**Finance – Self Study Guide for Staff of Micro Finance Institutions**

**LESSON 2**

# EFFECTIVE COST OF BORROWING

**Objectives:** When clients borrow money, they incur both financial and transaction costs. Financial costs include interest, fees, forced savings, group fund and insurance fund contributions. Transaction costs include direct costs such as child care and transportation costs to attend meetings, and other transaction costs such as time away from the business, plus the opportunity cost of savings.

The objective of this session is to familiarize you with the effective cost to clients of borrowing and the related yield to the lender. Topics covered include:

- Cost components
- Effective cost calculation
- Effective yield to an organization
- Role of savings

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## Cost Components

The term "effective cost" does not refer to half of the nominal interest rate (e.g. 20% interest on the declining balance does not result in an effective cost of 10% or 11%). In fact, the effective cost includes all financial costs to the borrower.

When a client borrows money, she incurs both financial costs and transaction costs. Financial costs include: interest, loan or membership fees, and savings requirements. *Transaction costs refer to either money paid out or opportunity costs to access the loan*. Examples of transaction costs are transportation or child care costs while attending meetings. Other transaction costs are indirect costs imposed by lenders through their delivery systems, but which are not received by the lending organization in the form of revenue. For example, if a client is required to open a bank account to receive a loan, she incurs the cost of maintaining that account. This revenue is paid to the bank who holds the account, not to the micro-finance organization (unless it is licensed to provide chequing services).

Opportunity cost refers to foregone income because the money isn't available to be used elsewhere, but it also refers to time expended. Examples of opportunity costs include: attendance at meetings and the corresponding absence from the business, missed investment opportunities because of delays in the disbursement of a loan, or extra time spent processing a loan because of a lost or misplaced document by the micro-finance organization or the borrower, and the opportunity costs of holding savings rather than using the money directly in the business.

Think of additional costs (either financial and/or transaction) for clients. Which costs result in revenue to the micro-finance organization and which do not?

## Effective Cost Calculation

*The effective rate of interest refers to the inclusion of all direct financial costs of a loan in one interest rate.* Effective interest rates differ from *nominal* rates of interest in that they incorporate interest, fees, the interest calculation method, and other loan requirements into the financial cost of the loan. To be completely correct, the effective rate should also include the cost of forced savings or group fund contributions by the borrower. To do this, a financial calculator is required to calculate the *Internal Rate of Return (IRR)*. For the purposes of this guide, the effective rate of interest is calculated on an *estimation* basis using a formula that does not require a financial calculator.[1]

[Note that this method does not take into account the *time value* of money and the frequency of payments which is considered in the IRR calculation. Although the difference is minimal, the longer the loan term and the less frequent the payments, the more substantial the difference will be. This is because the longer the loan is outstanding and the less frequent the payments, the greater the effective cost will be and hence the greater the difference between the *estimated* effective cost and the IRR calculation.]

Effective rates of interest are useful for determining whether the conditions of one loan make it more expensive or less expensive for the borrower relative to another loan.

When interest is calculated on a declining balance, and there are no additional financial costs to a loan, the effective interest rate is the same as the nominal interest rate. Many micro-finance organizations, however, calculate the interest on a flat basis, charge fees as well as interest, and often require the borrowers to maintain savings. This makes the effective interest rate on the loans higher than the nominal rate.

The effective cost to the client consists of the amount the borrower pays in interest and fees divided by the amount of money the borrower has outstanding over the period of time the loan is outstanding. An *estimation* of the effective cost can be calculated as follows (does not include the effect of forced savings):

$$\text{Effective cost} = \frac{\text{amount paid in interest and fees}}{\text{average principal amount outstanding}}$$

*Note*:

$$\text{Average principal amount outstanding} = \frac{\text{sum of principal amounts outstanding}}{\text{number of payments}}$$

To calculate the Effective Cost per payment period, simply divide the resulting figure by the number of periods.

[1] This method of estimating the effective rates was developed by Chuck Waterfield in Designing for Financial Viability of Microenterprise Credit Programmes, Gemini Technical Note 4. Bethesda: Development Alternatives Inc.

