Tunis Business School

Department of Finance

FIN 330 – Derivatives

Derivatives Project - Swap Contract Design

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Instructor: Dr. Eymen Errais

Submission Date: June 15, 2025

Introductory Note

We can proudly announce to our readers that we successfully designed the swap contract after rigorous technical and communication efforts ranging from contacting to practical field inquiries that shaped our journey throughout this educational project,

We present the following report detailing our strategy, engagements, findings, and final contract. We also included the relevant screenshots, graphs, formulas, as well as regulatory landscape as our guides,

This document should be read along with our other deliverables for a comprehensive overview of our work on the project including the project proposal, excel sheets, bank pitch presentations, and the final contract,

We hereby thank our dear professor Dr. Eymen Erraies for the top-notch course as well as the TAs for their availability and prompt assistance,

We finally express our fascination with this project that presented an unparalleled introduction to interest rate risk mitigation and the world of liabilities. We remain on the edge for projects to come with the Financial Risk Management course,

Enjoy reading this reports and our deliverables as much as we enjoyed writing and creating them,

Best,

Group 5.

1 Introduction

1.1 General Overview

In Tunisia's dynamic financial landscape, fluctuations in interest rates pose a continuous challenge for financial institutions. Banks, insurance companies, and microfinance institutions must proactively manage these risks to safeguard their profitability and long-term stability.

To address these challenges, this project investigates the strategic role of interest rate swaps as a hedging instrument for non-banking institutions Our project focuses on a real-world collaboration through a swap contract between **BNA Assurances** and **Société Tunisienne de Banque (STB)** as an instrument to navigate interest rate fluctuation risks.

1.2 Regulatory Landscape

Before establishing a swaps contract in Tunisia, we considered the following regulatory provisions outlined in the document *Circulaire aux Intermédiaires Agréés n° 2021-02* issued by the Central Bank of Tunisia (BCT, 2021):

1. Financial intermediaries are permitted to engage in swap operations, including currency swaps, interest rate swaps, and cross-currency swaps with their clients, in accordance with prevailing regulations.

2. Authorized intermediaries may execute vanilla-type interest rate swaps (IRS) with their clients for financial operations denominated in both Tunisian dinar and foreign currencies, provided that they comply with regulatory requirements.

3. The terms of the swaps, such as maturity and settlement dates, must match the characteristics of the underlying transactions they are designed to hedge.

4. All swap operations must comply with risk management requirements as stipulated in the circular, ensuring alignment with financial stability and exposure control standards set by the Central Bank of Tunisia.

5. Intermediaries are required to:

    - Report swap transactions to the Central Bank of Tunisia on a regular basis.
    - Conduct daily valuations of their swap portfolios, using international best practices and local reference rates such as TUNIBOR.

6. A master agreement, similar in structure to the ISDA agreement, must be established to govern derivatives transactions between intermediaries and their clients.

7. Intermediaries must promptly notify the Central Bank of Tunisia about any speculative hedging requests and follow the reporting procedures set forth in the circular.

Additionally, the Central Bank of Tunisia has released a new directive—*Circulaire n° 2025-08*—requiring financial institutions to implement a strategic plan that includes:

- A guide for the implementation of IFRS 9, specifically focusing on the calculation of expected credit losses (ECL),
- New capital adequacy standards,
- Updated rules for classifying and provisioning exposures.

These measures emphasize the increasing importance of strong risk coverage tools aligned with international accounting standards. In this context, our project becomes particularly relevant. IFRS 9 introduces strict conditions for the recognition of derivatives used in hedging relationships. By exploring how swaps can be used to manage interest rate risk, our work offers a practical framework that helps institutions meet both regulatory requirements and IFRS 9 compliance.

