**INTERNATIONAL PROJECT APPRAISAL**

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These problems are Prof. Vedpuriswar’s IP. These problems can be obtained from

Caution :The currencies and exchange rates may not be current. These problems are for explanation of the principle only

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**Problem 1**

An Indian firm finds that by investing in a project in East Africa, its borrowing capacity

will go up by Rs. 50 million. If the firm’s borrowing rate in India is 15% and the risk free rate of interest is 6%, what is the net benefit owing to the increased borrowing capacity ? Assume that the tax rate applicable in India is 40% and the life of the project is 5 years.

**Solution**

Interest on increased borrowing capacity = (.15) (50) = Rs. 7.5million

Tax shield generated per year = (.4) (7.5) = Rs. 3.0 million

Present value of tax shields due to increased borrowing capacity

= 3.0 x PVIFA6%,5

= Rs. 12.64 million.

**Problem 2**

An US multi-national is planning to invest in Germany. The local Government has agreed to give a loan of DM 100 million at a concessional rate of 5%. The competitive market rate of interest for similar loans in Germany is 10%. If the principal has to be repaid in 5 equal installments, what is the benefit which the US multinational will enjoy? You are given that the exchange rate at the time of investment is DM 1.50/$.

**Solution**

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Year Loan Principal Interest Present Value

outstandings repayment repayment of total repayment

(DM) (DM) (DM) (Discount rate = 0.10)

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1 100 20 5 25/(1.10) = 22.72

2 80 20 4 24/(1.10)2 = 19.83

3 60 20 3 23/(1.10)3 = 17.28

4 40 20 2 22/(1.10)4 = 15.03

5 20 20 1 21/(1.10)5 = 13.03

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Present Value of the concessional loan which can be deducted from the cost of the project = (100 - 87.89 ) / (1.5) = $ 8.07 million.

**Problem 3**

A German firm is planning to invest in USA. After detailed calculations, it finds that for

the project to break even, the adjusted present value has to increase by DM 5 million.

Meanwhile, it has to negotiate with the local Government regarding the interest rate which will be charged for a loan of $20 million. The competitive market rate of interest for similar loans in USA is 8%. If the principal is to be repaid in equal installments over 5 years, what concessional rate of interest must the German firm obtain for the project to break even? You are given that the spot rate at the time of implementation of the project is DM1.50/$.

**Solution**

Let the concessional rate of interest be i.

Then, the principal repayment will be $4 million each year interest payments will be as follows:

Year 1 : 20 i

Year 2 : (20-4) i = 16 i

Year 3 : (16-4) i = 12 i

Year 4 : (12-4) i = 8 i

Year 5 : 4 i

The assumption made in this problem is that the firm generates sufficient profits each year to absorb the tax shield. This means that the risk free rate of interest is adequate to incorporate the degree of risk involved.

The benefit due to the concessional loan must equal DM 5 million or $5/1.5 = $3.33 million.

But benefit due to the concessional loan

= 20 - { [ (20i+4) / 1.08] + [ (16i+4) ] / (1.08)2 ] + [ (12i + 4) / (1.08)3 ] +

[ (8i+4) /(1.08)4 ] + [ (4i+4) / (1.08)5 ]

= [ 20 - 50.36i - 15.97 ] = 4.03 - 50.36i

So, 4.03 - 50.36i > 3.33 or i <= .0138 = 1.38%

**Problem 4**

An US corporate is appraising an international project using the Adjusted Present Value method. It has calculated the APV to be $-70 million. The Government of India where the investment will be made has offered a concessional loan of Rs. 1400 crores. The competitive market rate of interest in India is 16% and the spot rate is Rs. 35/$. At what rate should the concessional loan be negotiated so that the project is feasible? Assume that the principal repayment will be made in five equal installments starting from the second year.

# Solution

# Let i be the rate of interest charged on the concessional loan.

# Then, we can construct the following table.

# -------------------------------------------------------------------------------------

# Year Interest Principal Total repayment

# (Rs crores) (Rs crores) (Rs crores) (Rs. crores)

# -------------------------------------------------------------------------------------

# 1 1400 i -- 1400 i

# 2 1400 i 280 1400 i + 280

# 3 1120 i 280 1120 i + 280

# 4 840 i 280 840 i + 280

# 5 560 i 280 560 i + 280

# 6 280 i 280 280 i + 280

# -------------------------------------------------------------------------------------

# Present Value of repayment

# = 1400i + 1400i+280 + 1120i+280 + 840i+280 + 560i+280 + 280i+280

# -------- ------------- ------------- ------------ ------------ ------------

# 1.16 1.162 1.163 1.164 1.165 1.166

# = Rs (790.16 + 3809.96i) crores

# = Rs (7901.6 + 38100i) million

This should be at least equal to the APV deficit which is Rs. (-70 mn x 35). Solve for I and deriver the value of i.

# Problem 5

Ved Udyog is exploring manufacturing of its scooters in the UK. The details of the project are a follows.

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Year 1 Year 2 Year 3 Year 4 Year 5

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Total Sales 60,000 70,000 80,000 90,000 100,000

(Units)

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\*Capital investment required is £45 mn

\* In current £ the sales price of a scooter is expected to be £500.

\* The variable cost of a scooter is expected to be £300 per scooter, also in current £.

\* The economic life of the UK plant is expected to be 5 years and it is expected that no major expenditure for repairs/renovation would be required during the life of the project.

\* The salvage value of the UK plant can be assumed to be negligible.

\* The depreciation of the plant allowable as per the UK tax laws will be as follows:

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Year 1 Year 2 Year 3 Year 4 Year 5

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Depreciation 3 2.6 2.4 1.7 1

( in £ million)

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\*The UK plant will incur fixed costs of £1 million per year, exclusive of depreciation.

