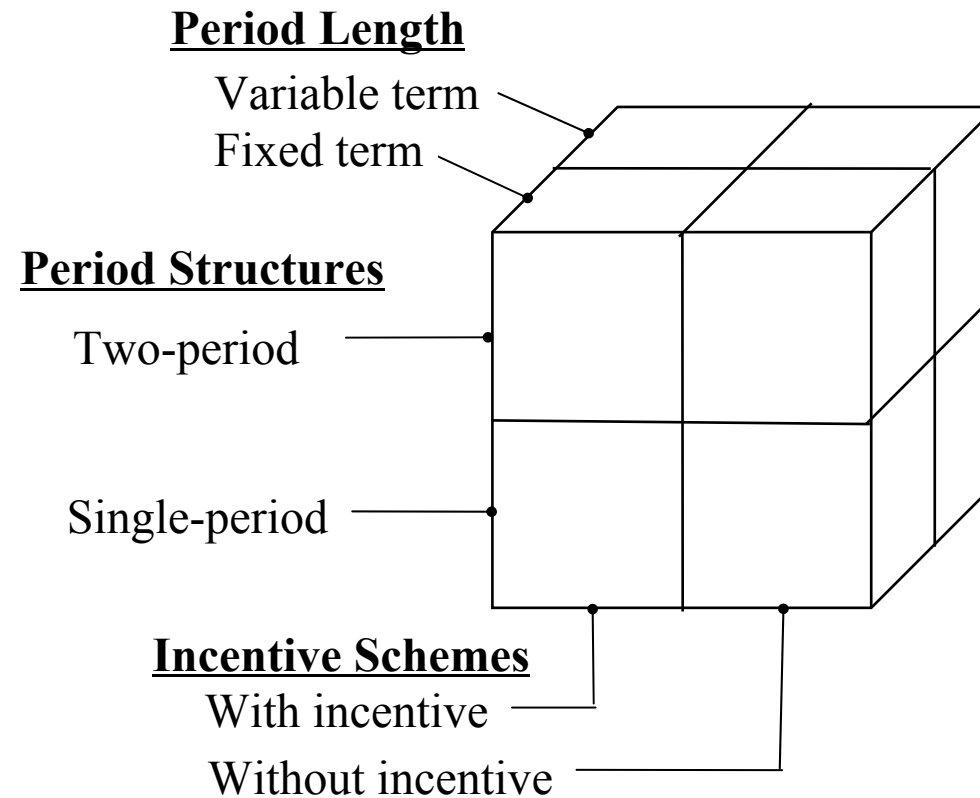
Risks	Government	Private Party	Notes
Site Conditions	S	P	
Approvals	S	P	
Environmental Risk	S	P	
Cultural Heritage	P	S	
Design Risk	-	P	
Construction Risk	-	P	
Force Majeure	S	P	
Tax Changes	-	P	
Changes in Law	P	-	
Corporate Failure	U	P	
Interest Risk	S	P	
Technical Risk	U	P	
Operational Risk	U	P	

Note: P=Principal bearer; S=In certain circumstances; U=Ultimate risk bearer³⁰

Design of Concession Period

Different designs reflect different risk control strategies for completion time overruns. The single-period concession structure requires the project company to assume completion risk, while the two-period concession structure could to some extent reduce the completion risk exposure to the project company, depending on the incentive schemes.