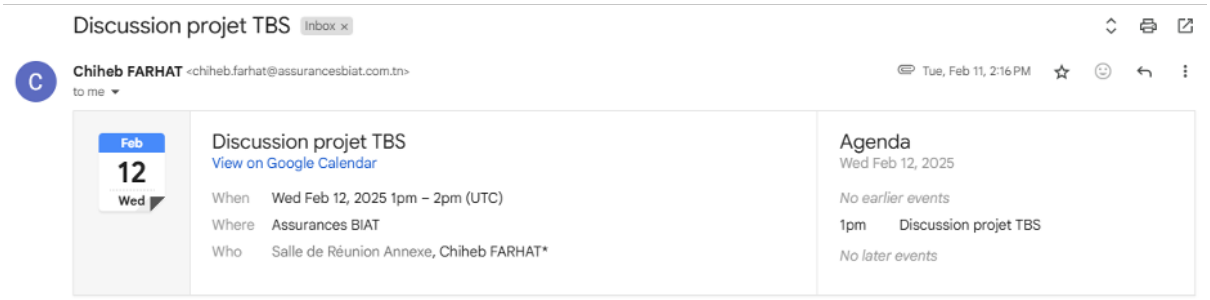
2 Institution Selection

After rigorous comprehension of the project and its implications, we started by developing a comprehensive contact database listing non-banking financial institutions and banks in Tunisia. The contacts were gathered through the established networks of the group members as well as targeted research on linkedin.It included detailed contact information as well as the advancement of the contacting process and outcome tracking. The contacting process consisted of LinkedIn messages, cold-emailing, and phone calls. To facilitate communication of our project deliverables, we prepared a professional business proposal that introduced our team, showcased TBS and our academic supervisor, and outlined the project's objectives and structure. The proposal emphasized the importance of swap contracts in hedging interest rate risk and served as a key tool in initiating partnerships and guiding discussions. We pitched the project's relevance by clearly explaining the mechanics of swap contracts and highlighting the strategic value of collaborating with us. This well-structured proposal helped position our team as a knowledgeable and credible partner for companies willing to join us in exploring innovative financial solutions.

For efficiency purposes, we will only be including relevant outcomes in the following part but the comprehensive outcome can be found in our database sheet attached with the deliverables.

2.1 Biat Assurances

BIAT Assurances was among the first institutions we contacted. Following our outreach, they agreed to hold an initial meeting where we presented the project, explained the academic framework, and discussed key elements such as the project's practicality, scope, and data needs. Our proposal was not ultimately retained because another group was priorly selected, we maintained a positive connection with the actuarial manager Mr. Chiheb Farhat who expressed willingness to support us in future initiatives or inquiries.



Meeting with BIAT Assurances

2.2 Star Assurances

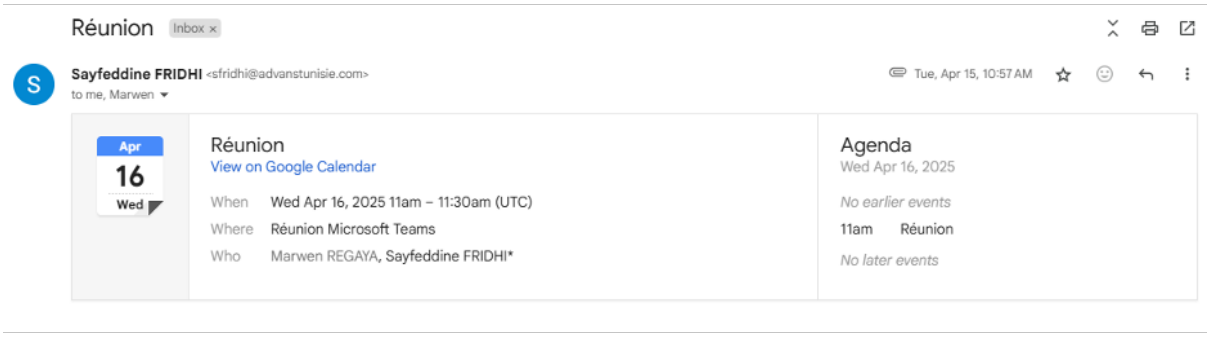
Our outreach to STAR was conducted by phone where both Mr. Mouhamed Loukil Brokerage and Bancassurance Manager and Mr. Achraf Hamdani, risk manager, was contacted through phone calls. We received an immediate and positive response. They expressed interest in the project and committed to sending us the necessary data. However, they indicated that preparing the internal data sheets would require additional time that will delay our work by more than 30 days, jeopardizing our timely project completion.

