



Case Example: Ganado Manufacturing

- Ganado concluded a turbine sale to Crown, a British firm for GBP1,000,000 in March
- The payment is due in June (3-months)
- The company earns the minimum acceptable margin at \$1,700,000. Below this amount Ganado would be losing money.



Case Data

- Spot Rate: GBP/USD 1.7640-1.7642
- 3-month Forward Rate: GBP/USD 1.7540-1.7545
 - $i_{UK}=8.00-10.00\%$ pa
 - $i_{US}=6.00-8.00\%$ pa
- Plain Vanilla Put Options
 - June OTC Put Option: @\$1.7500 strike is 1.5% for GBP1m
 - June OTC Put Option: @\$1.7100 strike is 1% for GBP1m
- Ganado's June spot forecast is \$1.7600-1.7605
- Ganado's cost of capital is 12%



Ganado's Alternatives

- Remain Unhedged
- Hedge in the forward market
- Hedge in the money market (Money Market Hedge)
- Hedge in the options market



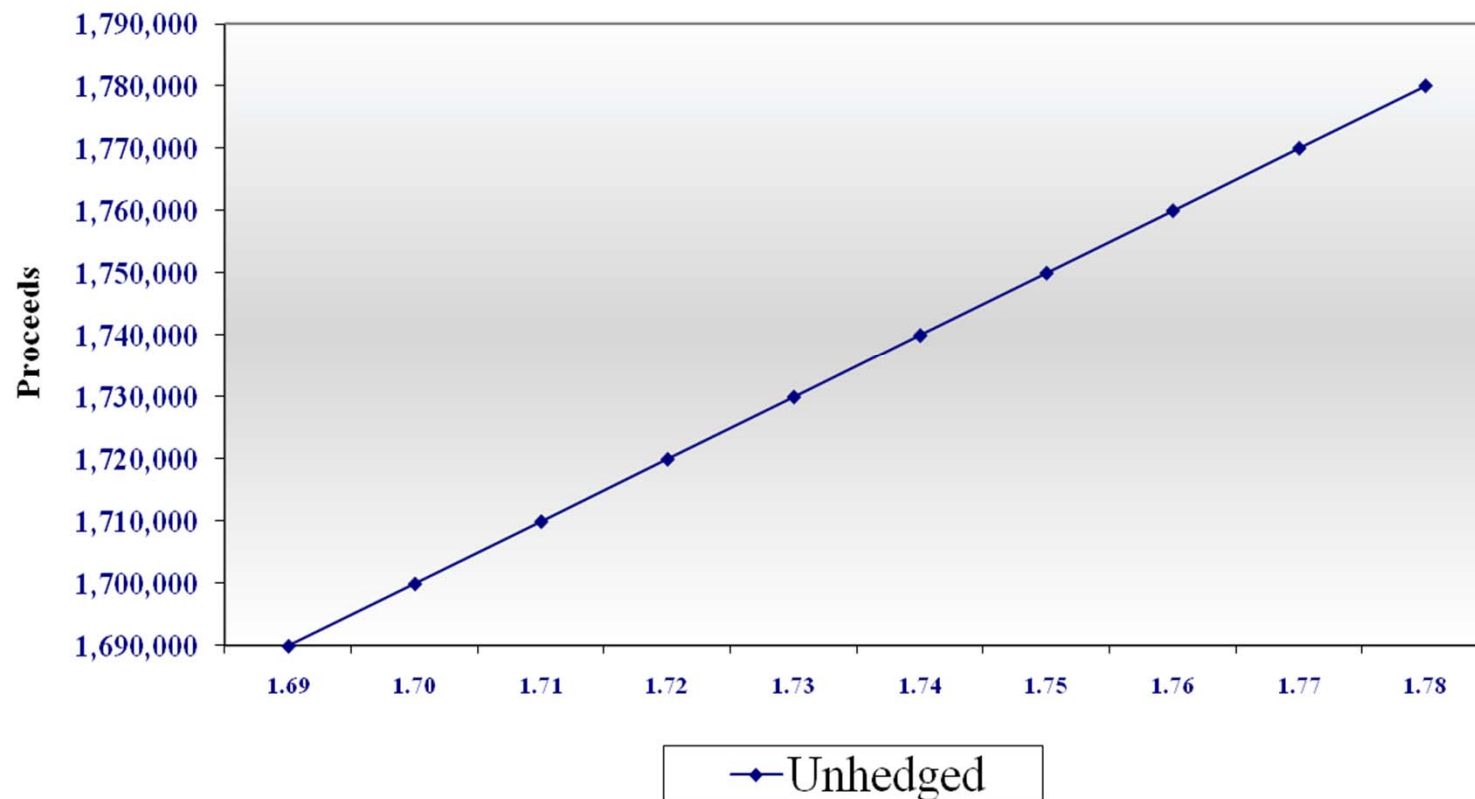
Remain Unhedged

- This alternative allows Ganado to accept the transaction risk. Spot rate will determine the USD cash-flows.
- If the spot rate in June is \$1.70 per GBP and above, Ganado earns the minimum acceptable margin.
- If the spot rate in June is below \$1.70 per GBP, Ganado loses money in this transaction.



