ALTERNATIVE MEANS OF FUNDING RAILWAY DEVELOPMENT

JOHN STANDINGFORD*
Director
John Standingford & Assoc. Pty. Ltd.

ABSTRACT: *A detailed projection of costs and freight potential by the Northern Territory Goverment has indicated that the long-proposed Alice Springs-Darwin rail link is economically feasible. This is not to say, however, that it could necessarily generate sufficient net revenue to service a conventional loan taken to meet its construction cost. This paper explores the possibility of using long-term index-linked securities, with an increasing real return to the investor over time, in an attempt to match debt servicing costs with expected net revenue. A three-part funding strategy is described which provides investors with attractive real returns. The analysis is specific to the Alice Springs-Darwin rail link, but the principle is more widely applicable.*

* When this paper was initiated, the author was Manager, Economic Studies Group, Pak-Poy & Kneebone Pty. Ltd.

Figure 1 illustrates this point. The numbers are specific to the Alice Springs-Darwin rail link, but the relative shape of the curves is universal. The road cost curve is horizontal because the basis for the graph is a with railway vs. without railway comparison. It is assumed that a road will exist in both cases, so capital and other fixed costs attributable to the road are omitted. Rolling stock amortization is treated as a (long run) variable cost.

Railway investments are essentially long-term. Viewed over a 30 or 40 year life, an adequate return to investment might be generated. But investors are not accustomed to waiting so long. Moreover, adequate real returns (i.e. net of inflation) may not be sufficient in the early years to pay the required nominal rate of interest. Hence, for example, a conventional 20 year Commonwealth bond paying 13% p.a. would be a complete mis-match with the net revenue flow which a railway could be expected to generate.

There is a further problem, which has been aired sufficiently elsewhere. I will simply draw attention to it here. Railways are publicly-owned assets. They are consequently expected to fulfil a non-commercial as well as a commercial role - to meet certain "public service obligations" (PSOs). Often in Australia the profits made from long-hauling bulk minerals and other cargoes well suited to the rail mode are more than absorbed by traffics which the railway systems, if they were able to make purely commercial decisions, would reject. Passengers and LCL (less than car load) traffic are the clearest examples (ARRDO 1981). The same applies where, for political, social, developmental or other reasons, railway systems are obliged to charge less than commercial rates.

In order for a railway (and the Alice Springs-Darwin rail link in particular) to generate sufficient net revenue to service the capital required for its construction, then, three conditions must be met:

- it must be free to reject unprofitable traffics (or be paid to carry them as a PSO);
- it must be free to charge commercially rational rates in all cases (or be paid a subsidy which would be passed on to certain users in the form of less than commercial rates); and
- an appropriate capital structure must be devised, such that debt service payments are matched with expected cash flow.

This paper addresses the third of these conditions.

TABLE 1

EXPECTED CASH FLOW
ALICE SPRINGS - DARWIN RAILWAY
WORST CASE, GROWTH 3%PA
INFLATION 7%PA

YEAR	CAPITAL COST ($M)	OPERATING COST ($M)	GROSS REVENUE ($M)	NET CASH FLOW ($M)
1984	25.68			-25.68
1985	89.30			-89.30
1986	95.55			-95.55
1987	102.24			-102.24
1988	109.40			-109.40
1989	117.06			-117.06
1990	125.25			-125.25
1991	134.02			-134.02
1992	14.71	55.20	102.70	32.78
1993		60.27	113.18	52.91
1994		65.80	124.74	58.93
1995		71.86	137.47	65.61
1996		78.50	151.51	73.01
1997		85.76	166.98	81.22
1998		93.70	184.03	90.32
1999		102.41	202.81	100.41
2000		111.94	223.52	111.58
2001		122.38	246.34	123.96
2002		133.82	271.50	137.68
2003		146.35	299.21	152.87
2004		160.08	329.76	169.68
2005		175.13	363.43	188.31
2006		191.62	400.54	208.92
2007		209.70	441.44	231.73
2008		229.53	486.51	256.98
2009		251.26	536.18	284.92
2010		275.10	590.92	315.82
2011		301.24	651.25	350.01
2012		329.92	717.75	387.83
2013		361.37	791.03	429.66
2014		395.89	871.79	475.91
2015		433.76	960.80	527.05
2016		475.32	1058.90	583.58
2017		520.93	1167.02	646.09
2018		570.99	1286.17	715.18
2019		625.95	1417.49	791.54
2020		686.28	1562.21	875.93
2021		752.53	1721.71	969.19