The effective cost changes in relation to the interest calculation method, the fee and the loan term.

The following examples estimate the effective cost of a loan with interest calculated on a flat basis and on a declining basis:

**FLAT METHOD** Loan Amount – Bs. 1,000
12 Month Loan Term
Monthly Loan Payments of Bs. 100
Fee – 3% (Bs. 30)
Interest Rate – 20%

| Month | Payments | Principal | Interest | O/S Balance |
|---|---|---|---|---|
| 0 | | | Bs. 1,000.00 | |
| 1 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 916.67 |
| 2 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 833.34 |
| 3 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 750.01 |
| 4 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 666.68 |
| 5 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 583.35 |
| 6 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 500.02 |
| 7 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 416.69 |
| 8 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 333.36 |
| 9 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 250.03 |
| 10 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 166.70 |
| 11 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 83.37 |
| 12 | Bs. 100 | Bs. 83.33 | Bs. 16.67 | Bs. 0 |

**Total Interest Paid** **Bs. 200.00**

**Effective Cost** = $\frac{\text{Bs. 200.00 + Bs. 30.00}}{\text{Bs. 541.69}}$

**Effective Cost** = 42% (3.5% per month)

This results in an effective cost per month of 3.5%. Calculating the effective cost for loans with interest calculated on a flat basis is fairly simple as each payment has the same portion of principal and interest.

Calculating the effective cost for loans with interest calculated on the declining balance method is more complicated because the amount on which the interest payments are calculated (the amount of principal outstanding) is different for each payment period:

**DECLINING BALANCE** Loan Amount – Bs. 1,000
12 Month Loan Term
Monthly Loan Payments of Bs. 92.60
Fee – 3% (Bs. 30)
Interest Rate – 20%

| Month | Payments | Principal | Interest | O/S Balance |
|---|---|---|---|---|
| 0 | | | Bs. 1,000.00 | |
| 1 | Bs. 92.60 | Bs. 75.93 | Bs. 16.67 | Bs. 924.07 |
| 2 | Bs. 92.60 | Bs. 77.20 | Bs. 15.40 | Bs. 846.87 |
| 3 | Bs. 92.60 | Bs. 78.49 | Bs. 14.11 | Bs. 768.38 |
| 4 | Bs. 92.60 | Bs. 79.79 | Bs. 12.81 | Bs. 688.59 |
| 5 | Bs. 92.60 | Bs. 81.12 | Bs. 11.48 | Bs. 607.47 |
| 6 | Bs. 92.60 | Bs. 82.48 | Bs. 10.12 | Bs. 524.99 |
| 7 | Bs. 92.60 | Bs. 83.85 | Bs. 8.75 | Bs. 441.14 |
| 8 | Bs. 92.60 | Bs. 85.25 | Bs. 7.35 | Bs. 355.89 |
| 9 | Bs. 92.60 | Bs. 86.67 | Bs. 5.93 | Bs. 269.22 |
| 10 | Bs. 92.60 | Bs. 88.11 | Bs. 4.49 | Bs. 181.11 |
| 11 | Bs. 92.60 | Bs. 89.58 | Bs. 3.02 | Bs. 91.53 |
| 12 | Bs. 92.60 | Bs. 91.07 | Bs. 1.53 | Bs. 0 |

**Total Interest Paid = Bs. 111.66**

**Effective cost** = $\frac{\text{Bs. 111.66 + Bs. 30}}{\text{Bs. 558.27}}$

**Effective cost** = 25% (2.1% per month)

Calculating interest on the declining balance results in an effective cost per month of 2.1%.