\* The British Government has offered a loan of £5 million at 1% p.a. The principal is to be repaid in 5 equal installments with the first installment due at the end of the first year of production. The competitive market rate of interest for similar loans in UK is 12% p.a.

\* All variable and fixed costs are expected to move in line with the UK inflation rate.

\* The excess capacity of the Indian plant will remain unutilised. As a result, the loss of contribution each year for Ved Udyog will be Rs. 40 million in current rupees.

\* Corporate tax rates in India and Britain are 35% and 20% respectively.

\* Ved Udyog Ltd faces a borrowing rate of 17% in India and the risk free rate of interest is 9%.

\* The long term inflation rates in India and UK are expected to be 9% and 2% p.a. respectively.

\* The current exchange rate is Rs. 59 = £1. It is believed that purchasing power parity is likely to hold.

\* The Corporate finance group of Ved Udyog has suggested a discounting rate of

18% for operational cash flows generated by the project.

\*Currently the Company exports 20,000 scooters per annum to UK

\*This project’s capability will enable the company to enhance its borrowing capacity in India by Rs.100 mn.

You are required to examine the feasibility of the project using the APV method.

**Problem 6**

M/s. GB Plc. is a leading UK manufacturer of optical fibre cables. The company is

planning to set up a manufacturing unit in Germany to access the European markets. The company has so far tapped only the French market through its sales subsidiary in Paris.

The estimated construction cost of the new plant is DM 50 million and sales from the plant will be realised in one year. The investment will allow the UK company to enhance its borrowing limit by £15 million. The French subsidiary has surplus funds to the tune of FFr. 35 million which can be utilised for the investment in the German factory. The long run inflation rates in the various countries are expected to be as follows:

UK : 1% p.a.

France : 2% p.a.

Germany : 4% p.a

The current exchange rates are £1 = DM 2.74 = FF 9.23 and it is believed that PPP is likely to hold between the three economics. The sales projection for the first five years of operation of the German plant are as follows:

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Year1 Year2 Year3 Year4 Year5

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Capacity (%) 60 75 90 100 100

Sales (DM in mn) 60 75 90 100 100

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The contribution on all sales is expected to be 25%. The economic life of the plant is 5

years. With the establishment of this new unit, the French subsidiary will cease to receive the raw material from UK and the only sales affected by it will be those generated by German production which are included in the projected revenues mentioned above.

Currently, the Paris subsidiary is generating a profit of £200,000 for the parent company. had the subsidiary continued to receive goods from UK, the current level of profits would only have grown to keep pace with the UK inflation. The British tax laws allow the historical cost of the plant to be depreciated over 5 years. All other production costs are estimated to move in line with the general price level in Germany.

The German Government has offered a loan of DM 20 million at 5% interest rate,

repayable in five equal installments. The first installment is due at the end of the first

year. The competitive market rate of borrowing in Germany is 10%. The company faces a borrowing rate of 7% in Britain with the riskless rate being 5%. The tax rate in Britain is 50% while that in Germany is 45%.

You are required to evaluate the proposal using the APV method. Assume that a discount rate of 15% is appropriate for cash flows generated by operations.

**Solution**

The exchange rate schedule is established by using PPP.

**Exchange rate schedule**

Year 1 2 3 4 5

Exch rate 2.82 2.91 2.99 3.08 3.17

(DM/£)

**Initial Investment**

= DM 50 million = £ (50/2.74) = £ 18.25 million.

**Cash flows from operations**

Year Sales PBT PAT PAT Lost profits

(DM million) (DM million) (DM million) (£million) (£million)

1 60 15 7.500 2.66 .202

2 75 18.75 9.375 3.22 .204

3 90 22.50 11.250 3.76 .206

4 100 25 12.50 4.06 .208

5 100 25 12.50 3.94 .210

Year Net profits PV (k = .15)

1 2.458 2.14

2 3.016 2.28

3 3.554 2.34

4 3.852 2.20

5 3.730 1.85

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10.81

Note that the higher tax rate of 50% has been applied here.

**Tax shield due to depreciation**

Since the UK tax rate is higher, depreciation has to be calculated on the basis of UK laws. We assume that UK tax laws allow consolidation of Profits of subsidiaries at parent country. We assume that the entire investment consists of depreciable assets. So, total value of depreciation assets is (50/2.74) = £ 18.25 million. This can be written off over a period of five years. The tax shield can be discounted at the risk free rate of 5% prevailing in Britain.

Year Depreciation

( £ million)

1 3.65

2 3.65

3 3.65

4 3.65

5 3.65

PV of depreciation tax shield = (3.65) (.5) (1.055 - 1)

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(.05) (1.05)5

= £ 7. 90 mn (the above formula is for PVIFA

**Tax shield due to increased borrowing capacity**

Annual tax shield generated = £ (15) (0.07) (0.5)

Present value of tax shields due to increased borrowing capacity can be calculated by

using a discount rate of 5%, the risk free rate in Britain.

Using PVIFA, this can be found equal to £ 2.28 mn.

**Benefit due to concessional loan**

We assume that the principal is repaid in five equal installments.

Year Loan o/s Interest Total payment PV (k = .10)

1 20 1 5 4.55

2 16 .8 4.8 3.97

3 12 .6 4.6 3.46

4 8 .4 4.4 3.01

5 4 .2 4.2 2.61

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17.60

PV of concessional loan = (20 - 17.6) / 2.74 = £ 0.88 mn

APV = - 18.25 + 10.81 + 7.90 + 2.28 + 0.88

= + £ 3.62 million

Since the APV is positive, the project can be accepted.