EXPECTED CASH FLOW

Table 1 shows projected costs, revenue and the consequent net cash flow during an eight year construction period and the first thirty years of operation, with an inflation rate of 7% p.a. They have been calculated on the basis of a simplified cost/revenue model derived from AN's estimates for three different levels of traffic. The elements of the model are:

- capital expenditure of $578 million spread over nine years;
- fixed operating costs of $9.75 million p.a.;
- long-run variable operating costs of 1.06¢/NTK; and
- average gross revenue of 2.92¢/NTK.

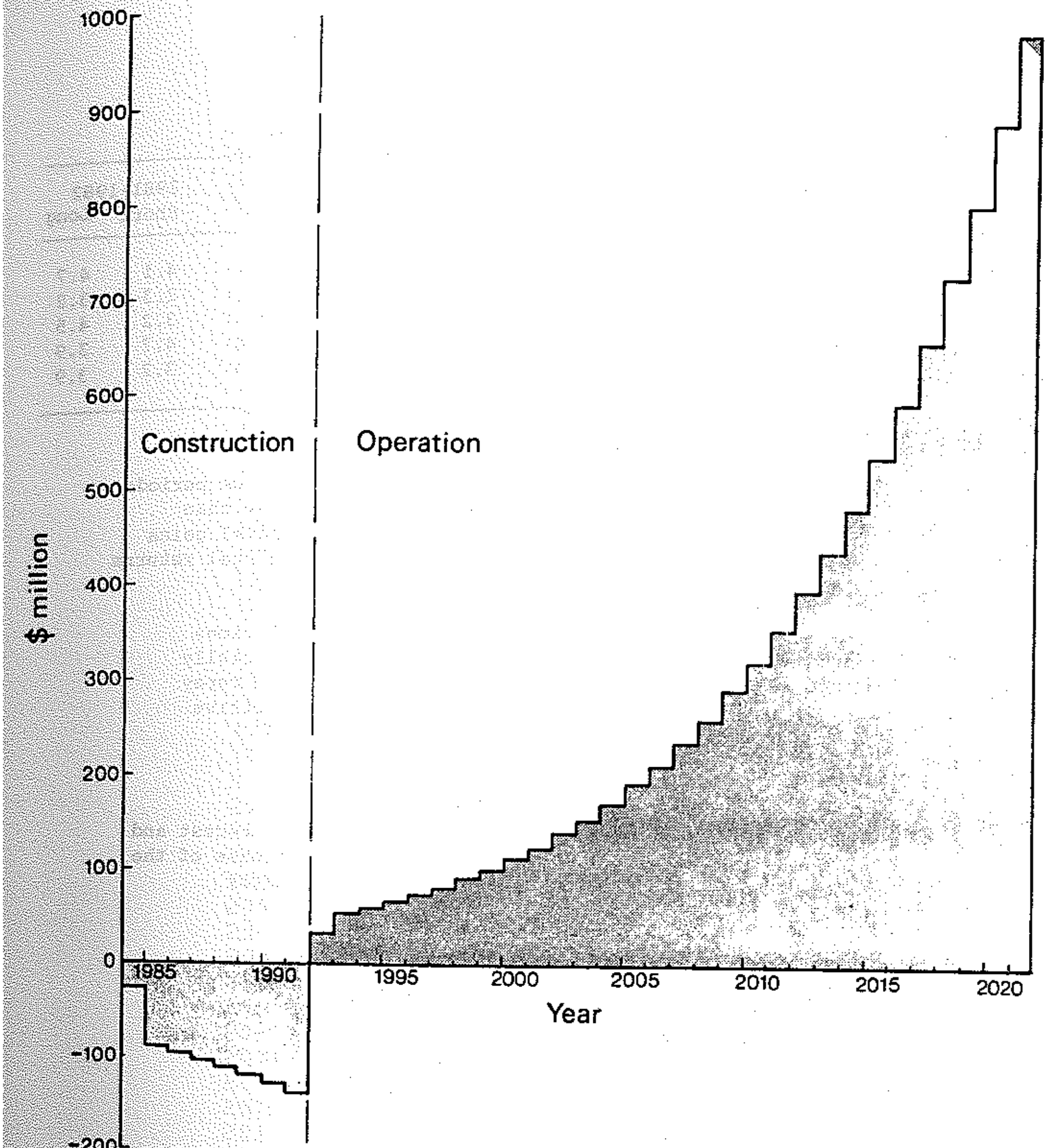
Operating costs are rather higher than those which appear in the original NT Government submission to the Hill Inquiry because additional cost data were supplied after its completion, necessitating a supplementary paper.