Design of Concession Period

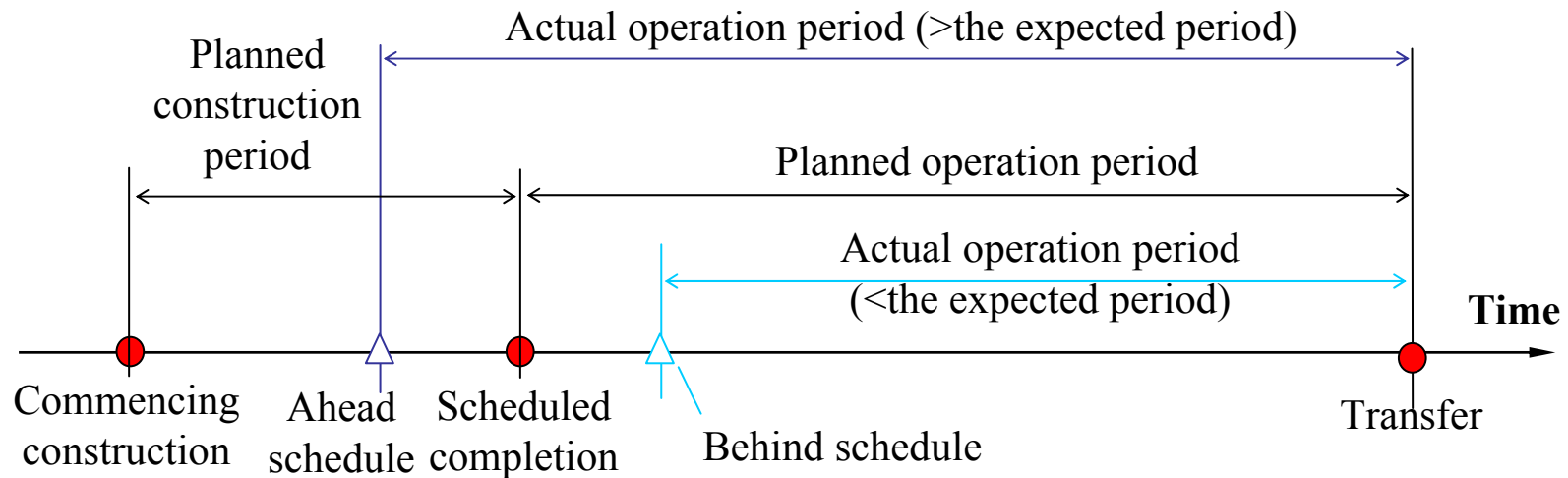


Design of Concession Period

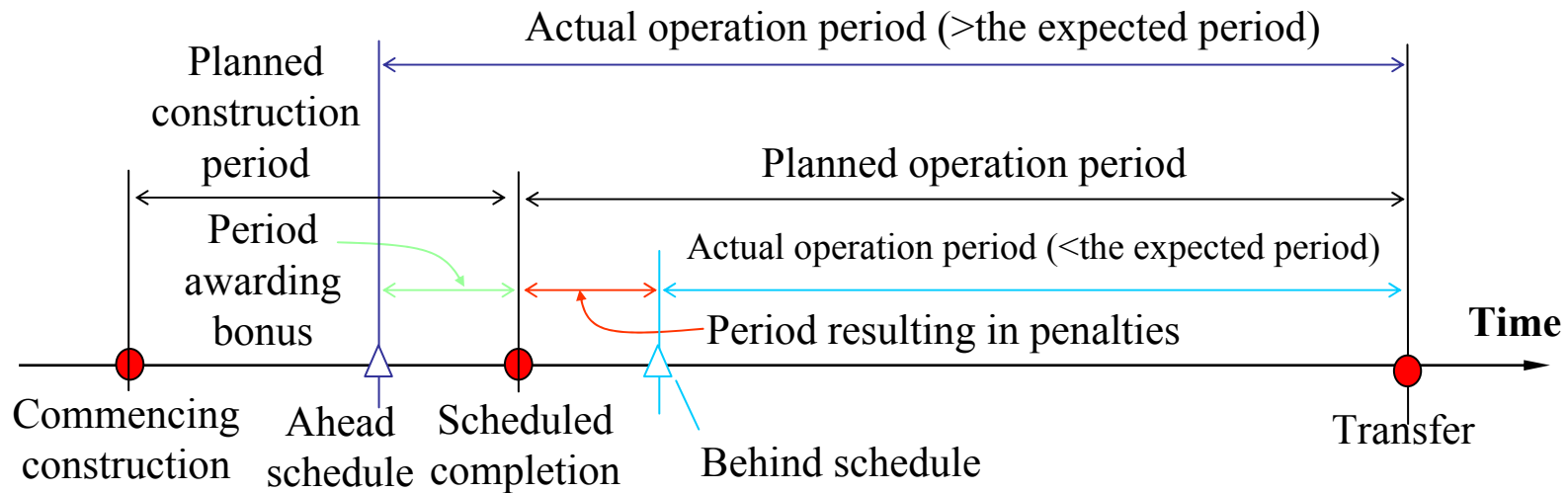
Incentive Scheme			
With	Single-period structure with Incentive schemes	Two-period structure with Incentive schemes	
	Single period structure without Incentive schemes	Two-period structure without Incentive schemes	
Without	Single-period	Two-period	