From the above examples, we can see that the interest rate calculation method has a large impact on the effective cost. With all other factors remaining the same, the cost decreases from 42% (3.5% per month) to 25% (2.1% per month) when the method of calculation is changed from flat to declining balance. As mentioned, the interest calculation method, the fee, and the loan term all affect the effective cost. The following table illustrates the effect that a change in the loan fee and a change in the loan term have relative to the effective cost:

| | Calculation 20% Annual Rate | Service Fee | Loan Term | Effective Cost/Month |
|---|---|---|---|---|
| **BASE CASE #1** | **Flat** | **3%** | **12 months** | **3.5%** |
| ↑ Fee to 8% | Flat | 8% | 12 months | 4.3% |
| ↓ Term to 3 months | Flat | 3% | 3 months | 4.0% |
| **BASE CASE #2** | **Declining Balance** | **3%** | **12 months** | **2.1%** |
| ↑ Fee to 8% | Declining Balance | 8% | 12 months | 2.9% |
| ↓ Term to 3 months | Declining Balance | 3% | 3 months | 3.2% |

Note that the effect of an increase in the fees from 3% to 8% has the same effect (increase of 0.8%/month in effective cost) whether the loan is calculated on a declining basis or flat method. Decreasing the term to three months from 12 months has a greater effect on the effective rate for the declining balance calculation method (increase of 1.1% in effective cost/month) than the flat method (increase of 0.5% in effective cost/month). This is because a shorter loan term with interest calculated on a flat basis results in a much more costly loan, e.g. the client has use of the money for less time but pays the same nominal amount of interest.

## Effective Rate Calculation

Calculate the effective rate for Base Cases 1 and 2 with an increase in the fee to 8% and a decrease in the loan term to 3 months together. How do these changes affect the effective rate?

## Effective Yield

Generally, the effective cost to the client of borrowing relates to the effective "yield" earned by a micro-finance organization. *Yield refers to the revenue earned by the lender on the portfolio outstanding.* For example, if the effective cost per loan is calculated (using the estimation method above) at 35%, the yield to the organization will approximate 35% of the portfolio outstanding, since interest and loan fees are paid to the lending organization. This is reduced by the amount of delinquent (or *non-revenue generating*) loans, late payments, and can also be affected by low loan turnover (idle funds). The effective yield differs from the effective cost to the borrower because yield doesn't include such other costs as savings, etc.

## Role of Savings

Many micro-finance organizations require clients to have a balance of a percentage of the loan held in savings (or contributions to group funds) for first and/or subsequent loans. This affects both the client and the micro-finance organization.

### *Impact on Client*

By requiring funds to be held as savings, the borrower is restricted from utilizing those funds in her business activity or other income producing activities/investments. Usually the rate paid (if any) on the savings is lower than that which could be earned by the borrower if the savings were put into her business. The opportunity cost is therefore the difference between what the client earns on her savings and the rate which could be earned in her business.

Savings have a positive impact on clients by smoothing out their consumption patterns and providing funds for emergencies, provided the savings are available for withdrawal. So in addition to requiring clients to save as part of the loan process, many micro-finance organizations are currently piloting or offering voluntary savings services. *The benefits of voluntary savings are that they allow clients to save in a safe, liquid and divisible manner and generally offer a rate of return to the client.* Voluntary savings provide clients with extra funds during times of need and can assist clients in budgeting for loan payments and other cash flow items. Savings can also be used for future investments.

If clients do not have access to voluntary savings services, they will often save by investing in livestock and find that their savings are not divisible e.g. they cannot sell half a cow if they do not need the whole amount of their savings and are not always safe if the livestock dies or is stolen. Also, while livestock may increase in value and therefore provide a rate of the return to the borrower, there is no guarantee that this will occur. Many micro-finance organizations have proven that voluntary savings services are greatly needed by micro-entrepreneurs and are a welcome service to many borrowers.

*Impact on the Micro-Finance Organization*

If savings are used to fund the loan portfolio, they can lower the average cost of funds for a micro-finance organization. For example, if a micro-finance organization funds its loan portfolio with borrowed money from a bank at 12% but pays only 6% on the client savings, the greater the portion of the portfolio that is funded with savings, the lower the overall cost of funding will be.