In the first year of operation a positive net cash flow of $32.78 million is achieved. This is not impressive when compared with a cumulative negative cash flow of nearly $800 million by the end of 1991 - and much more if debt servicing costs during the construction period are taken into account. However, over time two effects improve the situation very considerably:

- inflation widens the gap between revenue and costs; and
- as traffic grows, real costs rise more slowly than revenue because of their fixed component.

Consequently, with 7% p.a. inflation and a 3% p.a. growth in traffic (from a 1992 level of 2,395 million NTK) costs rise at an average annual rate of 9.43%, compared with 10.21% for revenue and 10.96% for net cash flow. The net cash flow is presented graphically in Figure 2.

The internal rate of return (IRR) of the 38 year cash flow from 1984 to 2021 is 11.91% p.a. With a 7% p.a. inflation rate this is equivalent to a <u>real</u> return of 4.59% p.a. This comfortably exceeds what investors in Commonwealth bonds and similar securities have historically been able to expect, as demonstrated in Table 2, originally published by the National Australia Bank (National Australia Bank 1983). The Northern Territory Department of the Treasury has quoted a Sydney-based Merchant Bank as expressing the confirmatory opinion that "Any long term discount rate must in our view represent a margin of 2-3 percent above the anticipated long term rate of inflation." (N.T. Government 1983, Appendix G).



EXPECTED NET CASH FLOW, 1984 - 2021

Figure 2

Table 2

Average Real Interest Rates
(% per annum)

	1961-1970 Short	Long	1971-1980 Short	Long	1981-1982 Short	Long
United States	1.6 (0.5)	2.1 (0.8)	-0.9 (1.2)	0.2 (1.7)	4.1	4.7
United Kingdom	1.7 (0.8)	2.9 (0.7)	-3.5 (3.4)	-1.1 (3.1)	2.3	3.2
Japan	2.4 (2.1)	1.5 (1.0)	-1.3 (3.4)	-0.9 (4.3)	3.2	4.5
West Germany	2.4 (1.5)	4.1 (0.8)	1.7 (1.7)	2.8 (0.4)	4.7	3.9
Australia	1.8 (1.0)	2.7 (0.9)	-2.6 (2.5)	-1.3 (2.3)	3.2	3.9

() figures in brackets represent standard deviations.

A recent confidential analysis of yields during various periods since 1961 has shown that equity investors fared rather worse than holders of fixed interest securities, taking account of capital gains and losses as well as dividends. The same analysis reveals real returns to property investment in the range -1.5% to 5.2% p.a.

It may be concluded that, subject to the three conditions listed in the previous section, the rail link could be financially self-sufficient. It could cover all its operating costs and repay all its capital costs, with interest equivalent to a competitive real return on investment, over thirty years.

CAPITAL STRUCTURE

The trick is to match investors' requirements for interest and capital repayment with the expected net cash flow. In the case of the Alice Springs-Darwin rail link, a combination of four investor categories is examined:

- The prime contractor, who would provide finance during the construction period and be repaid, with interest, on completion;

- Purchasers of conventional long-term bonds, who would receive a constant nominal interest rate until repayment at the end of the bond life;

- Purchasers of a flexible, index-linked security, designed to provide a reasonable real return after an initial grace period;

- The equity holder: in practice the Commonwealth Government, which would contribute no capital but would receive the projected cash flow surplus in return for bearing the risk.