Unhedged: \$ Value of GBP Receivable changes with the Spot

Unhedged Exposure





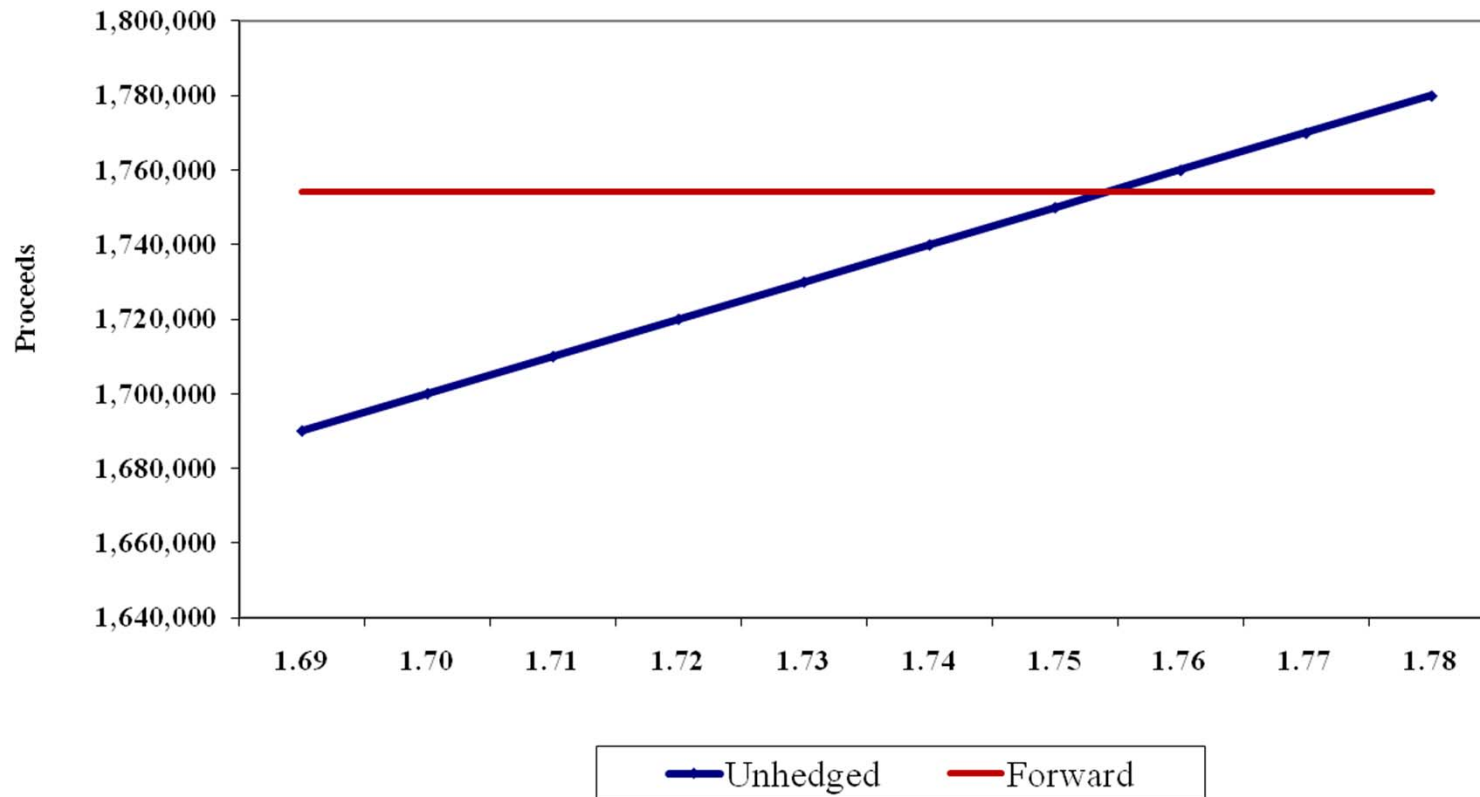
Forward Market Hedge

- If Ganado sells GBP1,000,000 forward in March as soon as it concludes the sale @1.7540 for June delivery it receives USD1,754,000 [Forward Rate: GBP/USD 1.7540-1.7545]
- This is about \$6,000 less than the amount to be received if the forecasted spot rate realized. However, this rate is uncertain.



Forward vs Unhedged

Forward vs Unhedged





Money Market Hedge (MMH)

- Ganado can create a money market hedge by
 - Borrowing present value of GBP cash-flows
 - Converting GBP into USD @ spot rate
 - Rolling the USD for three months @6.00%; while the company may be able to invest in riskier instruments and earn a higher rate, a direct comparison with Forward requires that we use risk free rate as rolling interest rate.
- The resulting amount will be Ganado's USD cash-flow



MMH

- Borrow PV of £1,000,000

$$\frac{1,000,000}{\left(1 + 0.1 \times \frac{90}{360}\right)} = £975,609.7$$

- Buy USD spot
 - @ \$1.7640 x £975,609.7 = \$1,720,975.61
- Rollover @ USD risk free rate of 6%
 - \$1,720,975.61 x (1 + 0.06 x (90/360))
 - \$1,746,790.24