2.3 UNIFACTOR

Despite prompt and positive response after contacting Mr. Meher Kochkar by phone from Union De Factoring Tunisie, we later determined that the interest rate exposure is not important enough for us to hedge it through a swap contract given the nature of their nonbanking financial activity focusing on receivables.

2.4 Advans Microfinance

Given the relevance of microfinance institutions in the financial sector, we reached out to Advans CEO, Mrs. Meriem Zine, who kindly referred our request to the Finance Director, Mr. Sayfeddine Fridhi. He scheduled a meeting with us on April 16th. During the meeting, we presented the project and clarified our academic objectives. However, it was noted that Advans primarily operates with pre-fixed loans, and as such, interest rate exposure is less of a pressing concern compared to larger financial institutions.

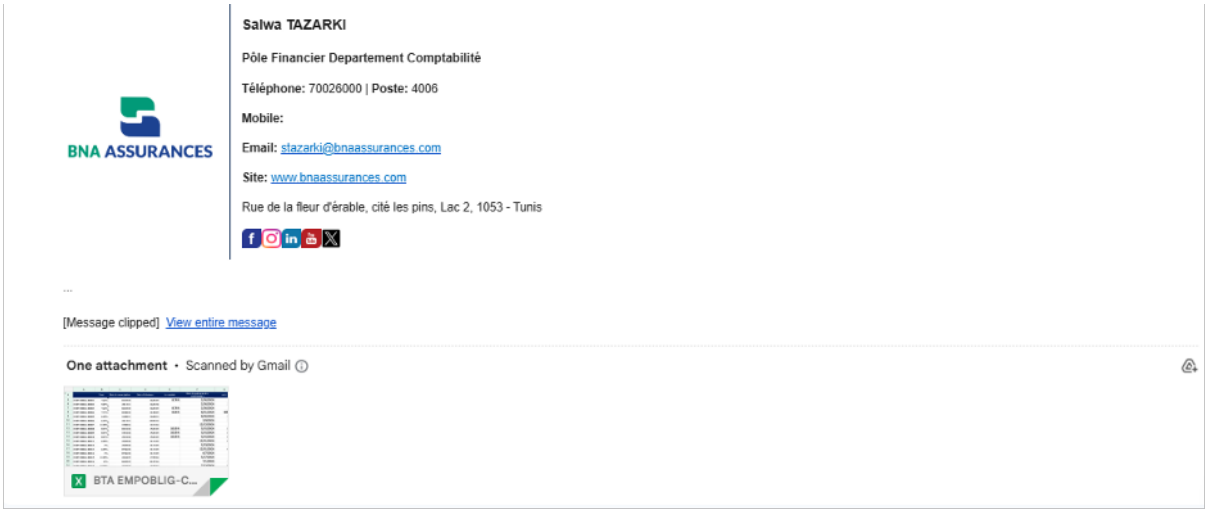


Meeting with Advans Microfinance

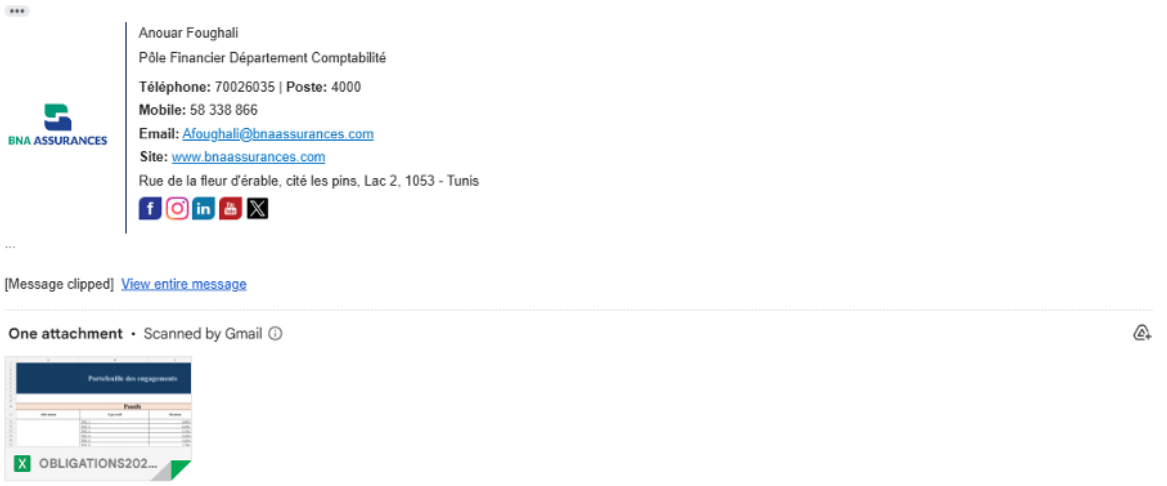
2.5 BNA Assurance: Our Chose Partner - Selection and Line of Communication Establishment

