Example

The following table contains LIBOR rates and the corresponding forwards (all continuously compounded). Consider an FRA where we will receive a rate of %6 measured with annual compounding, on a principal of $\$100,000,000$ between the end of year 1 and the end of year 2. In this case, the forward rate is 5% with continuous compounding or 5.127% with annual compounding. What is the value of the FRA?

Year	*Zero rate*	*Forward for the year*
1	3.0	
2	4.0	5.0
3	4.6	5.8
4	5.0	6.2
5	5.3	6.5

Example

First, let's check that 5% is 5.127% annual:

$$e^{.05} = (1 + .05127) <=> .05 = \ln(1.05127)$$

which is true.

Why did we need to express the given continuously compounded rate with annual compounding?

Because we are going to calculate the payoff as $100,000,000(.06 - .05127)$.

Example

Which is the same thing as saying that, on a notional of $100,000,000$ we pay the difference of both rates measures with annual compounding.

Before we discount the money (that is money at year 2), what if we want to compute the cash flow using continuous compounding?

We can do that BUT we need to express both rates with continuous compounding.

What is 6% annually compounded expressed with continuous compounding?

$$e^x = (1 + .06) <=> x = \ln(1.06) => x = .05826891$$

Example

Now, the interest payed on $100,000,000$ at 5.83% continuously compounded is:

$$100,000,000(e^{.05826891}-1)$$

So, the payoff is

$$100,000,000(e^{.05826891}-e^{.05})$$

which is the same as the one we computed before:

$$100,000,000(.06-.05127)=100,000,000(e^{.05826891}-e^{.05})$$

As we said, that is money payed at the end of year 2. How do we compute how much that is in money today?

Example

We can discount using continuous compounding since we know the 2−year rate.

$$100,000,000(.06 - .05127)e^{-.04*2}$$