Concession Period Structure

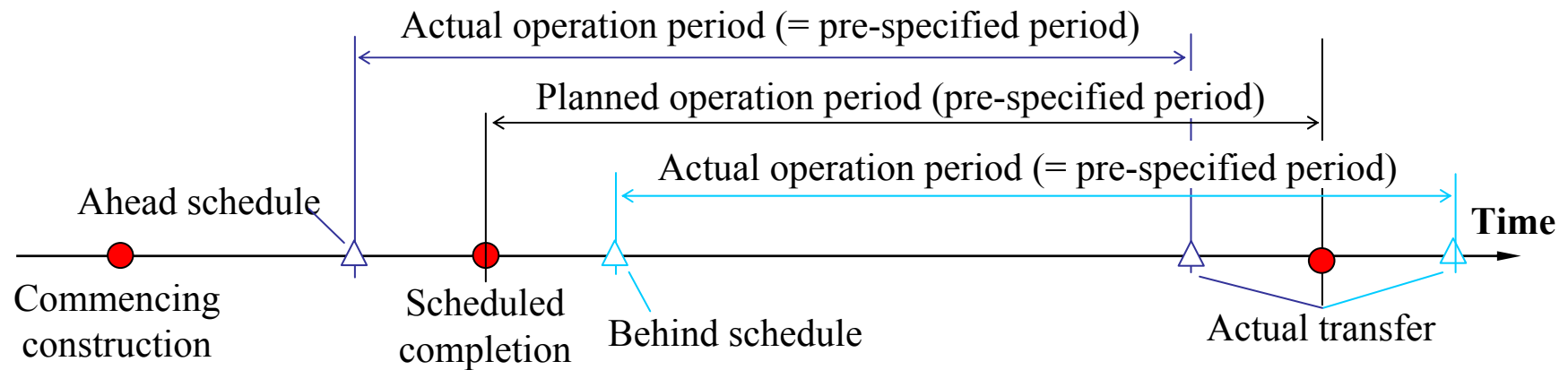
Single-Period without Incentives



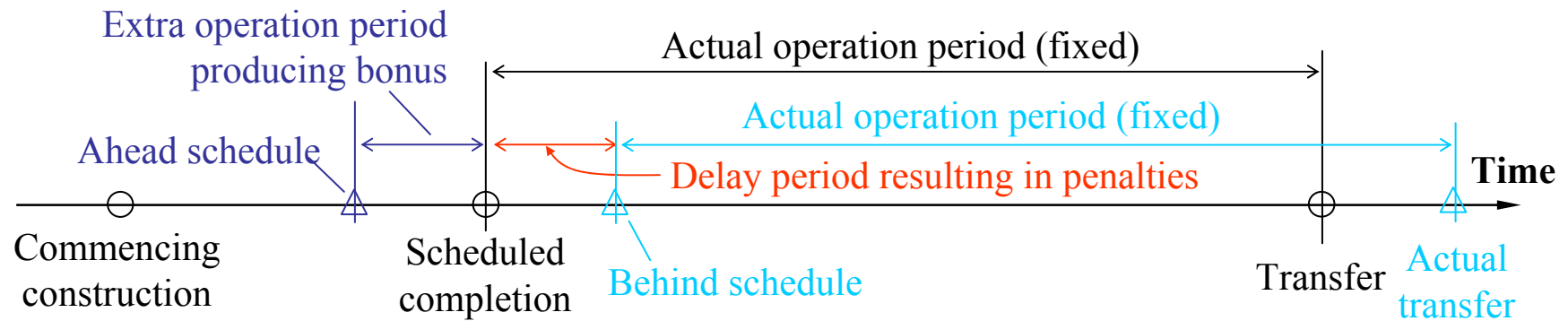
Single-Period with Incentives



Two-Period without Incentives



Two-Period with Incentives



Choice of Concession Period Design

Complexity of Markets	Recommended Concession Period Structures and Project Types	
Market-led	Single-period structure without delay penalty	Two-period structure without Early completion bonus and without Delay penalty
Contract-led	(1) Single-period structure with/without penalty (2) Two-period structure with/without incentives	Two-period structure with Early completion bonus and/or Delay penalty
	Low	High
	Complexity of Construction	