After communicating with Mr. Anouer Foughali, actuary and senior accountant, we received prompt and positive feedback on their willingness to provide us with all the needed data. They also offered us assistance with understanding the estimation of liabilities for insurance companies. Due to their engagement to comply with our time constraints and deadlines for the needed data and checkpoint meeting, we decided to partner with BMA Assurances over Star Assurances.

Shortly after informing them of our choice, we established a line of communication where we went deeper into the needed data and information as well as our addition to this partnership, all of which they welcomed and agreed to. Within the agreed upon timelines, they sent us all requested data sets.



Assets Sheet from BNA Assurances



Liabilities Sheet from BNA Assurances

3 Risk Assessement

3.1 Duration of Assets

BNA Assurances portfolio consists of four main components:

- EO (Emprunts Obligataires): Corporate bonds are debt securities issued by corporations and the government. They typically offer fixed coupon payments and are subject to interest rate risk due to their sensitivity to changes in market rates.
- BTA (Bons du Trésor Assimilables): Treasury bonds, medium to long term issued by the government. They are considered less risky than corporate bonds but still subject to interest rate variability.

- CDs (Certificats de Dépôts): Fixed income investments that generally pay a set rate of interest over a fixed time period.
- ENs (Emprunts Nationaux): Government-issued bonds or national loans generally considered low-risk investments backed by the state.

Note: BTA and ENs are considered risk free, while EO and CDs carry varying levels of risk, thus they require a risk premium.

1st sheet: EO Interest Rate

- Calculation of each bond's weight: By dividing its initial amount by the total amount.
- Calculation of each bond's weighted rate: We first converted all bond yields to continuously compounded rates to ensure consistency with the zero-coupon rates used for risk premium calculation. Each rate was then multiplied by the bond's portfolio weights.
- Determination of the bond's weighted interest rate: By summing up all the weighted rates.

2nd sheet: EO Risk Premium

1. **Extraction of the Zero-Coupon Rates**: We extracted the zero-coupon rates from the official website of **"Tunisie Clearing"** (Yield Curve at tunisiayield-curve.tn), using 01/01/2025 as the reference date. These rates serve as the basis for discounting the future cash flows to determine their present value.
2. **Determination of the missing zero-coupon rates**: The needed zero-coupon rates for the discounting dates were determined by performing the interpolation using the forward rate formula.
3. **Calculation of the EO Risk Premium**: The difference between the EO Interest Rate and each Zero-Coupon Rate was calculated and then we were able to find the EO Risk Premium by averaging all the differences already calculated.
4. **Calculation of the Discount Rates**: The appropriate discount rate were then calculated by adding the risk premium to each zero coupon rate.

3rd sheet: EO Duration

1. Calculation of the Present Value of Cash Flows: This was done in the cells ranging from Column H to CE and from row 8 till row 80. The discounting was based on the discount rates calculated in the Bonds Discount Rate sheet and using the `EXP(-R*t)` formula.

