

RESEARCH ARTICLE

Management of Interest Rate Risk Using Derivatives

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Abstract

This article explains the application of derivatives focusing on their utility in managing the interest rate risk faced by different companies. In times of volatile market environment, when interest rates have an unstable pattern, the companies borrowing large amounts wish to protect themselves against adverse movements in interest rate. The adverse movements could have a significant impact on interest expenses by increasing the interest payments and consequently on their profitability and on the shareholder value. On the other hand, the companies lending money would want to hedge against interest rate falling as their interest incomes are directly proportional to the level of market rates. The issues is becoming more challenging in the actual asset and liabilities management, as the ability to model on a dynamic basis the impact on net interest income of changing interest rates is becoming more and more complex. In this article I will explain how the interest rate derivatives work and recommend the one which would be more appropriate to apply having in consideration the Romanian market in a particular scenario.

Keywords: *Derivatives, Forward rate agreement (FRA), Interest rate risk, Risk management.*

Introduction

In an area of more stringent and always evolving regulatory requirements, the companies are not only required to comply with regulations, they also need to act swift and become more and more flexible in their approaches. It is a common approach among the entire world, to make progress in areas of risk management. The boards of directors are devoting more time in addressing key risk issues, such as approving the risk appetite statements, considering the organization's risk profile in determine the strategy or appointing risk chief officers. In a recent risk management survey conducted by Deloitte¹ and published in May 2015, the interest rate risk is listed among most often reviewed risks. For example, among the insurance firms responding to the survey, 94% consider interest rate development as most often risk factor for conducting stress scenarios. However, the interest rate risk is at the heart of every truly integrated risk management system: credit risk, market risk, asset and liability management, liquidity risk and even operational risk. Interest rate risk arises from the differences of interest rate sensitivity of

capital inflows and outflows. Monetary policy is the major driver of interest rates, since the prevailing view is that high interest rates are the best way to fight inflation. My research refer to the Romanian market were the development of interest rates was spectacular in the last few years, mainly in 2015, when the reference rate was repeatedly decreased, market interest rates following a similar trend. But the question remain, how can the companies protect themselves and how much this protection costs.

When is a Company Exposed to Interest Rate Risk?

Interest rate exposure appears when a company is concluding a lending agreement in such a way that a change in interest rates might conduct to unacceptable interest charges: either to high in case the company is borrowing money, either to low in case the company is lending. In case of banking sector is normal to accept this risk at a certain level, as interest income could be an important source of profits and shareholder value. However, in case of other companies where the core operations are not financial services, such a financial risk needs to be managed in such a manner that allows the company to focus on its core activities. Let's take for example a company

¹ Global risk management survey, ninth edition, May 2015, Deloitte & Touche LLP

which borrowed a specific amount and in the near future the loan is to be replaced or renegotiated, the company would be in this case vulnerable to a

sudden increase in market interest rate. In case of adverse movement in interest rate (i.e. sudden increase) the company may incur the following:

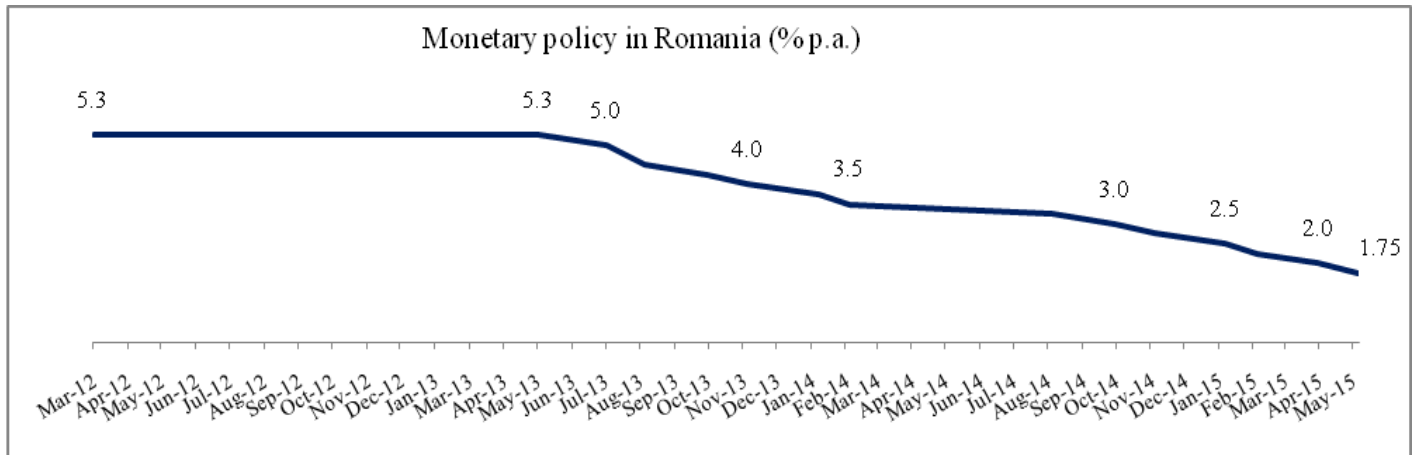


Fig. 1 Development of monetary interest rate in Romania (2012 - 2015)

- Borrowers: Increase cost of funds which conducts to lower profitability (lower market value), diminish possibility to undertake capital expenditure, diminish possibility to pay dividends, increase the chance of breaching loan covenants;
- Investors: Lower returns, lower profitability (lower market value), diminish possibility to pay returns to stakeholders conducting to incapacity to attract other investors
- Lower net present value (NPV) of companies due to the effect of changes in the discount rate on the value of financial instruments, hedges and returns on projects.

What are the Risks Arising from Interest Rate Movements?

Floating Rate versus Fixed Rate

A company can enter into a lending agreement which states the usage of fixed rate over the period of the contract, however, in case the market interest rate is decreasing, the company is legally bound to pay higher interest. Usually fixed rate finance is more expensive, however in case of floating rate the company is exposed to risk of

adverse upward interest movement. Usually the decision on how the company will be financed (at floating rate or fixed rate) is made by the corporate treasurer based on expectations of interest rate movements. An indication of market view on how the interest rates are developing is given by the available rates on loans of different length – also known as term structure of interest rates or yield curve and it plays a central role in an economy. The term structure reflects expectations of market participants about future changes in interest rates and their assessment of monetary policy conditions. Usually, the rates increase in line with maturity, giving rise to an upward sloping yield curve or a "normal yield curve." One basic explanation for this phenomenon is that lenders demand higher interest rates for longer-term loans as compensation for the greater risk associated with them, in comparison to short-term loans (Fig.1). It may be the case that long-term yields may be lower than short-term yields, generating an "inverted yield curve" which is regarded as a harbinger of recession.

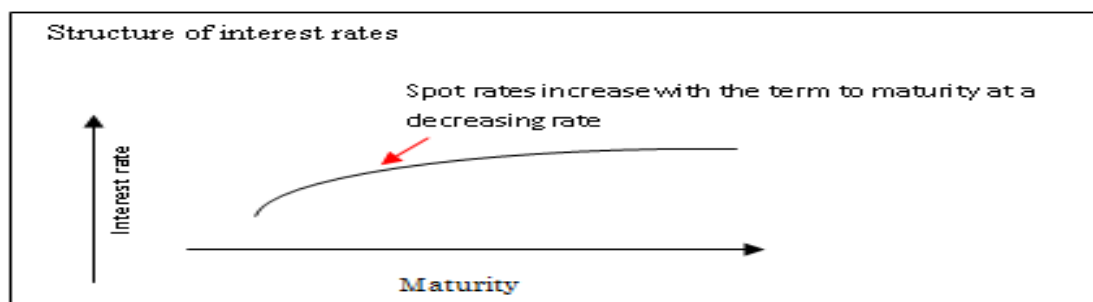


Fig. 2: Structure of interest rates

Other factors considered in decision on type of interest rate to be used may be: maturity (the longer is the term the more difficult is to predict market interest rate evolution), the basis points difference between floating and fixed rates (considering also arrangement costs), the risk appetite of the company (directors are acting as agents of the shareholders, therefore it results in the risk appetite of the shareholders), the existing debt mix (the finance risk can be managed via diversification of debt portfolio), liquidity issues (short term liquidity can be obtained at lower rate available on floating rate finance), the size of the company.

Currency of the Debt

The company can incur higher borrowing costs if the currency in which the loan is taken moves adversely against the domestic currency. The management of such a risk can be done by matching the currency of the loan with the currency of the underlying operations, namely by matching the operational income currency to interest expense one.

Term Loan versus Overdraft Facility

Depending on the necessity of finance, the company may prefer to pay interest only when it needs money, as in case of an overdraft facility. In such a case the company usually pays a commitment fee. Alternatively, the company can use a term loan, but it will incur interest expenses even if it is not needed the full amount. The decision is taken usually by considering the usage of the amount borrowed.