Tariff Design

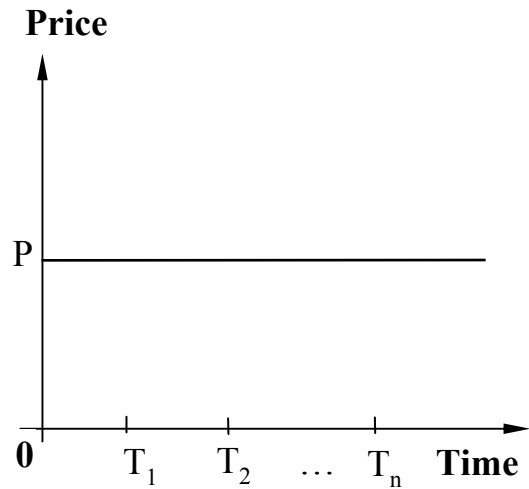
The design of tariff is a key issue in the development of privately-financed infrastructure projects. It involves the determination of tariff magnitude, the choice of tariff structure, and the design of adjustment mechanisms. Tariff structures can be an all-in tariff or a compound tariff. Tariff adjustment mechanisms can be used to address different risk factors such as inflation, exchange rate, demand, and fuel prices. An appropriate combination of tariff structure and adjustment mechanism can be effective to manage key risks of privately-financed infrastructure projects. A well-designed tariff can create a “win-win” solution for both project promoter and the host government.

Tariff Design

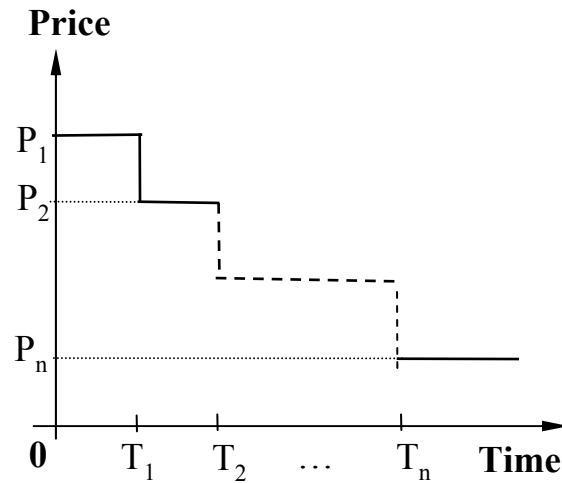
The design of tariff involves three key issues:

- the magnitude,
- structure, and
- adjustment mechanism of tariff.

