

# ACCOUNTING OF INTEREST RATE OPTIONS

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Interest rate options are a component of interest rate derivatives. The basic types of interest rate options are cap and floor type options. The same basic principles apply to the accounting of interest rate options as to those for the accounting of currency options, which were described in the previous article.

## Cap type interest rate option

A cap type interest rate option serves for ensuring against interest rate risk by guaranteeing a maximum limit of the reference rate. It is composed of various interest rate options, termed caplets. A caplet is actually a call (buy) option for a reference rate. If on an agreed date the reference rate is above the maximum set limit (the strike), the buyer of the option will receive an offsetting payment in the amount of the difference of the reference rate and the maximum limit. Through the concurrent purchase of several options (caplets) with the same maximum limit a cap type interest rate option is created. The buyer pays a price for this right – the premium.

The buyer of a cap type option wants to ensure itself against interest rate risk and the seller gains an option premium.

The nominal value of the trade is the amount from which the interest payments are calculated. This nominal sum may remain constant throughout the duration of the cap type interest rate option, or it may be variously adjusted. The price of a cap type interest rate option is calculated similarly as the price of other options, i.e. it is composed of the time and internal value of the option. The time value depends on how the market expectation for the future development of interest rates will change over time. The probability of this change in interest rates over time is determined by their volatility.

The internal value of an option is determined by comparing the strike with the future interest rate. If the strike, i.e. the maximum set limit of a cap type interest rate option lies:

- above the future interest rate, it has a zero internal value (out of the money),
- below the future interest rate, it has a positive value (in the money).

## Accounting example of a cap type interest rate option in banks

### Basic data necessary for accounting:

	Date	Market value	Option premium – balance	Market value + option premium
Bank sells interest rate option and client pays premium	1.12.2003	-56 000	36 000	-20 000
Revaluation	2.12.2003	-52 000	36 000	-16 000
Revaluation	3.12.2003	-50 000	36 000	-14 000
	Daily revaluation			
Revaluation prior to expiry date	31.5.2004	50 000	30 000	80 000
Expiry of 1st partial option (caplet)	1.6.2004	40 000	30 000	70 000
1st compensatory payment	2.6.2004	24 000	30 000	54 000
	Daily revaluation			
Revaluation prior to expiry date	30.11.2004	23 000	24 000	47 000
Expiry of 2nd partial option (caplet)	1.12.2004	22 000	24 000	46 000
2nd compensatory payment	2.12.2004	21 000	24 000	45 000
	Daily revaluation			
Expiry of last 6th partial option (caplet)	1.12.2005	0	6 000	6 000
6th compensatory payment	1.12.2005	0	0	5 000

### 1. Accounting in the case of the buyer:

Accounting date	Operation description	Dr/Cr	A/c group	Account title	Príklad	Currency
29.11.2003	off-balance sheet receivable	Dr	96	Receivables from cap type interest rate options sold	10 000 000	SKK
		Cr	99	Settlement account	10 000 000	SKK

**1. Accounting in the case of the buyer:**

	off-balance sheet liability	Dr	99	Settlement account	10 000 000	SKK
		Cr	96	Liabilities from cap type interest rate options sold	10 000 000	SKK
1.12.2003	payment of premium received	Dr	22	Client's account	36 000	SKK
		Cr	39	Sold cap type interest rate options – option premium received	36 000	SKK
	revaluation of option	Dr	61	Negative differences from revaluation of cap type interest rate options sold	20 000	SKK
		Cr	39	Negative differences from revaluation of cap type interest rate options sold	20 000	SKK
2.12.2003	cancellation of revaluation	Dr	39	Negative differences from revaluation of cap type interest rate options sold	20 000	SKK
		Cr	61	Negative differences from revaluation of cap type interest rate options sold	20 000	SKK
	revaluation of option	Dr	61	Negative differences from revaluation of cap type interest rate options sold	16 000	SKK
		Cr	39	Negative differences from revaluation of cap type interest rate options sold	16 000	SKK
3.12.2003	cancellation of revaluation	Dr	39	Negative differences from revaluation of cap type interest rate options sold	16 000	SKK
		Cr	61	Negative differences from revaluation of cap type interest rate options sold	16 000	SKK
	revaluation of option	Dr	61	Negative differences from revaluation of cap type interest rate options sold	14 000	SKK
		Cr	39	Negative differences from revaluation of cap type interest rate options sold	14 000	SKK
Revaluation of interest rate option is accounted daily in the same manner.						
1.6.2004	cancellation of revaluation	Dr	71	Positive differences from revaluation of cap type interest rate options sold	80 000	SKK
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	80 000	SKK
	revaluation of option	Dr	39	Positive differences from revaluation of cap type interest rate options sold	70 000	SKK
		Cr	71	Positive differences from revaluation of cap type interest rate options sold	70 000	SKK
	re-accounting of aliquot part of the option premium	Dr	39	Cap sold – option premium received	6 000	SKK
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	6 000	SKK
2.6.2004	option exercised – provision of compensatory payment	Dr	39	Positive differences from revaluation of cap type interest rate options sold	10 000	SKK
		Cr	22	Client's account	10 000	SKK
Revaluation of interest rate option is accounted daily in the same manner.						
	cancellation of option revaluation	Dr	71	Positive differences from revaluation of cap type interest rate options sold	74 000	SKK
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	74 000	SKK
	revaluation of option	Dr	39	Positive differences from revaluation of cap type interest rate options sold	54 000	SKK
		Cr	71	Positive differences from revaluation of cap type interest rate options sold	54 000	SKK
Revaluation of interest rate option is accounted daily in the same manner.						
1.12.2004	cancellation of option revaluation	Dr	71	Positive differences from revaluation of cap type interest rate options sold	47 000	SKK
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	47 000	SKK
	revaluation of option	Dr	39	Positive differences from revaluation of cap type interest rate options sold	46 000	SKK
		Cr	71	Positive differences from revaluation of cap type interest rate options sold	46 000	SKK



