



A Model Proposed for Financing Transportation Projects: Build-Operate-Transfer via Public-Private Partnership

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Extensive Summary

Introduction

This study has pointed out that a new version of Build-Operate-Transfer (BOT) financing model generated out from the classical BOT model can be used for highway financing. The classical BOT, one of the most popular PPP models, has been often employed by various countries for financing of large scale public projects. Over the last 20 year a number of infrastructure projects in Turkey such as natural gas plants, airports and hydro-electric power plants were constructed by using BOT model. In this study, the new version of BOT model is proposed and implemented on the Ankara-İzmir Highway Project.

Method

The Ankara-Izmir highway project is a 549 km 2x3 road construction project which includes the construction of 27.5 km bridges, 5.7 km tunnels, 13 cross-bridges and 15 exit-toll stations. It is expected that a 90,000 cars per day uses the highway. The construction period is planned to cover 5 years. After completion the construction, the project company will be eligible to operate it for next 25 years. This project is planned to be constructed by the classical BOT model where the private company is responsible to construct and finance the project and then operate it next 25 years and finally transfer to the public authority. All risks in this model must be assumed by the private company. The proposed Private Partner- BOT model (PP-BOT) offers a true partnership of public and private partners in every stage of the project. Both partners in this model utilize their advantages where they have the strength. The project is developed by the public, but constructed and financed by the private partner while the public acts a guarantor for the loan acquired to finance project. Moreover, the public partner postpones all kinds of taxes (import, VAT, income, etc.) until the project starts generating cash inflows.

Therefore, the borrowing rate gets down while the cash outflows during the construction phase are minimized in the other side.

In the operating phase, all revenues are initially allocated to operating expenses and loan installments. The public presumes that the private partner earn an acceptable return over the private equity invested in the project. Beyond the private partner recovers its equity invested and earns an agreed return, the profit or loss is shared between private and public partners at a pro-rate.

This model eliminates most uncertainty relating the project. The private partner can borrow at a lower rate, postpone all taxes at the construction phase and secure a reasonable return over its equity invested. Therefore, the project can be constructed and operated at a much less cost. However, the key for this model is to have an effective accounting and auditing system. The partners should be able to clearly follow every stage of the project. Table 1 below shows all inputs for both the classical BOT and the proposed PP-BOT models.

Table 1. Inputs of Models

		BOT	PP-BOT
Construction Phase	Construction period	5 years	5 years
	Guarantee of Treasury	No	Yes
	Debt-Equity Ratio	70% - 30%	70% - 30%
	Total cost of project - \$	7,024,549,412	6,668,982,212
	Total loan needed - \$	4,935,408,765	4,667,713,527
	Total equity needed - \$	2,089,140,647	2,001,268,685
	Private partner-cash equity - \$	1,327,576,472	No
	Short term loan - \$	101,820,926	48,806,321
	Maturity of short term loan	4 years	3 years
	Interest rate on ST loan - \$	10%	8%
	Long term loan - \$	4,935,408,765	4,667,713,527
	Maturity of long term	5 year no payment period + 10 year	5 year no payment period + 10 year
	Interest rate on LT loan - \$	8.74%	5.51%
	Depr.period.straight line method	25 years	25 years
	Guaranteed return to private partner	No	Equity + 6% annual return
Operating Phase	Operating period - \$	25 years	25 years
	Profit/Loss share of public partner	No	20%

Results

Table 2 presents all cash flows next 30 years for both models and partners. The results show that the private partner can have about 2.5 billion \$ NPV while the public can have around 960 million \$ by employing BOT model. When applying PP-BOT model, the private partner can register about 2 billion \$ NPV and the public can register around 1 billion \$ NPV. This must be noticed that the private partner earns less in PP-BOT model but it assumes much less risk and secures a guaranteed return over its equity investment. The most important outcome of PP-BOT models is to considerably

lower toll rate by 20%. The toll becomes \$64.23 which is \$76.86 in the classical BOT model.

Overall, this highway project can be constructed at a lower project cost by using the proposed PP-BOT model compared to the classical BOT model. Therefore, the lower project cost results in a lower toll rate by 20%..

Table 2. Casf Flows and Comparative Results

	Year	BOT		PP-BOT		
		Private	Public	Project	Private	Public
Constructi on Period	1	-546,166,684	0	-546,166,684	-103,535,169	0
	2	-1,281,307,040	0	-1,281,307,040	-251,648,862	0
	3	-1,418,573,446	0	-1,418,573,446	-301,701,966	0
	4	-1,215,433,728	0	-1,215,433,728	-290,130,825	0
	5	-1,239,742,403	0	-1,239,742,403	-329,520,088	0
Operating Period	6	746,626,310	-56,831,878	621,576,817	0	-34,595,144
	7	762,775,088	-25,583,783	634,747,390	0	-10,154,244
	8	779,355,242	6,732,572	648,270,654	0	15,332,426
	9	796,421,020	41,134,071	662,199,011	0	42,284,107
	10	825,722,709	68,660,208	686,205,183	55,069,643	77,006,095
	11	867,560,188	88,211,515	720,813,983	130,042,700	109,331,198
	12	787,516,885	107,276,976	476,168,878	281,222,571	34,520,048
	13	788,743,069	126,808,352	423,180,482	281,222,571	48,848,399
	14	828,756,490	146,833,364	407,653,702	281,222,571	63,584,280
	15	871,020,326	167,381,135	442,647,504	281,222,571	78,900,626
	16	915,652,418	184,168,716	479,617,274	721,790,750	201,947,989
	17	962,776,969	197,228,265	518,666,469	741,151,357	217,754,997
	18	1,012,524,877	210,907,127	559,904,134	774,141,489	237,482,087
	19	1,065,034,093	225,240,834	603,445,197	808,974,339	258,212,274
	20	1,116,631,497	239,312,119	646,222,626	843,196,282	278,566,349
	21	1,170,896,158	254,016,734	691,224,515	879,197,794	299,889,881
	22	1,227,959,212	269,388,421	738,560,103	917,066,265	322,232,929
	23	1,287,958,384	285,462,539	788,344,130	956,893,486	345,648,002
	24	1,351,038,320	302,276,153	840,697,103	998,775,864	370,190,180
	25	1,417,350,919	319,868,115	895,745,586	1,042,814,651	395,917,242
26	1,487,055,704	338,279,157	953,622,500	1,089,116,182	422,889,804	
27	1,560,320,190	357,551,987	1,014,467,433	1,137,792,128	451,171,463	
28	1,637,320,284	377,731,383	1,078,426,975	1,188,959,762	480,828,940	
29	1,718,240,702	398,864,308	1,145,655,062	1,242,742,231	511,932,243	
30	1,803,275,403	421,000,008	1,216,313,340	1,299,268,854	544,554,827	
Total Cash Flow		22,087,309,156	5,051,918,398	12,193,152,750	14,675,347,151	5,764,276,998
NPV		2,496,485,365	960,404,531	220,465,134	1,971,298,515	1,031,642,747
IRR		12.10%		8.44%	15.32%	
Toll	Per Km	\$0.14		\$0.117		
	Total	\$76.86		\$64.23		