TABLE 3

POSSIBLE FUNDING FOR ALICE SPRING - DARWIN RAILWAY
WORST CASE, GROWTH 3%PA
INFLATION 7%PA
THREE LOANS

YEAR	NET CASH FLOW ($M)	LOAN 1 ($M)	LOAN 2 ($M)	LOAN 3 ($M)	SURPLUS ($M)
1984	-25.68	25.68			.00
1985	-89.30	89.30			.00
1986	-95.55	95.55			.00
1987	-102.24	102.24			.00
1988	-109.40	109.40			.00
1989	-117.06	117.06			.00
1990	-125.25	125.25			.00
1991	-134.02	134.02			.00
1992	32.78	-1155.20	500.00	622.42	.00
1993	52.91		-50.00	.00	2.91
1994	58.93		-50.00	.00	8.93
1995	65.61		-50.00	.00	15.61
1996	73.01		-50.00	.00	23.01
1997	81.22		-50.00	.00	31.22
1998	90.32		-50.00	-37.36	2.96
1999	100.41		-50.00	-39.98	10.43
2000	111.58		-50.00	-42.78	18.80
2001	123.96		-50.00	-45.77	28.19
2002	137.68		-50.00	-48.98	38.70
2003	152.87		-50.00	-52.40	50.46
2004	169.68		-50.00	-56.07	63.61
2005	188.31		-50.00	-60.00	78.31
2006	208.92		-50.00	-64.20	94.72
2007	231.73		-50.00	-68.69	113.04
2008	256.98		-50.00	-195.61	11.37
2009	284.92		-50.00	-209.30	25.61
2010	315.82		-50.00	-223.96	41.87
2011	350.01		-50.00	-239.63	60.38
2012	387.83		-50.00	-256.41	81.43
2013	429.66		-50.00	-274.35	105.30
2014	475.91		-50.00	-293.56	132.35
2015	527.05		-50.00	-314.11	162.94
2016	583.58		-50.00	-336.10	197.49
2017	646.09		-50.00	-359.62	236.46
2018	715.18		-50.00	-384.80	280.38
2019	791.54		-50.00	-411.73	329.80
2020	875.93		-50.00	-440.55	385.37
2021	969.19		-550.00		419.19

Table 3 shows the results of adopting one possible funding strategy:

- The prime contractor receives $1,155.20 million in 1992, on completion of his contract. This represents full repayment of funds provided during construction, with interest at 9.5% p.a.

- The money paid to the contractor comes from two sources. One is a $500 million bond issue with an interest rate of 10% p.a., repayable in 2021.

- The second source is a loan of $622.42 million from an investor who wants a delayed, index-linked return: probably a superannuation fund or life assurance company. The example used in Table 3 is explained in detail in the following section.

- The risk-taking equity investor receives a surplus every year, provided that the out-turn for costs and revenue is no worse than the forecast Worst Case Scenario.

THE INDEX LINKED SECURITY

Clearly the key to the suggested funding strategy is the investor who wants a delayed return which grows over time. For a superannuation fund or a life assurance company it could be an ideal opportunity to match future income, secured against unpredictable inflation, with known or expected liabilities. Index-linked securities such as UK "granny bonds" are not new, but the Australian money market is undeveloped in this area (partly because of unfavourable tax treatment of apparent but "unreal" capital gains).

In the example used in Table 3 the index-linked investor receives his return in three phases:

- 1993-1997 Five-year grace period during which neither interest nor repayments are received.

- 1998-2007 Ten years of interest at 4% p.a., index-linked from 1992.

- 2008-2020 Thirteen years of repayment as an equated annuity, with interest at 5% p.a., index-linked from 1992.

Over the whole 28-year period the average real return to the investor is 3.12% p.a.

The exact terms under which such index-linked securities might be issued are infinitely variable, of course, and the task of matching available net revenue to investors' exact requirements would be complex. But similar matching is done for large property and other developments, and the necessary skills exist in Australia.

CONCLUSION

Using the Alice Springs-Darwin rail link as an example, it has been demonstrated that in the first thirty years of operation a sufficient net cash flow could be generated to provide investors, collectively, with a real return superior to that available from alternative investments. And a possible capital structure has been described which would enable the equity investor (the Commonwealth Government) to receive a dividend in every year for no capital outlay.

It is concluded that where such public investments are contemplated - economically feasible but with poor short-term financial performance - alternatives to conventional Commonwealth funding should be explored. In particular, investors with a need for secure inflation-proof returns in the long-term future (such as superannuation funds and life assurance companies) should be sought in order to match their long-term cash flow needs with the project's expected cash flow generation.

Railway development is an obvious candidate for such treatment, but the principle may be applied more widely.

REFERENCES

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