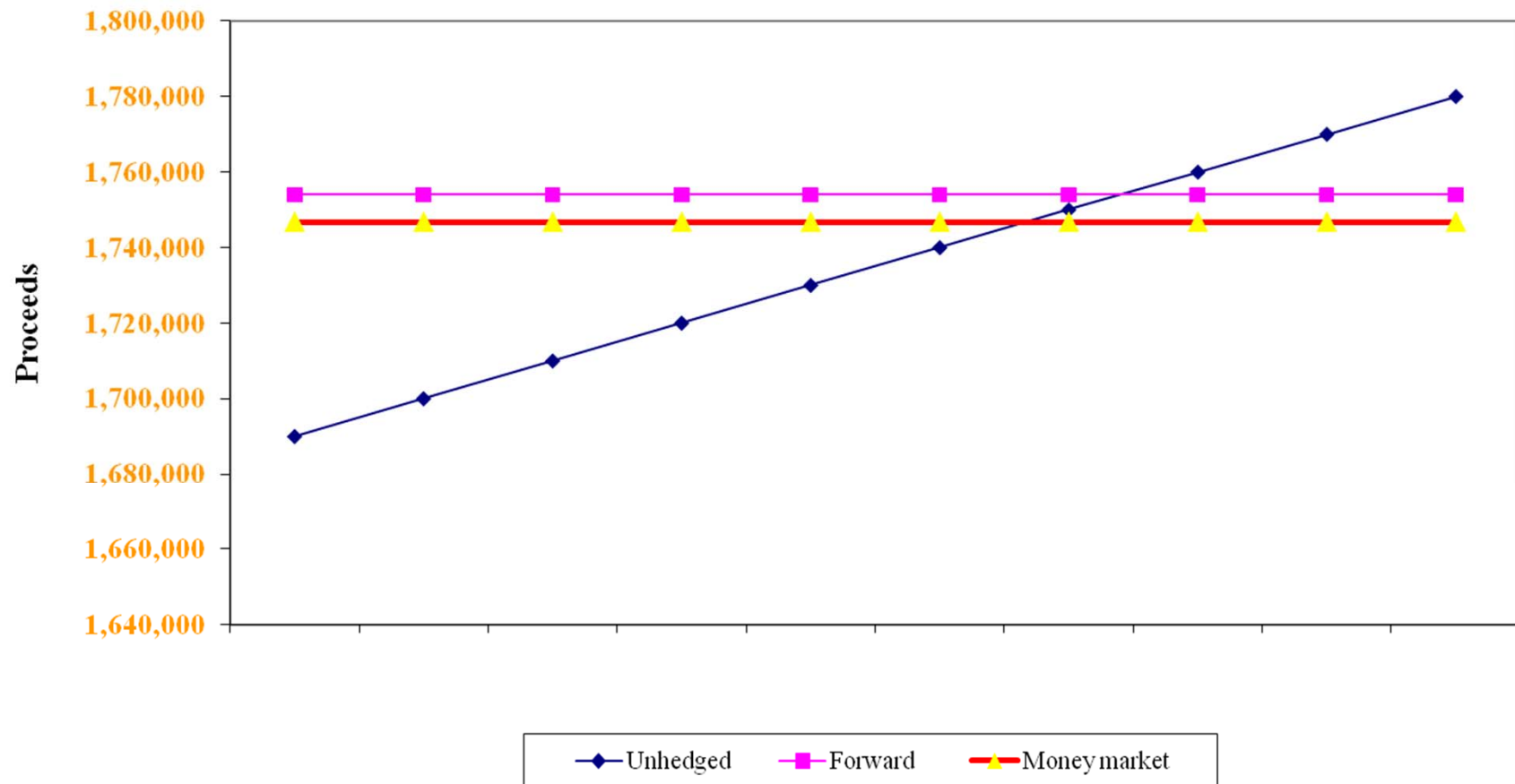
Note

- The proceeds from money market hedge depends on the Ganado's capability to place (invest) the USD in the money market.
 - At the on going market rate of 6% p.a., the hedge generated \$1,746,790.
- Ganado could generate
 - 1,755,396 if it could place/invest dollars @8%
 - \$1,772,605 if it could place/invest dollars @12%.



Forward vs MMH

Forward vs MMH @ 6%





Hedging with Options

- There are two Put options available to Ganado. Both options are out of the money
 - Exercise Price 1.75 is near forward at the money with 1.5% premium
 - Exercise Price 1.71 is out of money with 1% premium

At the money options: strike price is equal to spot price

At the money forward: strike price is equal to forward price



Premium at the purchase

- Premium for strike 1.75 is :
 - $1.5\% \times £1,000,000 = £15,000$
 - $£15,000 \times 1.7640 = \$26,460$
 - Time Value of the Premium at the expiration:
 - $26,460 \times (1 + (0.12/4)) = \$27,254$ [we use cost of capital as opportunity cost]
 - (if we account for the time value of premium paid at $t=0$)
- Premium for strike 1.71 is:
 - $1\% \times £1,000,000$
 - $£1,000,000 \times 1.7640 = \$17,640$
 - Time Value of the Premium at the expiration:
 - $17,640 \times (1 + (0.12/4)) = 18,169$ [we use cost of capital as opportunity cost]



Put Option Summary

Put Option @ Strike	Strike 1.75	Strike 1.71
Option Cost	\$27,254	\$18,169
Proceeds if Exercised	\$1,750,000	\$1,710,000
Minimum net proceeds	\$1,722,746	\$1,691,831
Maximum net proceeds	Unlimited	Unlimited
Break-even spot rate	\$1.7813	\$1.7722