How can be Managed the Interest Rate Risk?

When a company is exposed to interest rate, first it needs to assess whether the magnitude of the risk is material comparing to overall cash flows and appetite for the risk. If the impact is not material, the company may decide to bear the risk, actually to do nothing in its respect and to accept all the effects of the movements in interest rate. The same option can apply also when costs of managing interest rate are excessive, both in terms of actual costs of specific transactions and the staff resources necessary for conducting these activities. The company may act in an economic environment where the appropriate instruments for managing the risk are not available either due to regulation either due to lack of market opportunities.

Alternatively, if the magnitude of the interest rate risk is considered significant, the company may

want to hedge the risk. Hedging is a method of reducing the risk by entering into an agreement with another party which is willing to take on the risk, which otherwise the first party needs to bear. The second party is taking over the risk either because it bears an opposite risk which can be matched with this one or because it is acting as a speculator which bears the risk in return of the prospect of making profit.

Hedging comes with a cost – a fee paid to a financial institution usually or a reduction in profit. This cost needs to be assessed against the reduction of financial risk achieved, and, depending on the result, the company may wish to cover the entire exposure – a perfect hedge, or only a part of it.

Considering the globalization process and the increasing complexity of economic transactions, a large variety of instruments were developed with the aim of helping corporate treasurers to properly hedge the risk of interest rate movements. This instruments and techniques include and are not limited to the followings:

- Netting: aggregating all positions, both assets and liabilities and hedge only the net exposure;
- Smoothing: maintain a balance between fixed and floating rate loans;
- Matching: match assets and liabilities to have a common interest rate;
- Pooling: by asking the bank to pool the amounts of all its subsidiaries when considering interest level and overdraft limits;
- Derivative instruments: forward rate agreements, interest rate futures, interest rate options or interest rate swaps.

Using Forward Rate Agreements (FRAs) for Managing Interest Rate Risk

A forward rate agreement is an over-the-counter forward contract, up to 12 months, usually between a corporate company and a financial institution that determines the rate of interest to be paid or received on an obligation beginning at a future start date. The contract will determine the rates to be used along with the termination date and notional value. The FRA does not involve an actual transfer of money from one party to another. The notional sum is the amounts in which the interest payment is calculated. At maturity no funds exchange hands, only the difference between the FRA rate and the prevailing market rate at the time of settlement applied to notional amount is transferred from

one party to another. The buyer of the FRA is protected against the risk of interest rate to increase by locking the rate at the level of the

FRA rate, while the seller protect itself against the risk of a decrease in interest rate.



Fig. 3: Timeline of a FRA

A quote for a FRA presented as RON 3x9 – 2.60/3.40% p.a. should be interpreted as a deposits interest starting in 3 months from now for 6 months is 2.60% and borrowing interest rate starting 3 months from now for 6 months is 3.40%.

The FRAs provide protection for the borrower from adverse interest rate movements over the rate negotiated, flexibility as they can be arranged for any amount and duration (OTC instrument as it is not standardized) and bears a minimum cost, usually are traded for free. However, the FRA's do not allow the buyer to take advantage on a decreasing market rate trend and being a binding agreement it is difficult to be sold to other party. Also the rate set by the bank in case on a FRA will reflect the expectations of future interest rate movements, therefore on a increasing interest rate market the FRA rate will be higher than the spot rate.

A similar hedging instrument to FRAs is the interest rate future, the distinction being that amounts, periods and terms are standardized. Normally, the borrowers sell future in order to hedge against interest rate rising and buy futures on the day that interest rate is fixed, while the lenders buy futures to protect against interest rate falls and lend futures when the actual lending starts.

The seller of futures contracts does not require owning the underlying instruments. Considering that most of the contracts are settled in cash rather than by delivering the underlying asset, the seller does not need to acquire the asset by the delivery date, depending on the buyer requirements.

Similarly to FRAs, costs of interest rate futures are relatively low and the companies have the possibility to hedge large exposure with a reasonable small initial employment of cash. However, being a standardized contract, the interest rate futures can only be traded for fixed periods and cover begins quarterly, in March, June, September and December. Amounts are

fixed, therefore the company may be in the position either to over-hedge or to under-hedge if the exposure those not match the contract. Also, in case the price of the future contract does not move in the expected direction, the company is liable and, moreover it needs to settle daily the profits or losses arising from the contract.