   The formula used in the excel sheet was the following (example of cell H8):

   ```
   =SI(ET(JOUR(H$3)=JOUR($G8);MOIS(H$3)=MOIS($G8);H$3<$G8;H$3>=$E8);
   $F8*EXP(-H$4*(ENT(H$3-$B$2)/$B$3));
   SI($G8=H$3;($F8+$D8)*EXP(-H$4*(ENT(H$3-$B$2)/$B$3));"-"))
   ```

   - `ET(JOUR(H$3)=JOUR($G8);MOIS(H$3)=MOIS($G8);H$3<$G8;H$3>=$E8);` for verifying if the date in question corresponds to a coupon payment date
   - `$F8*EXP(-H$4*(ENT(H$3-$B$2)/$B$3))` for if true, discount the coupon cash flow to the present date
   - `SI($G8=H$3;($F8+$D8)*EXP(-H$4*(ENT(H$3-$B$2)/$B$3));"-")` otherwise, verify if the date corresponds to the maturity date, then discount the sum of the coupon and notional to the present date if true. Otherwise display "-"

2. Calculation of the Present Value of Bonds: The present value of each bond was carried out through the summation of all its cash flows. Then we calculated the Total PV of bonds.

3. Calculation of the Bonds Duration: For the calculation of Bonds Duration, we used the Macaulay Duration formula.

   In excel, we used the following function (example of cell CG8):

   ```
   =SOMMEPROD(H8:CE8;$H$6:$CE$6)/$CF8
   ```

   The Sumproduct function returns the sum of the products of the corresponding PV of Cash Flow and Time. We divide the value calculated by the total PV of bonds.

   We calculated each bond's weight by dividing its PV by the total PV, then found the weighted duration by multiplying each bond's duration by its weight. Summing these gave a total weighted duration of 2,242.

4th, 5th and 6th sheet: BTA Duration

We utilized the same approach as EO but we discounted using zero rates only for the 5th sheet.

7th sheet: Total assets Duration

After calculating the weight of each asset class within the portfolio, we multiplied each weight by its corresponding duration. The sum of these weighted durations gave a total duration of **1.86**.

3.2 Duration of Liabilities

When we were about to embark on the liabilities side of our calculations, we met with Ms. Rym Khenissi, the *Senior Actuary at BNA Assurances*, and she explained to us that the structure of the BNA portfolio is divided into two primary categories: *"Assurance Vie"* and *"Assurance Non Vie"*.

Assurance Vie (life insurance): covers long-term policies related to mortality and savings.

Assurance Non Vie (non-life insurance): includes short-term coverage such as health, property, and auto insurance.

Note: For both categories, the same approach was applied.

- **i. Discount Rate for Present Values**

  In line with actuarial practices, liabilities are typically discounted using risk-free rates (such as zero-coupon rates) to reflect their time value without incorporating market risk. We extracted the zero-coupon rates from "Tunisie Clearing" using 01/01/2025 as the reference date and assumed that the rates would remain constant beyond the year 2040.

- **iii. Weight Determination**

  The weight was computed by dividing its total present value by the sum of all computed values:

$$\text{Weight}_i = \frac{PV_i}{\sum PV_i}$$

- **iv. Duration Calculation**

  We applied the Macaulay Duration formula:

$$D = \frac{\sum_{t=1}^{T} \frac{t \cdot C_t}{(1+y)^t}}{P}$$

  The `SOMMEPROD` function (as seen in `SOMMEPROD(H8:CE8,$H$6:$CE$6)/$CF8`) returns the sum of the products of the corresponding Present Value (PV) of Cash Flow and Time. This value is then divided by the total PV of bonds.

This results in a duration for life insurance and non-life insurance of 4.976 and 2.05 respectively.

- **v. Total Duration of Liabilities**
  After computing the weight per category, each one was multiplied by its corresponding duration, which results in a total duration of:

$$D_{\text{total}} = 2.822$$

  The total duration of the liabilities portfolio was derived by aggregating the weighted durations of both contract categories: Life and Non-Life Insurance Contracts, based on their respective proportions within the total liabilities value. This produced a comprehensive metric representing the portfolio's sensitivity to changes in interest rates.

Actuarial Perspective

During our meeting, Mrs Rym Khenissi thoroughly explained the actuarial models used for *"Assurance Vie"* and *"Assurance Non Vie"* with various examples.

For *"Assurance Vie"*, she highlighted that the primary actuarial focus was on projecting long-term cash flows, which are heavily influenced by mortality rates, policy surrender rates, and investment returns. For instance, when discussing the calculation of liabilities for a whole life policy, she explained how actuarial tables (like specific mortality tables if available, or a standard table adjusted for local experience) are used to estimate the probability of policyholders dying at each age, thereby allowing for the projection of future death benefits.

