



# **Time & Cost Overrun in Development Projects: Evidence from Audit Reports of Roads Projects**

**Dr. Kazi Iqbal  
Dr. Md. Taibur Rahman  
Jayed Bin Satter**

**BIDS Research Almanac 2023  
May 18, 2023  
Dhaka**

# Motivation

- **Output = f(private capital, public capital, labor)**

Private capital = g(public capital)

- Public investment in infrastructures and capital goods industry complement private investment by **raising marginal product of private capital** and providing intermediate input for production in the private sector. (Hatano,2010)
- Aschauer (1989) and Munnell (1990) find that public non-military investment spending, particularly on core infrastructure, has a **substantial influence on output and the productivity of private capital.**
- Studies by Greene and Villanueva (1991) for a panel of developing countries, Ramirez (1994) for Mexico, Odedokun (1997) for 48 developing countries, and Ramirez (2000) for a panel of Latin American countries find that **public investment stimulates private investment.**

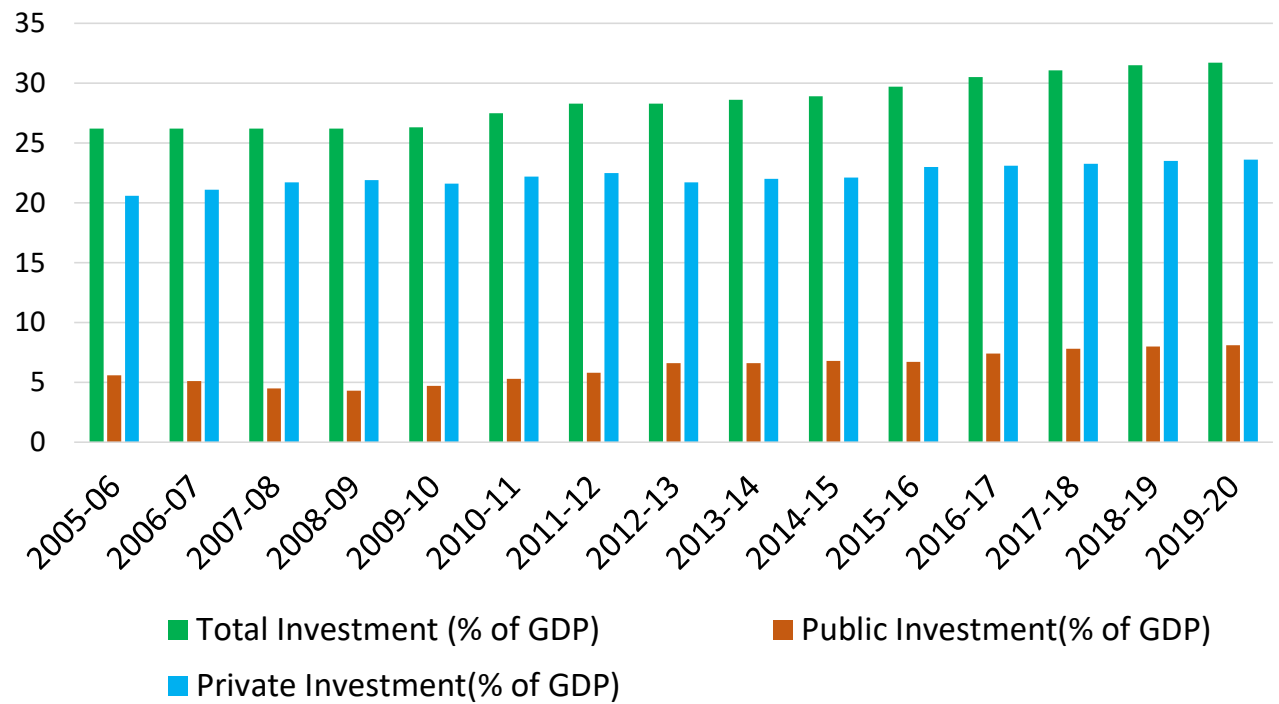
- Oshikoya (1994) for a panel of African countries present evidence that public investment in infrastructure has a positive impact on private investment, while non-infrastructure investment has a negative impact on private sector investment.
  - Erden and Holcombe (2005) find evidence of a positive correlation between public and private investment for a sample of 19 developing countries over the period 1980– 1997, and a negative correlation for a sample of developed economies for nearly the same period.
  - Lora (2007) finds evidence of complementarities between public and private infrastructure investment for seven Latin American countries in the period of 1987–2001
- The most significant mechanism and the most compelling argument supporting public investment is that public infrastructure investment would have substantial spill-over benefits for private investment. If public infrastructure investment is complementary to private investment, the rate of return to private investment will increase.

