## Chapter X

# CASH MANAGEMENT

## PROBLEMS

### Problem 1

An American Multi National Corporation has three subsidiaries whose cash positions for the month of March, 1997 are given below

Swiss Subsidiary : Cash surplus of SF 15,000,000
German Subsidiary : Cash deficit of DM 35,000,000
UK Subsidiary : Cash deficit of £ 3,000,000

What are the cash requirements if :

a. decentralised cash management is adopted ?
b. centralised cash management is adopted ?
(Exchange rates : SF 1.5/$, DM 1.75/$, $1.60/£)

### Solution

a. Total cash requirement
= DM 35,000,000 + £ 3,000,000
= $ (35,000,000/1.75 + 3,000,000 x 1.60)
= $ (20 + 4.8) million
= $24.8 million

In this case, the surplus available at the Swiss subsidiary is not available for adjustment against the deficits of other subsidiaries.

b. Total cash requirement
= -SF 15,000,000 + DM 35,000,000 + £3,000,000
= $ ( -15,000,000/1.5 + 35,000,000/1.75 + 3,000,000 x 1.60)
= $14.8 million

Centralised cash management helps in management of a given volume of business with lower cash balance.

### Problem 2

An US multinational has subsidiaries in Switzerland, UK and Germany. The following

cash flows are involved among the subsidiaries and Headquarters.

| From | To | Amount |
|---|---|---|
| Swiss subsidiary | US parent | SF 290,000 |
| Swiss subsidiary | UK subsidiary | SF 29,000 |
| UK subsidiary | Swiss subsidiary | £ 24,390 |
| UK subsidiary | US parent | £ 54,878 |
| German subsidiary | Swiss subsidiary | DM 504,000 |
| German subsidiary | UK subsidiary | DM 134,400 |
| US parent | German subsidiary | $ 120,000 |

The exchange rates are currently :

£ 1 = $ 1.64
$ 1 = DM 1.68
$ 1 = SF 1.45

Explain how the company can use centralised cash management.

**Solution**

All the subsidiaries can convert their receivables and payables into dollars and determine their net position.

| | | |
|---|---|---|
| The Swiss subsidiary | | |
| receives £ 24,390 | = $ (24390) (1.64) | = $ 40,000 |
| receives DM 504,000 | = $ (504,000) / (1.68) | = $ 300,000 |
| pays SF 319,000 | = $ (319,000) / (1.45) | = $ 220,000 |
| | | + $ 120,000 |
| The UK subsidiary | | |
| receives SF 29,000 | = $ (29,000) / (1.45) | = $ 20,000 |
| receives DM 134,000 | = $ (134,400) / (1.68) | = $ 80,000 |
| pays £ 79,268 | = $ ( 79,268) / (1.640) | = $ 130,000 |
| | | - $ 30,000 |
| The German subsidiary | | |
| receives $ 120,000 | = $ 120,000 | |
| pays DM 638,400 | = $ (638,4000/(1.68) | = $ 380,000 |

| | | |
|---|---|---|
| | | - $ 260,000 |
| The parent company | | |
| receives SF 290,000 | = $ (290,000) / (1.45) | = $ 200,000 |
| receives £ 54,878 | = $ (54,878) / (1.64) | = $ 90,000 |
| pays $ 120,000 | | = $ 120,000 |
| | | --- |
| | | + $ 170,000 |

So, the Swiss subsidiary will receive $ 120,000 or SF 174,000 from the netting centre.
The UK subsidiary pays $ 30,000 or £ 18,293 to the netting centre.
The German subsidiary pays $ 260,000 or DM 436,800 to the netting centre.
The parent company receives $ 170,000 from the netting centre.

## Problem 3

An US MNC has three subsidiaries in UK, Germany and India. The Treasurer has tabulated the various cash flows taking place among the parent company and the subsidiaries.

UK subsidiary pays DM 1,000,000 to the German subsidiary.
UK subsidiary pays $ 1,000,000 to the parent company.
German subsidiary pays £ 500,000 to the UK subsidiary.
German subsidiary pays $ 2,000,000 to the parent company.
Indian subsidiary receives $ 1,000,000 from the parent company.
Indian subsidiary pays Rs. 35,000,000 to the parent company.
Parent company pays £ 500,000 to the UK subsidiary.

Assuming that the following exchange rates are being quoted, explain how the company can use centralised cash management to its advantage.