In order for the buyer to be able to choose if he wants to actually make the deal at the future date, than the instruments acquired needs to be an **interest rate option**. This is a specific financial derivative tied to an underlying interest future rate, which grants the buyer the right, but not the obligation to deal at an agreed interest rate, called strike price, at the maturity of the contract. On the date of expiry of the option the buyer needs to decide whether to exercise the right, depending on the level of market interest rate. He will actually exercise if the market rate is above the strike rate. The main advantage is that the buyer cannot lose more than what he has paid upfront (the premium), the interest rate being looked and he can also take advantage of any favorable moves in the market.

Caps, floors and collars option can be used to set a floor and a ceiling to a range of interest rates that might be incurred. These types of agreements do not provide a perfect hedge, however they limit the range of possibilities and therefore reduce the level of interest rate exposure.

Applying above Mentioned Instruments in Hedging an Interest Rate Exposure

On 1st of January 2015, the company ABC receives interest of 3% per annum on short-term deposits on the Amsterdam money markets amounting to EUR 10 million. The company considers using a collar to protect the interest yield it currently earns for a period of 7 months, while the following prices are available and the premium cost is quoted in annual percentage terms:

Tabel 1: Interest rate exposure

Strike price	Calls		Puts	
	June	September	June	September
95.50	0.71	1.40	0.02	0.06
96.00	0.36	1.08	0.10	0.14
96.50	0.12	0.74	0.20	0.35
97.00	0.01	0.40	0.57	0.80
97.50	-	0.06	0.97	1.12

The company ABC would like to limit exposure to the interest rate risk of movements, therefore it would arrange for both a ceiling – setting the upper limits, and a floor-setting a lower limit on its interest yield.

ABC want to protect for the next seven months than it can use September options in order to cover for the entire period. We assume that floor will be fixed at the current rate of 3%, which implies will buy call options at 9700. Consequently ABC will limit its ability to benefit

from rise in interest rate by selling a put option at higher price-4% (or 9600).

Payable premium is depending on the number of contracts required for full hedge, in this case:

$10\text{mln}/0.5\text{mln}^* \times 7\text{months}/3\text{months} = 47$ contracts (EUR 23.5mln)

1 contract = EUR 0.5 mln, standard period of 3 months

The payable premium will be in Table 2:

Tabel 2: The payable premium

Call	Premium	Put	Premium	Net premium	EUR cost*
9700	0.40	96.50	0.35	0.05	2,938
9700	0.40	96.00	0.14	0.26	15,275
9700	0.40	95.50	0.06	0.34	19,975

*EUR costs: EUR 23.5 mln x 0.05% x $\frac{1}{4}$ = EUR 2,938

Considering ABC will hedge using options as described above, the result will be:

- If interest rate will fall below 3%, ABC will exercise call option and effectively fix its interest rate at 3%. The loss on interest rate will be supported by the seller of the call option
- If interest rate remains between 3% and 4%, ABC will do nothing but it will benefit from the effect of any increase in rates above 3%, but below 4%.
- If interest rate will rise above 4%, the buyer of put option will exercise its right, provided that

future price will fall below 9600. ABC will achieve a rate of 7%, however, the benefit of any premium on rates above 4% will be integrated in the buyer of put option result.

The potential gross interest rate gain and the net gain taking into account premiums if interest rates have various movements are as follows (EUR 10 mln for 7 months):

Tabel 3: Interest rate, Premium cost, Net gain

	Interest rate % rise	Interest gain EUR	Premium cost EUR	Net gain EUR
9650	0.50	29,167	2,938	26,229
9600	1.00	58,333	15,275	43,058
9550	1.50	87,500	19,975	67,525

Conclusion

Based on the above, ABC would make the highest potential gain by selling put option at 9550. However, this gain would be realized only if the market rates will rise at 4.5%, now being at 3%. If it remains around 3%, then ABC will incur costs without realizing any benefits. The actual put price chosen will depend on the view of ABC

representatives on the likely movements in rates over the following 7 months.

In conclusion, my study demonstrates that derivatives can be a significant tool for corporate clients to manage the risk. This result is consistent with the argument that financial institutions or other type of companies can use derivatives to improve their efficiency by reducing

the explicit cost of financial distress and the probability of bankruptcy.

It contributes to the current literature by emphasizing the steps to a strong interest rate risk management, impact and benefits of establishing a system of risk management and proves the benefits of using derivative securities.

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Companies need to adjust to the new environment for risk management and in order to achieve this goal, they need to enhance their risk management programs, to diversify the instruments used, to improve their analytical capabilities, to invest in technology, in information systems and to foster an ethical culture.[1-10].