## ▪ Inefficient Use of Public Investment

- Public investment may be substitutes and have a less positive or even negative effect on economic growth (Balassa, 1988) when:
  - ✓ Goods and services of public enterprises compete directly with those of the private sector.
  - ✓ Wasteful public investment may also crowd-out private investment by raising cost of borrowing and tax burden on the private sector.
- Keefer and Knack (2007) find that public investment is significantly higher in countries with weak institutions, which they argue is a reflection of the enhanced rent-seeking incentives.

# Public Investment in Bangladesh

- Currently, the size of the Bangladesh economy is of around \$460 billion.
- On the investment front, recent total investment is **32% of GDP** in which the share of **private investment is 24%** and that of **public investment is 8%**.



Source: Bangladesh Economic Review: 2022

- Public investment is channelized through development projects in Bangladesh which are published as annual development programme (ADP)
  - ADP contains a list of projects of all sectors along with their allocation for the year.
  - Each year gets approval in the parliament as development budget after getting the approval from National Economic Council first.

# Trend in ADP over Last 10 Years

Fiscal Year	ADP Allocation (Crore Taka)	ADP Allocation (% of GDP)	Total Projects in ADP	Highest Allocating Sector in ADP		
				Sector	ADP Allocation (% of total ADP)	Total Number of Projects
FY 13-14	65,870	4.4	1046	<b>Transportation &amp; Communication</b>	<b>23.3</b>	203
FY 14-15	80,315	4.9	1034	Same as above	<b>23.3</b>	189
FY 15-16	97,000	5.3	999	Same as above	<b>22.4</b>	157
FY 16-17	110,700	5.9	1141	Same as above	<b>25.8</b>	188
FY 17-18	1,53,331	6.8	1192	Same as above	<b>26.8</b>	171
FY 18-19	1,73,000	6.6	1339	Same as above	<b>26.3</b>	225
FY 19-20	2,02,721	7	1473	Same as above	<b>26</b>	257
FY 20-21	2,05,145	6.5	1584	Same as above	<b>25.4</b>	298
FY 21-22	2,25,324	6.5	1426	Same as above	<b>24.7</b>	290
FY 22-23	2,46,066	5.5	1349	Same as above	<b>28.7</b>	256

- **Inefficiency in ADP Implementation**

- Development projects in Bangladesh have a tendency to go through multiple phases of revision resulting in time escalation and cost escalation.
- Time & cost overrun in ADP implementation:
  - Delayed benefits
  - Complementary private investment suffers
  - Cost and time overrun may increase social cost (welfare loss)
  - In the case of projects financed through borrowing, longer implementation period have high rate of interest and add to more repayment schedule.
  - Too much delay can make projects irrelevant
- Hence it is important to identify the major causes of time and cost overruns.



# Research Question, Methodology & Data

- **Research Question**

- In our study, we considered the projects of RHD to examine the causes of time and cost overruns reported by IMED. In particular, we study:
  - Incidence of time and cost overrun
  - Factors behind the time and cost overrun
  - Relative importance of the factors in the time and cost overrun

- **Methodology**

- Descriptive Statistics & Simple OLS have been used to examine the cause of time and cost overruns

- **Dataset**

- Information of 369 projects completed under Roads & Highway Department from 2012-13 to 2021-22 have been compiled from the audit report of IMED, Ministry of Planning
- Available Information: Project name, initial cost, revised cost, initial duration, revised duration, reasons of time & cost escalation.
- Reasons for time & cost escalations are categorized in some broader groups (which are later used as dummy variables in regression analysis)