Exchange rates : DM 1.50 / $, $ 1.50 / £, Rs 35/ $

## Solution

### Alternative I

Subsidiaries use netting.

The UK subsidiary
pays DM 1,000,000 to the German subsidiary
receives £ 500,000 or DM (500,000) (1.5) (1.5) = DM 1,125,000.
Hence, by netting, the UK subsidiary will receive
DM ( 1,125,000-1,000,000) = DM 125,000 from the German subsidiary.

The UK subsidiary
pays $ 1,000,000 to the parent company.
receives £ 500,000 = $ (500,000) (1.5) = $ 750,000 from parent company.
After netting, the UK subsidiary pays
$ (1,000,000 - 750,000) = $ 250,000 to the parent company.

The Indian subsidiary
pays Rs 35,000,000 = $ (35,000,000) / (35) = $ 1,000,000 to the parent company.
receives $ 1,000,000 from the parent company.
Receivables and payables hence cancel out after netting.

Thus, with centralised cash management, we are left with only the following transactions.
a) UK subsidiary receives DM 125,000 from the German subsidiary.
b) UK subsidiary pays $ 250,000 to the parent company.
c) German subsidiary pays $ 2,000,000 to the parent company.

Thus, we have reduced the number of transactions from 7 to 3.

**Alternative II**

We use centralised cash management.

<u>UK</u> <u>subsidiary</u>

Receipts = 500,000 + 500,000 = £ 1,000,000
Payments = DM 1,000,000 + $ 1,000,000
= (1,000,000) / 2.25 + (1,000,000) / 1.5
= £ 1,111,111
So, net payable = £ 111,111.

Thus, the UK subsidiary pays £ 111,111 to the netting centre.

<u>German</u> <u>subsidiary</u>

Receipts = DM 1,000,000
Payments = £ 500,000 + $ 2,000,000
= DM (500,000) (2.25) + DM (2,000,000) (1.50)
= DM 1,125,000 + DM 3,000,000
= DM 4,125,000
So, net payable = DM (4,125,000 - 1,000,000) = DM 3,125,000

Thus, the German subsidiary pays DM 3,125,000 to the netting centre.

Indian subsidiary

Receipts = $ 1,000,000
Payments = Rs 35,000,000 = $ 1,000,000.
So, receivables and payables cancel out.

Parent company

| | | | |
|---|---|---|---|
| Receipts | = Rs 35,000,000 | + $ 3,000,000 |
| | = $ 1,000,000 | + $ 3,000,000 |
| | = $ 4,000,000 | |
| Payments | = $ 1,000,000 | + £ 500,000 |
| | = $ 1,000,000 | + $ 750,000 |
| | = $ 1,750,000 | |

So, net receivables = $ (4,000,000 - 1,75,000) = $ 2,250,000.

Thus, the parent company receives $ 2,250,000 from the netting centre.

**Problem 4**

An US multinational has three subsidiaries in India, Germany and UK. The projected cash flows for the next six months are as follows. (+ denotes net inflows and - denotes net outflows)

| | Indian subsidiary (Rs 000) | German subsidiary (DM 000) | UK subsidiary (£ 000) |
|---|---|---|---|
| 01.01.96 | +3600 | +50 | +70 |
| 01.02.96 | -2000 | +200 | -40 |
| 01.03.96 | +1500 | -100 | +50 |
| 01.04.96 | -1000 | -50 | +100 |
| 01.05.96 | +3000 | +250 | +150 |
| 01.06.96 | -500 | -200 | +100 |

The one month interest rates for the three currencies are expected to be steady and would be as follows:

Re - 18%  DM - 5%  £ - 8%  $ - 6%

The one month forward rates are given below.

| | Rs. /$ | DM/$ | $/£ |
|---|---|---|---|
| 01.12.95: | 35.50 | 1.51 | 1.60 |
| 01.01.96: | 36.00 | 1.50 | 1.61 |
| 01.02.96: | 36.40 | 1.52 | 1.62 |
| 01.03.96: | 36.70 | 1.53 | 1.63 |
| 01.04.96: | 36.90 | 1.54 | 1.64 |
| 01.05.96: | 37.10 | 1.55 | 1.65 |

The company is evaluating two alternative approaches to cash management.

a) Allow each subsidiary to manage its cash flows. The net position at the end of six months will be converted into $ and repatriated.

b) At the beginning of each month, allow each subsidiary to retain only funds to the extent required for meeting liabilities during the next two months. The balance will be converted into dollars using forward contracts and repatriated back to US.