- Mortality projection often uses the life table function:

$$q_x = \frac{d_x}{l_x}$$

  where q_x is the probability of death between age x and $x+1$, d_x is the number of deaths, and l_x is the number of people alive at age x.

- For endowment policies, projected maturity benefits and potential surrender values are incorporated using policyholder behavior models. Surrender probability may be modeled as a logistic function:

$$P_{\text{surrender}}(t) = \frac{1}{1 + e^{-(\alpha+\beta r(t))}}$$

where $r(t)$ is the interest rate at time t, and α, β are behavioral sensitivity parameters.

- Discounting of future liabilities is based on risk-free rates:

$$\text{PV} = \sum_{t=1}^{T} \frac{CF_t}{(1 + r_t)^t}$$

where CF_t is the expected cash flow at time t, and r_t is the zero-coupon rate from "Tunisie Clearing".

In contrast, for *"Assurance Non Vie"*, the actuarial models centered on predicting short-to-medium term claims. She demonstrated this with compelling examples from motor insurance:

- Claim frequency was modeled using a Poisson distribution:

$$P(N = k) = \frac{\lambda^k e^{-\lambda}}{k!}$$

where λ is the expected number of claims.

- Claim severity followed a log-normal distribution:

$$f(x) = \frac{1}{x\sigma\sqrt{2\pi}} \exp\left(-\frac{(\ln x - \mu)^2}{2\sigma^2}\right)$$

where μ and σ are the mean and standard deviation of the log of the claim amounts.

- For reserving incurred but not reported (IBNR) claims, she mentioned the Chain Ladder method, typically expressed as:

$$C_{i,j} = C_{i,j-1} \cdot f_j$$

where $C_{i,j}$ is the cumulative claims in development year j for accident year i, and f_j is the development factor.

- Health insurance models accounted for medical inflation, utilization trends, and disease incidence. Deterministic or stochastic interest rate scenarios are often incorporated, particularly in life insurance modeling.

She emphasized that while both types of insurance involve robust cash flow projections, "Vie" models place a greater emphasis on longevity and savings components, often relying on deterministic or **stochastic scenarios** for interest rates. In contrast, "Non Vie" models are more attuned to the volatility and frequency of claims, frequently incorporating advanced reserving techniques like the Chain Ladder method.

She also underscored the consistency in applying risk-free rates from "Tunisie Clearing" for discounting across both categories as a unifying principle despite their inherently differing underlying risk profiles.

This actuarial overview of the inner workings of the insurance companies deepened our understanding of how insurance liabilities estimates work.

3.3 Net Duration

Our calculations gave us the following results:

$$\text{Net Duration} = \text{Duration of Assets} - \text{Duration of Liabilities} = -0.961$$

A negative net duration means that the duration of liabilities exceeds the duration of assets.

The institution is therefore exposed to interest rate decreases. If rates fall, liabilities will increase in value more than assets—this leads to potential losses.

To hedge the risk associated with a negative net duration, the insurance company should enter into an interest rate swap where it pays a floating rate and receives a fixed rate.

This strategy will help to neutralize the interest rate sensitivity mismatch between its assets and liabilities, thereby stabilizing its financial position against interest rate fluctuations.

4 Swap Contract Design

4.1 Swap Terms

- **Notional Amount:** The principal amount on which the swap payments will be based. This should be equivalent to the amount needed to match the net duration of assets and liabilities.
- **Beginning Date:** At which BNA Assurances and the corresponding bank will enter into a swap agreement.

- **Effective Date:** The first exchange of payments will occur, we suppose it to be 02/06/2025.
- **Termination Date:** Date of the last payment.
- **Fixed Rate:** The rate that the insurance company will receive from the bank.
- **Floating Rate:** The rate that the insurance will pay to the bank, often based on a benchmark like LIBOR.
- **Swap duration:** The length of time the swap will be in effect. We assume it 5 years (as long as it is higher than the required duration gap).
- **Frequency of payments:** Annual.