# Categorization: Reasons for Cost Escalation

## 1. Scope of the work (increased or decreased)

- Consideration of reality/given situation/public demand
- Extension/inclusion of component/ Repairing of existing component / infrastructure
- Addition/changes of different clauses in DPP
- Soil related work
- Utility Shifting

## 2. Price escalation issues

- Changes in Quotation rate
- Change in Scheduled Rate of RHD/ Implementing agency
- Cost escalation due to imposition of VAT/Income tax in the project component/consultants etc.
- Price of raw/construction materials increased

## 3. Land acquisition issue

- Price of land increased
- Quantity of land increased
- Compensation issue

## 4. Engineering issue: Change / Adjustment in design

## 5. Other issues

- Delay in project launching(delay in tender invitation, coordination with agencies etc.)
- Scarcity of constructing / materials or manpower crisis due to Covid 19
- Delay in consultant recruitment (by the donor agency)
- Change of donor agency
- Legal issue , etc.

# Categorization: Reasons for Time Escalation

## 1. Insufficient allocation of budget against the actual work plan

## 2. Changes in scope of work

- Consideration of reality/given situation/public demand
- Extension of component/ infrastructure
- Addition/changes of different clauses in DPP
- Engineering issue: Design correction/adjustment
- Utility shifting

## 3. Land Acquisition Issues

- Delay in land Acquisition
- Late handover from the respective authority
- Resolving the compensation issue

## 4. Delay in tender / workorder

- Cancellation of tender/workorder
- Revision in contract (with the contractor)

## 4. Adverse condition

- Natural disaster
- Remote project area: Hill tracts / Haor / Island or Char (adverse weather / communication problem)

## 5. Price Escalation Issues

- Price of raw/construction materials increased
- Scarcity of constructing or raw materials & manpower due to Covid 19
- Changes in the scheduled rate of RHD
- Quotation adjustment with the Scheduled Rate/DPP (contractor)

## 6. Covid-19 crisis

## 7. Others issue

- Legal issue
- Security issue in hill tracks
- Lack of skilled manpower
- Negotiation with the stakeholders
- Delay in consultant recruitment ( by the donor agency )
- Change of donor agency

## Summary of the Findings:

### Time and Cost Escalation Status of the Projects

Project Status	Number of projects	% of projects
<b>Time escalation</b>	<b>289</b>	<b>80.06</b>
No time escalation	72	19.94
<b>Total</b>	<b>361</b>	<b>100</b>
<b>Cost escalation</b>	<b>201</b>	<b>55.68</b>
No cost escalation	160	44.32
<b>Total</b>	<b>361</b>	<b>100</b>
<b>Both time and cost escalation</b>	<b>179</b>	<b>49.72</b>
No time and cost escalation	49	13.61
<b>Either time or cost escalation</b>	<b>132</b>	<b>36.67</b>
<b>Total</b>	<b>360</b>	<b>100</b>

## Extent of Time and Cost Escalation of the Projects

	All projects	Large (project costs greater than the median value=8639.02 lac)	Small (project costs lower than the median value=8639.02 lac)	Mean Difference (p value)
Number of projects	356	178	178	
% of Cost escalation (average)	26.25	25.04	27.65	-2.06 (p value= 0.65)
% of Time escalation (average)	94.84	91.62	98.52	-6.91 (0.38)
The average number of revisions	1.10	1.12	1.09	0.03 (0.41)

# Reported Reasons for Time and Cost Escalation

Status	Number of audit reports							
	Reported with reason		No reasons reported		Reasons not Applicable (no time/cost escalation)		Total	
	Obs	%	Obs	%	Obs	%	Obs	%
Cost escalation	183	50.55	22	6.08	157	43.37	362	100
Time escalation	270	74.79	18	4.99	73	20.22	361	100

# Incidence of Reported Reasons for Cost Escalation

Sl. No.	Reported reasons for cost escalation	Number of projects	Percentage of projects
1.	Change in the scope of work	118 (Total no. projects reported with reason=179)	<b>65.92 (% of 179)</b>
2.	Price escalation issues	83	<b>45.81</b>
3.	Land acquisition issue	61	<b>34.8</b>
4.	Change or adjustment in design	41	22.91
5.	Other issues	11	5.59