Considering the period 01.01.96 - 01.06.96 which option do you think is preferable for the company? Calculations may be rounded off to the nearest whole number.

**Solution**

Alternative 1

Indian Subsidiary

On 01.01.96, it can invest 3600 for one month to get (3600) (1+0.18/12) = 3654 after 30 days.

On 01.02.96, it can settle the liability of 2000.
Surplus funds available on 01.02.96 = 3654 - 2000 = 1654

Investment for one month yields (1654) (1+0.18/12) = 1679
On 01.03.96, surplus funds available = 1500+1679 = 3179
Investment for one month yields (3179) (1+0.18/12) = 3227
On 01.04.96, surplus funds available = 3227 – 1000 = 2227
Investment for one month yields (2227) (1+0.08/12) = 2260
On 01.05.96, surplus funds available = 2260+3000 =5260
Investment for one month yields (5260) (1+0.18/12) = 5339
On 01.06.96, a liability of 500 has to be settled.
So, surplus funds available for repatriation = 5339 - 500
= 4839
Exchange rate applicable = 37.10 being the forward rate on 1.5.96
So, amount repatriated = (4,839,000) / (37.10) = $130,431

German Subsidiary

The cash position at the beginning of each month can be worked out as in the case of the Indian subsidiary.

| Date | Net cash positions |
|---|---|
| 01.01.96 | 50 |
| 01.02.96 | (50) (1+0.05/12) + 200 = 250 |
| 01.03.96 | (250) (1+0.05/12) - 100 = 151 |
| 01.04.96 | (151) (1+0.05/12) - 50 = 102 |
| 01.05.96 | (102) (1+0.05/12) + 250 = 352 |
| 01.06.96 | (352) (1+0.05/12) + 200 = 153 |

Amount repatriated on 01.06.96 = (153,000) / (1.55) = $98,710

UK Subsidiary

| Date | Net cash positions |
|---|---|
| 01.01.96 | 70 |
| 01.02.96 | (70) (1+0.08/12) - 40 = 30 |
| 01.03.96 | (30) (1+0.08/12) + 50 = 80 |
| 01.04.96 | (80) (1+0.08/12) + 100 = 181 |
| 01.05.96 | (181) (1+0.08/12) - 150 = 32 |
| 01.06.96 | (32) (1+0.08/12) + 100 = 132 |

Amount repatriated on 01.06.96 = (132,000) (1.65) = $217,800

So, total dollars funds available from the subsidiaries on 01.06.96

= 130,431 + 98,710 + 217,800

= $ 446,941.

Alternative 2

We assume that the cash flow projections are accurate.

Indian Subsidiary

| Date | Surplus available (Rs 000) | Exchange rate (Rs/$) | Amount repatriated ($) |
|---|---|---|---|
| 01.01.96 | 3600-2000/(1+0.18/12) =1630 | 35.50 | 45,915 |
| 01.02.96 | Nil | -- | |
| 01.03.96 | 1500-1000/(1+0.18/12) = 515 | 36.40 | 14,148 |
| 01.04.96 | Nil | -- | |
| 01.05.96 | 3000-500/(1+0.18/12) = 2507 | 36.90 | 67,940 |
| 01.06.96 | Nil | -- | |

German Subsidiary

| Date | Surplus available (DM 000) | Exchange rate (DM/$) | Amount repatriated ($) |
|---|---|---|---|
| 01.01.96 | 50 | 1.51 | 33,113 |
| 01.02.96 | 200-100 / (1+0.05/12) -50 $(1+0.05/12)^2$ =51 | 1.50 | 34,000 |
| 01.03.96 | Nil | | |
| 01.04.96 | Nil | -- | |
| 01.05.96 | 250-200 / (1+0.05/12) | 1.54 | 33,117 |

| | | | |
|---|---|---|---|
| | =51 | | |
| 01.06.96 | Nil | -- | |

UK Subsidiary

| Date | Surplus available (£ 000) | Exchange rate ($/£) | Amount repatriated ($) |
|---|---|---|---|
| 01.01.96 | 70-40/(1+0.18/12) = 30 | 1.60 | 48,000 |
| 01.02.96 | Nil | -- | |
| 01.03.96 | Nil | -- | |
| 01.04.96 | Nil | -- | |
| 01.05.96 | Nil | -- | |
| 01.06.96 | 101 | 1.65 | 166,650 |

So, the total dollar amounts repatriated can be tabulated below :

| | | | |
|---|---|---|---|
| 01.01.96 | 45,915 + 33,113 + 48,000 | = | 127,028 |
| 01.02.96 | 34,000 | = | 34,000 |
| 01.03.96 | 14,148 | = | 14,148 |
| 01.04.96 | | = | -- |
| 01.05.96 | 67,940 + 33,117 | = | 101,057 |
| 01.06.96 | 166,650 | = | 166,650 |

These cash flows can be invested at 6%.