	re-accounting of aliquot part of the option premium	Dr	39	Cap sold – option premium received	6 000	SKK	
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	6 000	SKK	
	option exercised – provision of compensatory payment	Dr	39	Positive differences from revaluation of cap type interest rate options sold	10 000	SKK	
		Cr	22	Client's account	10 000	SKK	
2.12.2004	cancellation of option revaluation	Dr	71	Positive differences from revaluation of cap type interest rate options sold	50 000	SKK	
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	50 000	SKK	
	revaluation of option	Dr	39	Positive differences from revaluation of cap type interest rate options sold	45 000	SKK	
		Cr	71	Positive differences from revaluation of cap type interest rate options sold	45 000	SKK	
Revaluation of interest rate option is accounted daily in the same manner.							
1.12.2005 Expiry of the last partial option	posting of the off-balance-sheet receivable	Dr	99	Settlement account	10 000 000	SKK	
		Cr	96	Receivables from cap type interest rate options sold	10 000 000	SKK	
	posting of the off-balance-sheet liability	Dr	96	Liabilities from cap type interest rate options sold	10 000 000	SKK	
		Cr	99	Settlement account	10 000 000	SKK	
	cancellation of option revaluation	Dr	71	Positive differences from revaluation of cap type interest rate options sold	13 000	SKK	
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	13 000	SKK	
	revaluation of option	Dr	39	Positive differences from revaluation of cap type interest rate options sold	6 000	SKK	
		Cr	71	Positive differences from revaluation of cap type interest rate options sold	6 000	SKK	
	re-accounting of aliquot part of the option premium	Dr	39	Cap type interest rate options sold – option premium received	6 000	SKK	
		Cr	39	Positive differences from revaluation of cap type interest rate options sold	6 000	SKK	
	option exercised – provision of compensatory payment	Dr	61	Negative differences from revaluation of cap type interest rate options sold	5 000	SKK	
		Cr	22	Client's account	5 000	SKK	

### Accounting example of a cap type interest rate option in banks (see tables above)

A non-bank client buys a cap type interest rate option from a bank. The beginning of the deal is 29.11.2003. The underlying asset is SKK 10 000 000. The non-bank client pays a premium to the bank in the amount of SKK 36 000 on 2.12.2003. The interest rate option comprises 6 partial options (caplets). On the day of their expiry, in the case of their being exercised, a compensatory payment is made.

### Floor type interest rate option

A floor type interest rate option is actually the opposite of a cap type interest rate option and serves for ensuring against interest rate risk (a fall in interest rates) by guaranteeing a minimum limit of the reference rate. A floor type interest rate option is composed of several partial interest rate options (floorlets). A floorlet is actually a put (sell) option for a reference rate. In the case that on the agreed date the reference rate is below the

minimum set limit (the strike), the buyer of the option will receive an offsetting payment in the amount of the difference of the minimum limit and the reference rate. Through the concurrent purchase of several partial options (floorlets) with the same minimum limit a floor type interest rate option is created. The buyer pays a price for this right – the premium. The same rules apply to valuation as in the case of the cap type interest rate option, i.e. the price of the floor type interest rate option is composed of an internal and time value.

### Accounting example of a floor type interest rate option in banks

A non-bank client buys a floor type interest rate option from a bank. The beginning of the deal is 1.12.2003. The non-bank client pays a premium to the bank in the amount of SKK 36 000 on 2.12.2003. The underlying asset is SKK 10 000 000. The interest rate option comprises 6 partial options (floorlets). On the day of their expiry, in the case of their being exercised, a compensatory payment is made.

