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Calculating Cash P&L for a Put Option

Our cash P&L model for a European put option is a mirror image of our cash P&L for a European call option model. The difference arises from how we hedge a put versus how we hedge a call.

To hedge a put option we short Delta units of the underlying and invest the proceeds in a risk-free security, essentially generating excess cash in addition to the premium received. Both amounts are invested in an interest-earning instrument.

If a put is exercised at maturity, we receive the underlying security on which the put option is written, and close our short position. In exchange, we deliver the strike price in cash to the buyer of the put option (or the seller of the underlying security when the put option is exercised).

To model our P&L, we will assume writing a European put option on Barclays Bank where the current spot price is US$242.5 (the 5 June 2014 stock price) and the strike price is US$225. Time to expiry is one year. For simplicity, we will assume that Barclays Bank will not pay a dividend during the life of the option.

1 Dissecting the P&L model

As mentioned above, primary contributors to our put cash P&L model include:

a. **Cash in.** Includes premium received, interest received on investment for the life of the hedge, and the proceeds from the short sale of the underlying position.

b. **Cash out.** The excess cash generated from the short sales grows to the amount we have to pay to the customer if the put option is exercised. If the option expires worthless, no payment is made.

c. **Trading gains.** As part of our strategy, we sell the underlying as prices rise, and purchase it when they fall. Earlier we discussed that trading P&L is separated only for presentation purposes. The amount is already included in the cash account.
Interest paid and principal borrowed for the hedge

The first step is to add two new columns to our Delta hedge model. These are:

1. Interest received per period, and
2. Incremental amount invested/lent per period

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**Figure 96**  Cash P&L for the writer for a put option that expires in the money
*Source: FinanceTrainingCourse.com*

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i **Interest paid and principal borrowed for the hedge**

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