[Note: it is very important to mention that this does not reflect the increase in operational costs incurred to provide savings services. The cost of delivering savings products often exceeds the cost of obtaining wholesale funding elsewhere. This discussion only refers to the average *cost of funds* for an organization, not the net cost of providing savings.[2]]

For example: $1,000,000 loan portfolio funded by 300,000 savings (@6%) and 700,000 borrowed funds (@12%). The average cost of funds is:

$$\frac{(300{,}000 \times 6\%) + (700{,}000 \times 12\%)}{1{,}000{,}000}$$

$$= \quad 10.2\%$$

If the savings component is increased to $500,000, the average cost of funds is reduced. Using the above example, a $1,000,000 loan portfolio funded by: 500,000 savings (@6%) and 500,000 borrowed funds (@12%). The average cost of funds is:

$$\frac{(500{,}000 \times 6\%) + (500{,}000 \times 12\%)}{1{,}000{,}000}$$

$$= \quad 9\%$$

The converse is also true. If a micro-finance organization funds its portfolio primarily with grant money for which there is no interest cost, the addition of 6% paid to the clients for savings *increases* a micro-finance organization's overall cost of funds.

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**EXERCISES**

Complete the "Effective Cost of Borrowing" Exercises on the next page.

[2] Although the overall cost of savings can be higher to an organization than wholesale funding, retail savings are generally a more stable source of funding. In addition, the availability of savings services can increase client loyalty and can enhance client viability.

## Effective Cost of Borrowing

*EXERCISES*

1. Define financial and transaction costs for the borrower.

2. Identify whether the following costs are financial or transaction costs:

| | FINANCIAL COST | TRANSACTION COST |
|---|---|---|
| Interest | | |
| Forced savings | | |
| Cost of opening a bank account | | |
| Transportation cost for receiving loan | | |
| Attendance at weekly meetings | | |
| Missed investment opportunities due to delays in loan disbursement | | |

3. What are opportunity costs?

4. Gemina is a member of the Philippine Savings and Credit Union. She saved P. 5 each week and earns 6% per annum interest on her savings. After saving for 50 weeks, she saved P. 250. If Gemina could invest her savings in her business rather than leaving them on deposit, she could earn P. 24 on P. 250 for one year.

   Calculate the opportunity cost for one year of Gemina's saving with Philippine Savings and Credit Union rather than investing the savings in her business.

5. What are the components of the effective cost of borrowing?

6. Write the formula for estimating the effective cost of a loan.

7. What is the impact on the effective cost of borrowing:
(i) a change in the calculation method for interest from declining balance to flat

(ii) increased loan fees

(iii) a shortened loan term

8. Estimate the Effective Cost per month for clients:

Loan Amount: $5,000
Loan Term: 6 months
Monthly Loan Payments: $958.34
Interest rate: 15% flat
Loan fees: 5%

| Months | Payments ($) | Principal ($) | Interest ($) | Principal O/S Balance ($) |
|---|---|---|---|---|
| 00 | – | – | – | 5,000.00 |
| 01 | 958.34 | 833.34 | 125.00 | 4,166.67 |
| 02 | 958.34 | 833.34 | 125.00 | 3,333.32 |
| 03 | 958.34 | 833.34 | 125.00 | 2,499.98 |
| 04 | 958.34 | 833.34 | 125.00 | 1,666.64 |
| 05 | 958.34 | 833.34 | 125.00 | 833.30 |
| 06 | 958.34 | 833.34 | 125.00 | 0.00 |
| | 5,750.00 | 5,000.00 | 750.00 | |

Effective Cost = $\frac{\text{Amount paid in interest and fees}}{\text{Average principal amount outstanding}}$

Effective Cost =

9. The total outstanding portfolio of a branch is Rd 350,000. The branch collects Rd 100,000 as savings from the group members with an interest rate of 7% per annum. The remaining balance of the portfolio is funded by Head Office with interest of 12% per annum. What is the average cost of funds of the portfolio?

10. "If savings are used to fund the loan portfolio, the average cost of funds is lower for a branch." Do you agree? If yes, with what condition? Does this take into account increased operational costs? Is it possible that collecting savings could in fact reduce a micro-finance organization's profitability?