So, total value of cash flows accumulating on 01.06.96.

= $(127,028)\ (1+0.06/12)^5 + (34,000)\ (1+0.06/12)^4 + (14,148)\ (1+0.06/12)^3 + (101,057)\ (1+0.6/12) + 166,650$

= $ 447,494

So, we find that decentralised cash management is more beneficial in this case but only marginally.

Note : In the case of the UK subsidiary, under alternative 2, a small surplus of £1000 will be available on 1.5.96. We assume this is repatriated along with the remaining amount on 1.6.96.

**Problem 5**

An US multinational has three subsidiaries in India, Germany and Switzerland. The following are the details of transactions taking place among the subsidiaries during the current month.

Indian subsidiary

It pays the German subsidiary DM 100,000
It receives SF 200,000 from the Swiss subsidiary
It pays SF 100,000 to the Swiss subsidiary

German subsidiary

It receives DM 100,000 from Indian subsidiary
It receives SF 100,000 from Swiss subsidiary
It pays SF 50,000 to Swiss subsidiary

Swiss subsidiary

It receives SF 100,000 from Indian subsidiary
It pays SF 200,000 to Indian subsidiary
It receives SF 50,000 from German subsidiary
It pays SF 100,000 to German subsidiary

You are given that the following exchange rates will hold steady. Interest costs may also be ignored.

Rs/$ : 35.00/35.50 DM/$ : 1.70/1.75 SF/$ : 1.48/1.52

Explain how centralised cash management can benefit the MNC.

**Solution**

Alternative 1

First we net out the transactions.

Indian subsidiary will pay German subsidiary DM 100,000
Indian subsidiary will receive from Swiss subsidiary SF 100,000
German subsidiary will receives SF 50,000 from Swiss subsidiary

There are now only three forex transactions.

i) Conversion of Rupees into DM in India
ii) Conversion of SF into Rupees in India
iii) Conversion of SF into DM in Germany

This is against the five forex transactions earlier, three in India and two in Germany. In addition to reducing the number of transactions, costs have also been reduced because each time a transaction is undertaken, the spread will work against the multinational.

Alternative 2

If we convert the payables and receivables into net receivables or payable the position will be as follows.

Indian subsidiary

Payable of DM 100,000 or $ 100,000/1.70 = $ 58,824
Receivable of SF 100,000 or $ 100,000/1.52 = $ 65,789
---
+ $ 6,965

German subsidiary

Receivable of DM 100,000 = $ 100,000/1.75 = $ 57,143
Receivable of SF 50,000 = $ 50,000/1.52 = $ 32,895
---
+ 90,038

Swiss subsidiary

Net payable of SF 150,000 = $ 150,000/1.48 = - $ 101,351
Net cash position by centralised cash management
= +$6,965 + $90,038 - $101,351 = - $4,348

Thus with a small cash balance of around $ 5,000 at the beginning of the month, all the obligations can be settled.

To see how we have reduced transaction costs and cash requirements, assume that each subsidiary operates in decentralised fashion and buys or sells the foreign currency

involved in each transaction.

Indian subsidiary

Cash outflow = (100,000) (35.50/1.70) = Rs. 2,088,235
Cash inflow = (200,000) (35.00/1.52) = Rs. 4,605,263
Cash outflow = (100,000) (35.50/1.48) = Rs. 2,398,649
This can be converted into a surplus of 118,379/35.5 = $ 3335

German subsidiary

Cash inflow = DM 100,000 = DM 100,000
Cash inflow = (100,000) (1.70/1.52) = DM 111,842
Cash outflow = (50,000) (1.75/1.48) = DM 59,122

This can be converted into a surplus of 152,720/1.75 = $ 87,269

Swiss subsidiary

Net cash outflow = SF 150,000

To finance this deficit, we need 150,000/1.48 = $ 101,351

So, net cash position = 3335 + 87,269 - 101,351
= $ 10,747.

Thus, the cash requirement has been cut down significantly by using centralised cash management.