4.2 Swap Valuation Calculation

Net Duration and Swap Value Calculation

i. **Notional Calculation:** We used the following formula to determine the notional principal:

$$\text{Notional} = \frac{\text{Duration of liabilities} \times \text{MV of liabilities} - \text{Duration of assets} \times \text{MV of assets}}{\text{Duration of swap}}.$$

We also assumed the required duration gap is zero, implying a hedged position against interest rate risk.

ii. **Forward Rates Calculation:**
The forward rate $f(t_1, t_2)$ between two dates t_1 and t_2 can be calculated from zero-coupon rates $z(t)$ as:

$$f(t_1, t_2) = \frac{(1 + z(t_2))^{t_2}}{(1 + z(t_1))^{t_1}} - 1.$$

iii. **Swap Rate:**
The swap fixed rate s is calculated by:

$$s = \frac{\sum_{i=1}^{N} \tau_i \cdot DF_i \cdot f_i}{\sum_{i=1}^{N} \tau_i \cdot DF_i},$$

where

- τ_i is the accrual period for the i^{th} payment,
- DF_i is the discount factor for payment date i,

- f_i is the forward rate for the i^{th} period,
- N is the total number of payments.

In Excel, the function used was:

```
=SOMMEPROD(C5:G5;C7:G7;C6:G6)/SOMMEPROD(C7:G7;C6:G6)
```

iv. **Swap Value:**
The valuation is based on the difference between fixed leg and floating leg cash flows:

- Floating Leg Cash Flows CF_i^{float}:

$$CF_i^{\text{float}} = \text{Notional} \times f_i \times \tau_i.$$

- Fixed Leg Cash Flows CF_i^{fixed}:

$$CF_i^{\text{fixed}} = \text{Notional} \times s \times \tau_i.$$

- Net Cash Flow CF_i^{net}:

$$CF_i^{\text{net}} = CF_i^{\text{fixed}} - CF_i^{\text{float}}.$$

- Swap Value:

$$\text{Swap Value} = \sum_{i=1}^{N} CF_i^{\text{net}} \times DF_i.$$

v. **Extended Analysis: Swap Fair Valuation**
We determined the fair swap rate, the rate that makes the swap value zero, using Excel's Goal Seek by adjusting s until:

$$\text{Swap Value} = 0.$$

5 Engagement with Banks and Negotiation

5.1 Contacting Templates

The presentation, included with the other deliverables, is structured as follows:

- Brief introduction of the project, team, and academic supervision

- Problem statement and proposed solution
- Summary of BNA Assurances' risk exposure situation
- Definition and legal justification of a swap contract
- Proposed swap structure

5.2 Results

We initially reached out to Mr. Ousama Mellouli, Central Director of Currency Treasury at STB Bank, and successfully secured an on-site meeting with him.

Proposition de collaboration pour un projet universitaire en produits dérivés

Imen Ksouri <imenksourildr@gmail.com> Mon, May 26, 10:36 AM (5 days ago)
to o.mellouli

Monsieur,

Je me permets de vous contacter au nom de BNA Assurances dans le cadre d'un projet universitaire en produits dérivés que nous menons actuellement sous l'encadrement de Dr. Eymen Errais.

Notre projet consiste à explorer les possibilités de gestion du risque de taux d'intérêt au sein de notre portefeuille d'assurance. Nous avons identifié la mise en place d'un contrat swap comme une solution potentielle pour limiter notre exposition au risque de taux d'intérêt.

Serait-il possible de planifier un court appel ou une réunion afin de vous expliquer plus en détail le projet ?
Je peux également vous transmettre les termes établis du swap. Veuillez noter qu'il s'agit d'un projet **réalisé uniquement dans le cadre éducatif et n'a aucune portée juridique ou financière.**

Je vous remercie pour votre attention, et je suis à votre disposition pour toute information supplémentaire.

Cordialement,
Imen Ksouri

Our Request to Mr Mellouli

Ousama Mellouli Wed, May 28, 8:40 AM (3 days ago)
to me

Bjr
Je vous propose le vendredi 30/05/2025 à 9 H à mon bureau.
Cdt

De : Imen Ksouri <imenksourildr@gmail.com>
Envoyé : lundi 26 mai 2025 11:37
À : Ousama Mellouli <o.mellouli@stb.com.tn>
Objet : Proposition de collaboration pour un projet universitaire en produits dérivés

Mr Mellouli's Response

5.3 Meeting and Negotiation on Pricing

On May 30th, we met with Mr. Mellouli to present our proposal and review the draft contract, including the suggested terms. During the meeting, we went through the document thoroughly, and Mr. Mellouli raised several relevant questions—for example, regarding the calculation basis of the fixed rate, how interest rate volatility might affect the swap, and the flexibility of early termination provisions.