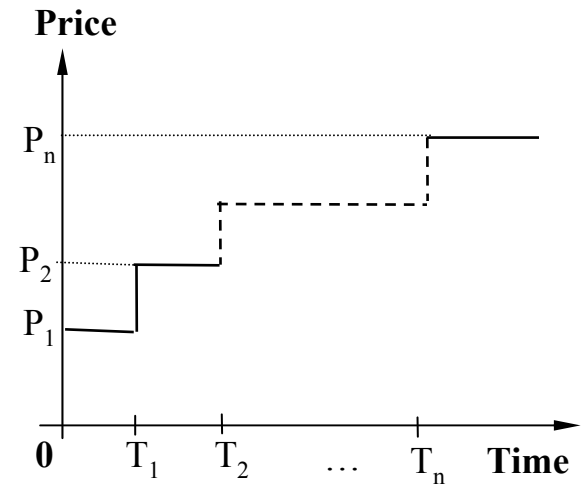
Base-Tariff Structures



(a) Flat Rate Base-Tariffs

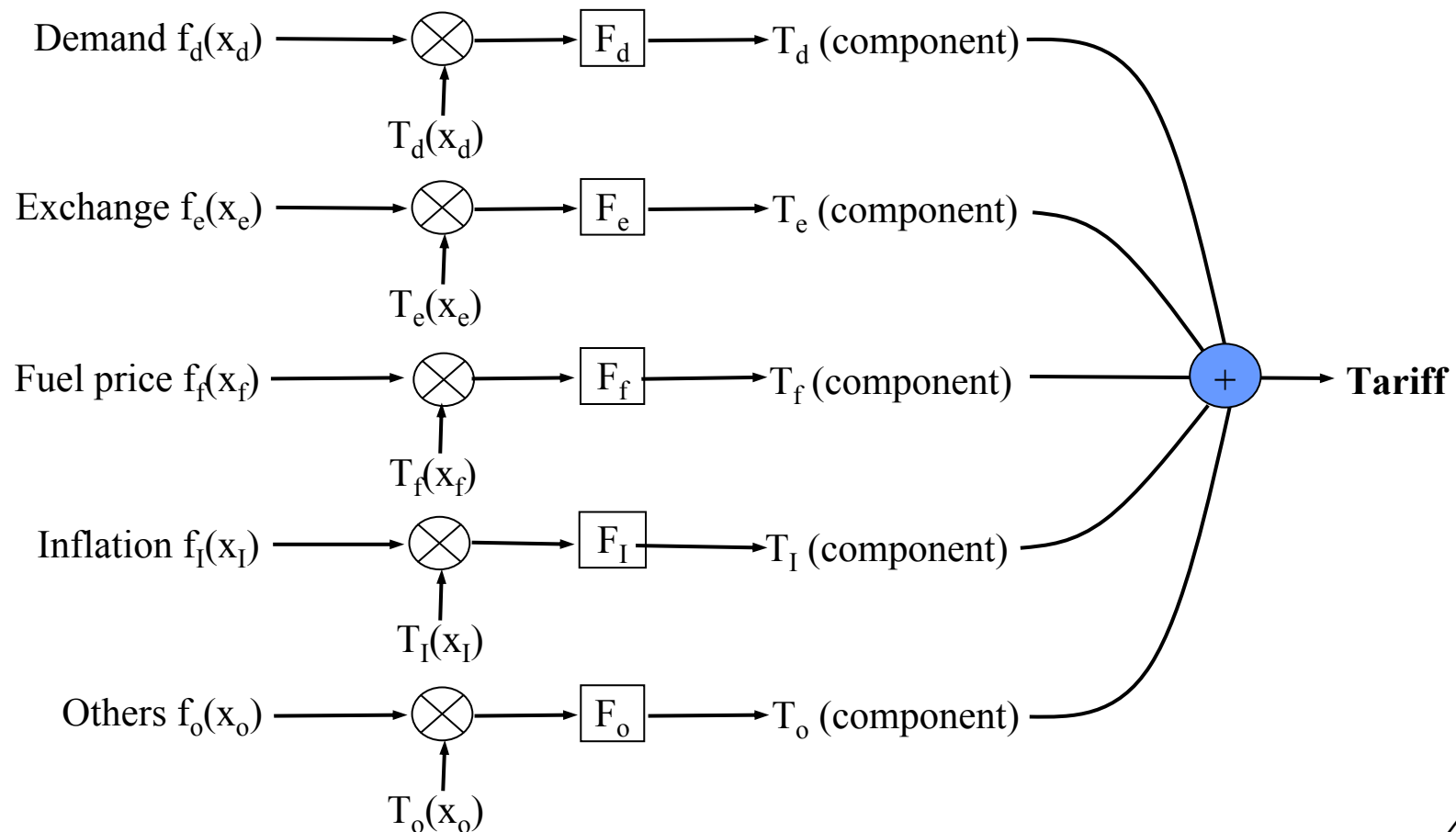


(b) Declining Block Base-Tariffs

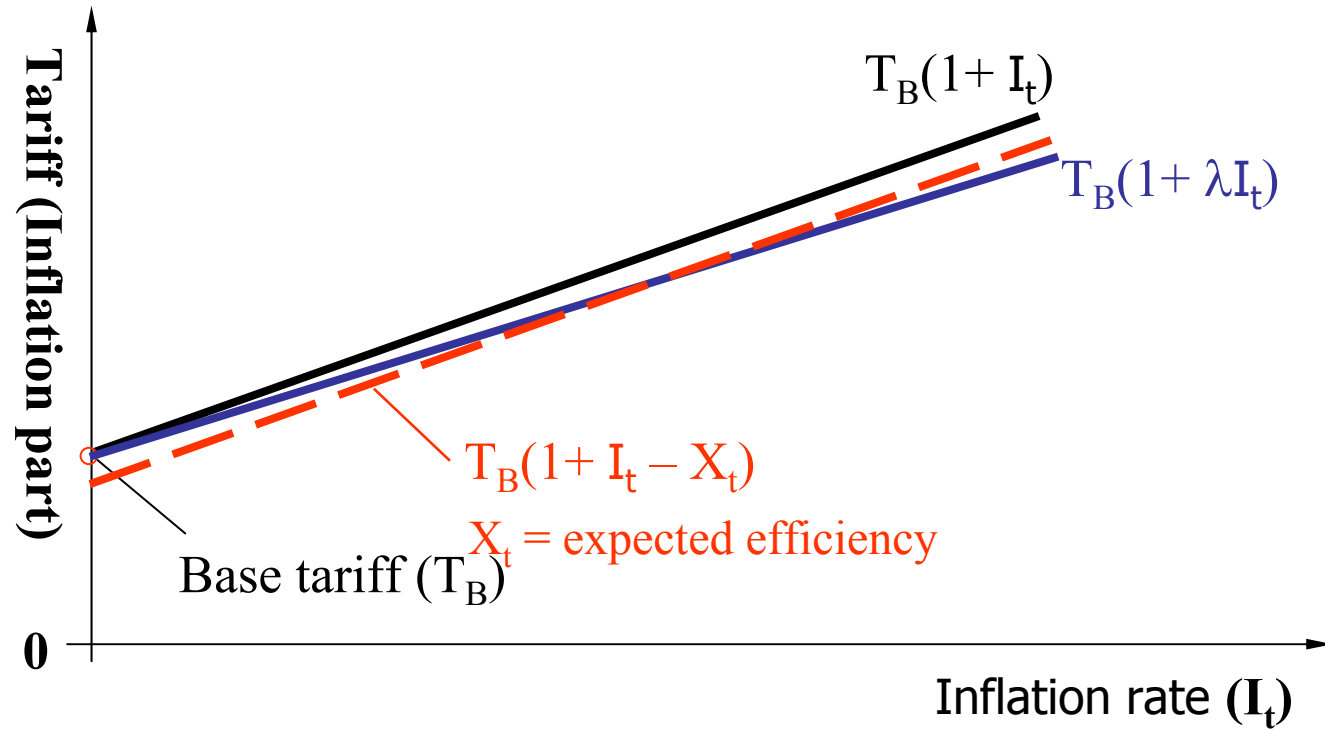


(c) Increasing Block Base-Tariffs