**Basic data necessary for accounting:**

	Date	Market value	Option premium - balance	Market value + option premium
Bank sells interest rate option and client pays premium	1.12.2003	-56 000	36 000	-20 000
Revaluation	2.12.2003	-52 000	36 000	-16 000
Revaluation	3.12.2003	-50 000	36 000	-14 000
	Daily revaluation			
Revaluation prior to expiry date	31.5.2004	-19 000	30 000	11 000
Expiry of 1st partial option (floorlet)	1.6.2004	-20 000	30 000	10 000
1st compensatory payment	2.6.2004	-22 000	30 000	8 000
	Daily revaluation			
Expiry of last 6th partial option (floorlet)	1.12.2005	3 000	6 000	9 000
6th compensatory payment	1.12.2005	0	0	5 000

Accounting date	Transactiona	Dr/Cr	A/c group	Account title	Example	Currency
29.11.2003	off-balance sheet receivable	Dr	96	Receivables from floor type interest rate options sold	10 000 000	SKK
		Cr	99	Settlement account	10 000 000	SKK
	off-balance sheet liability	Dr	99	Settlement account	10 000 000	SKK
		Cr	96	Liabilities from floor type interest rate options sold	10 000 000	SKK
1.12.2003	payment of premium received in favour of bank	Dr	22	Client's account	36 000	SKK
		Cr	39	Sold floor type interest rate options – option premium received	36 000	SKK
	revaluation of option	Dr	61	Negative differences from revaluation of floor type interest rate options sold	20 000	SKK
		Cr	77	Negative differences from revaluation of floor type interest rate options sold	20 000	SKK
2.12.2003	cancellation of revaluation	Dr	39	Negative differences from revaluation of floor type interest rate options sold	20 000	SKK
		Cr	61	Negative differences from revaluation of floor type interest rate options sold	20 000	SKK
	revaluation of option	Dr	61	Negative differences from revaluation of floor type interest rate options sold	16 000	SKK
		Cr	39	Negative differences from revaluation of floor type interest rate options sold	16 000	SKK
3.12.2003	cancellation of revaluation	Dr	39	Negative differences from revaluation of floor type interest rate options sold	16 000	SKK
		Cr	61	Negative differences from revaluation of floor type interest rate options sold	16 000	SKK
	revaluation of option	Dr	61	Negative differences from revaluation of floor type interest rate options sold	14 000	SKK
		Cr	39	Negative differences from revaluation of floor type interest rate options sold	14 000	SKK
Revaluation of interest rate option is accounted daily in the same manner.						
1.6.2004	cancellation of option revaluation	Dr	71	Positive differences from revaluation of floor type interest rate options sold	11 000	SKK
		Cr	39	Positive differences from revaluation of floor type interest rate options sold	11 000	SKK
	revaluation of option	Dr	39	Positive differences from revaluation of floor type interest rate options sold	10 000	SKK
		Cr	71	Positive differences from revaluation of floor type interest rate options sold	10 000	SKK
	re-accounting of aliquot part of the option premium	Dr	39	Floor type interest rate option sold – option premium received	6 000	SKK
		Cr	39	Positive differences from revaluation of floor type interest rate options sold	6 000	SKK
	option exercised – provision of compensatory payment to client	Dr	39	Positive differences from revaluation of floor type interest rate options sold	10 000	SKK
		Cr	22	Client's account	10 000	SKK



2.6.2004	cancellation of revaluation	Dr	71	Positive differences from revaluation of floor options sold	14 000	SKK
		Cr	39	Positive differences from revaluation of floor type interest rate options sold	14 000	SKK
	revaluation of option	Dr	39	Positive differences from revaluation of floor type interest rate options sold	8 000	SKK
		Cr	71	Positive differences from revaluation of floor type interest rate options sold	8 000	SKK
Revaluation of interest rate option is accounted daily in the same manner.						
1.12.2005 Expiry of the last partial option	posting of the off-balance-sheet receivable	Dr	99	Settlement account	10 000 000	SKK
		Cr	96	Receivables from floor type interest rate options sold	10 000 000	SKK
		Dr	96	Liabilities from floor type interest rate options sold	10 000 000	SKK
		Cr	99	Settlement account	10 000 000	SKK
	cancellation of option revaluation	Dr	71	Positive differences from revaluation of floor type interest rate options sold	9 000	SKK
		Cr	39	Positive differences from revaluation of floor type interest rate options sold	9 000	SKK
	revaluation of option	Dr	39	Positive differences from revaluation of floor type interest rate options sold	6 000	SKK
		Cr	71	Positive differences from revaluation of floor type interest rate options sold	6 000	SKK
	re-accounting of aliquot part of the option premium	Dr	39	Floor type interest rate options sold – option premium received	6 000	SKK
		Cr	39	Positive differences from revaluation of floor type interest rate options sold	6 000	SKK
	option exercised – provision of compensatory payment	Dr	61	Negative differences from revaluation of floor type interest rate options sold	5 000	SKK
		Cr	22	Client's account	5 000	SKK

### Conclusion

We end this series of articles on the accounting of derivatives in banks with the accounting of interest rate options. All the accounting procedures described here are only a basic introduction which may be used for simple derivative trades. For accounting of various complex derivatives, or alternative derivatives it is always necessary to

analyse all the relationships of the counterparties involved in the trade and the rights and obligations, assets and liabilities resulting from it, and only subsequently to adjust the basic accounting procedures. Naturally, it is always necessary to comply with the basic principles of Ministry of Finance of the SR Measure No 20 359/2002-92 laying down accounting procedures in banks.