As part of the discussion, he requested a modification of the principal amount, adjusting it from 56,438,599.57 to 58,905,966.34, to better reflect the bank's exposure and operational needs. The exchange was constructive, with a clear focus on aligning the agreement with the bank's financial strategy. After addressing his concerns and incorporating the adjustment, Mr. Mellouli agreed to move forward with the contract.

Spécifications

Montant principal	56 438 599,57
Date de début	02/06/2025
Date de résiliation	02/06/2030
Durée du swap	5 ans
Fréquence	Annuel
Emprunt à taux fixe	9.23%
Prêt à taux variable	TMM + 2.5%
Devise de référence	TND

Contract Details

6 Final Contract

Following the conclusion of fixed and floating rate negotiations with the bank, we returned to BNA Assurance to present the proposed terms and provide a detailed account of the negotiation process. On June 30th at 9:00 AM, we met with Mr. Anouer Foughali, who formally signed the agreement during the meeting. He expressed his appreciation for the work accomplished and emphasized that the project represents a valuable opportunity for both our academic and professional development, as well as a potentially strategic advantage for BNA Assurance. He underscored their intention to conduct a thorough evaluation of the proposed swap transaction.

TUNIS BUSINESS SCHOOL
UNIVERSITY OF TUNIS

Date: le 30/05/2025

CONTRAT DE SWAP DE TAUX D'INTÉRÊT ENTRE BNA ASSURANCES ET STB

Encadreur Académique:
Dr. Eymen Errais

Description:
Le présent contrat a pour finalité la simulation académique d'une opération de swap de taux d'intérêt entre la Banque STB et la société BNA Assurances. Cette opération est réalisée exclusivement dans un cadre pédagogique et sans aucune valeur contractuelle réelle. Elle n'engendre aucun engagement financier, juridique ou commercial pour les parties concernées.

Équipe:
Imen Ksouri - Salma Regaieg - Mustapha Aziz Laroussi - Mohamed Mechri

Spécifications

Montant principal	58 905 966,34
Date de début	02/06/2025
Date de résiliation	02/06/2030
Durée du swap	5 ans
Fréquence	Annuel
Emprunt à taux fixe	9.23%
Prêt à taux variable	TMM + 2.5%
Devise de référence	TND

Signature:

En tant que **STB**, nous acceptons ce contrat uniquement à des fins éducatives et nous ne sommes pas censés le mettre en œuvre ou le pratiquer de quelque manière que ce soit dans la vie réelle.

الشركة التونسية للبنك
Société Tunisienne de Banque
DIRECTION CENTRALE DE LA TRESORIE

BNA Assurances

Final Contract, signed, sealed and delivered

Conclusion - Final Words

Our project successfully designed and negotiated an interest rate swap contract, providing a practical framework for interest rate risk mitigation within the financial sector. Our rigorous technical efforts, coupled with real-world engagement with BNA Assurances and STB, culminated in a tangible application of derivative instruments.

The project not only deepened our understanding of liability management but also demonstrated the strategic value of interest rate swaps as hedging instruments for non-banking institutions, particularly given their utility in managing interest rate exposure.

Notably, the concept of a swap contract proved to be a novelty among several of the institutions we contacted, indicating a limited prior engagement with such derivative instruments for hedging purposes.

BNA Assurances expressed significant commendation for our work and offered summer internships within their risk and actuarial department. This external validation underscores the project's practical relevance and the quality of our analytical and technical contributions.

The experience has significantly enhanced our understanding of interest rate risk, actuarial models, and the evolving regulatory landscape, including IFRS 9 compliance, which emphasizes the importance of robust risk coverage tools. We are now better equipped for future challenges in financial risk management and anticipate that the demonstrated efficacy of swaps for interest rate exposure will encourage broader adoption within the Tunisian financial landscape.