## Incidence of Reported Reasons for Time Escalation

Sl. No.	Reported reasons for time escalation	Number of projects	Percentage of projects
1.	Insufficient budget allocation	32 (Total no. projects reported with reason =272)	11.76 ( % of 272)
2.	Change in the scope of work	134	<b>49.26</b>
3.	Delay in land acquisition	113	<b>41.54</b>
4.	Delay in tender/work order	24	8.82
5.	Adverse situation	49	18.01
6.	Price escalation	20	7.35
7.	Covid 19 crisis	91	<b>33.46</b>
8.	Others	14	5.15



# Regression Result: Cost Escalation

Dependent Variable: Cost Escalation (%)				
Variables	(1)	(2)	(3)	(4)
log (Primary cost)	-0.277 (2.927)	1.765 (3.074)	-1.501 (3.246)	-4.669 (3.061)
Year of inception		<b>-1.424*</b> (0.816)	<b>-0.944*</b> (0.564)	-0.787 (0.542)
Primary duration (month)			<b>0.954*</b> (0.524)	0.769 (0.483)
<b><u>Reported reasons for cost escalation (dummy, yes=1)</u></b>				
Change in the scope of the work				4.553 (7.080)
Price escalation issues				2.802 (6.226)
Land acquisition issues				<b>26.717***</b> (6.891)
Change/adjustment in design				<b>15.435*</b> (8.714)
Others reason (dummy, yes=1)				9.967 (12.749)
Constant	40.644 (27.847)	2,889.471* (1,633.050)	1,922.254* (1,132.103)	1,624.305 (1,087.421)
Observations	189	189	188	175
R-squared	0.000	0.056	0.099	0.199

## Regression Result: Cost Escalation

- Cost escalation is less likely to relatively new projects.
- Longer projects are more likely to incur cost escalation: 1 month increase in project duration leads to 0.95 percentage point increase in cost (on average).
- Land acquisition and adjustment/change in design are found to be significantly associated with cost escalation.

# Regression Result: Time Escalation

Dependent variable: Time Escalation (%)				
Variables	(1)	(2)	(3)	(4)
Log (Primary cost)	-7.158*** (2.630)	-3.634 (4.088)	0.967 (6.487)	-1.917 (5.367)
Year of inception		-2.184 (1.798)	-2.905 (2.491)	-2.166 (2.288)
Primary duration (month)			<b>-1.218*</b> (0.647)	<b>-1.477**</b> (0.597)
<b><u>Reported reasons for time escalation (dummy, yes=1)</u></b>				
Insufficient budgetary allocation				15.076 (13.127)
Changes in the scope of work				4.504 (7.635)
Delay in land acquisition				<b>22.931***</b> (7.819)
Delay in tender/work order				<b>20.855*</b> (11.744)
Adverse condition				-12.862 (8.099)
Price escalation issues				<b>32.906**</b> (14.365)
Covid19 crisis				-5.101 (10.787)
Others reasons				<b>24.514*</b> (12.911)
Constant	165.434*** (25.666)	4,531.309 (3,591.342)	5,979.149 (4,979.192)	4,512.290 (4,584.414)
Observations	268	268	268	256
R-squared	0.022	0.073	0.108	0.177

## **Regression Result: Time Escalation**

- Time escalation is comparatively low for projects with longer duration (as the base is high).
- Delay in land acquisition, delay in work order placement, price escalation issues and the other issues (Lack of skilled manpower, negotiation with the stakeholders, delay in consultant recruitment by the donor agency etc.) are found to be significantly responsible for time escalation .

# Conclusion

- Specific incidence of the reasons for time & cost overrun has been examined in this study from administrative data (audit report of IMED)
- Land acquisition issues are mostly responsible both for time & cost escalation. So, without any reformation in existing system/practice of land acquisition it would be difficult to solve the time & cost overrun in development projects.

---

## Thank You.