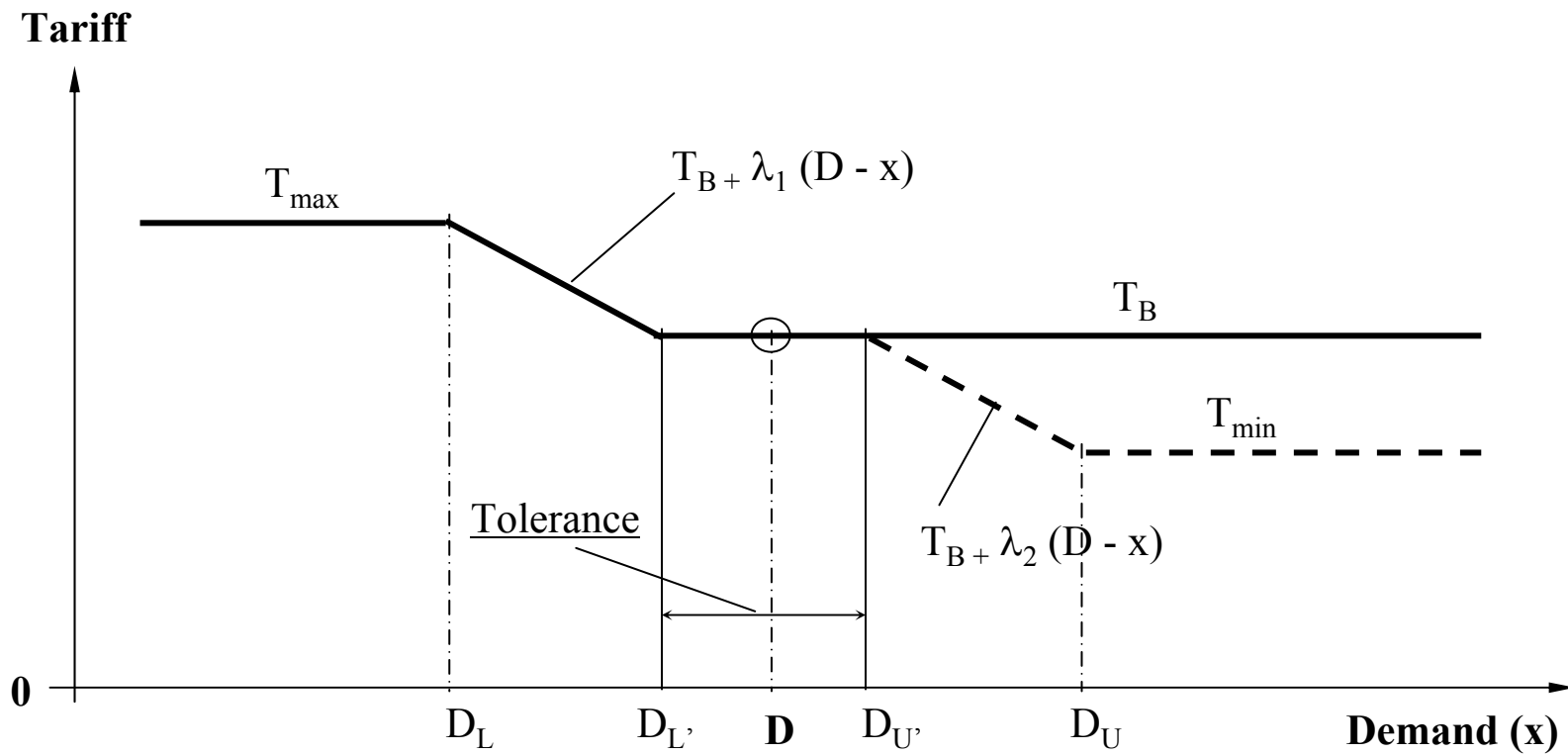
Tariff Structure & Adjustments



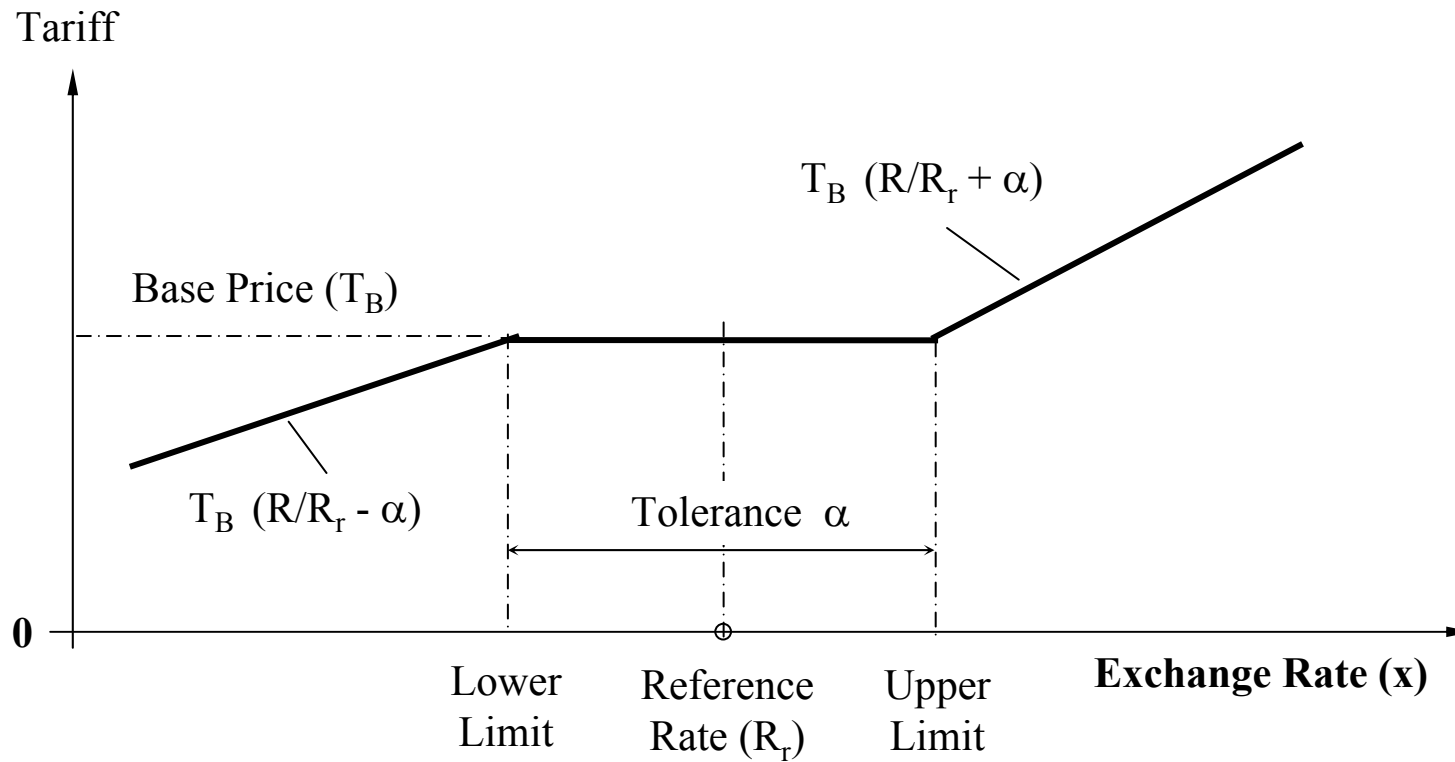
Inflation



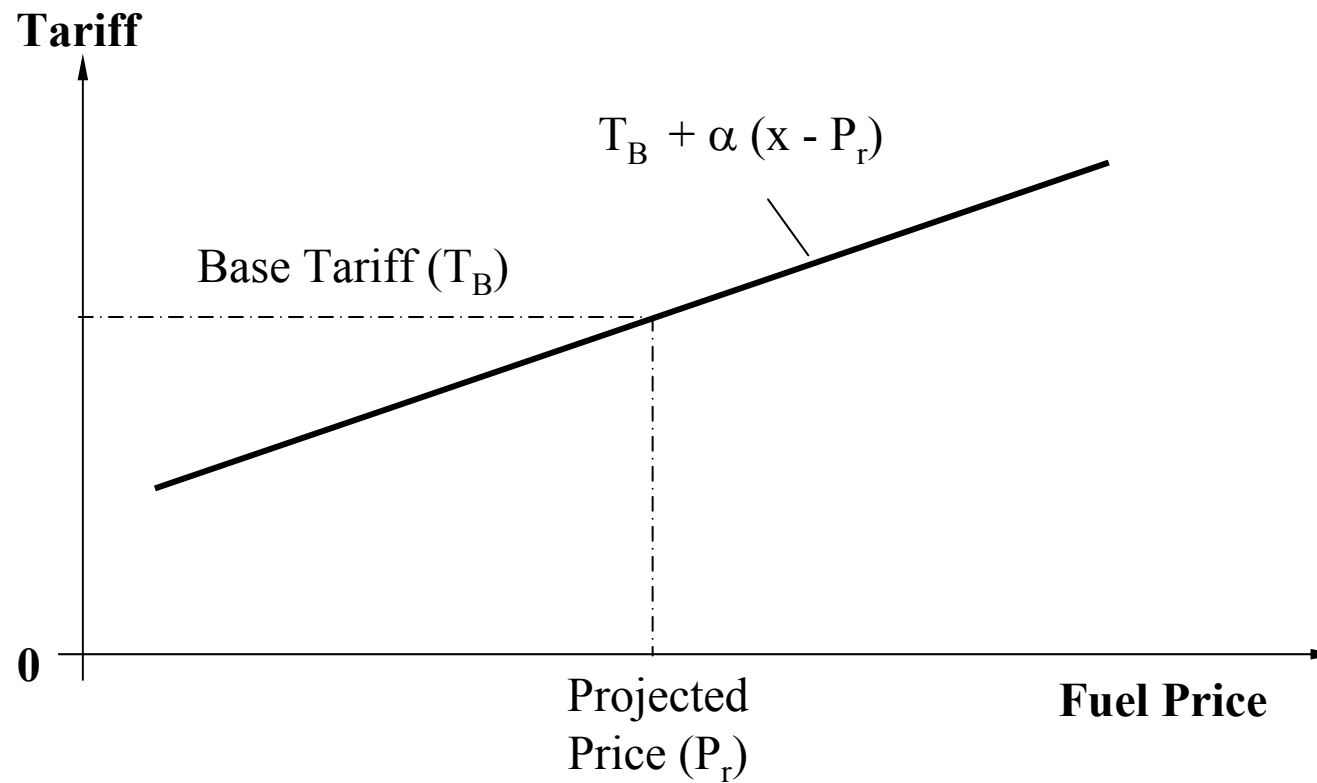
Tariff Adjustment Based on Demand



Tariff Adjustment Based on Exchange Rates



Tariff Adjustment Based on Fuel Price



Choice of Tariff Structures

Project Types and Recommended Tariff Structures

Nature/ source of Revenue	Complexity of Production Cost	
	Low	High
Contract-led Revenue	- All-in tariff without adjustment - All-in tariff with pre-set increment	- Compound tariff with adjustment to specified cost components
Market-led Revenue	- All-in tariff with ceiling, adjusted by market	- All-in tariff with ceiling

Thanks !