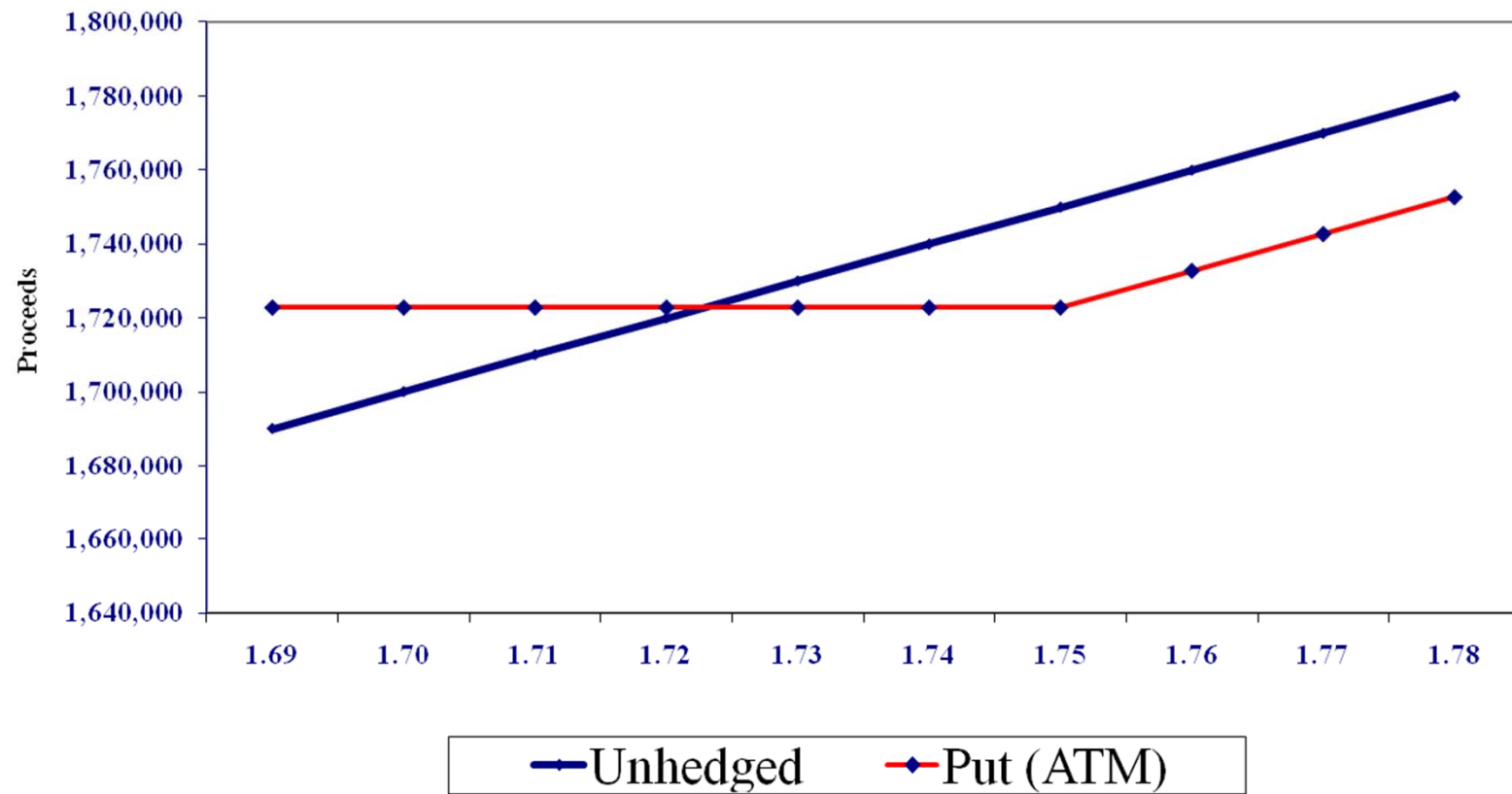
At these exchange rates, the receipt from the forward hedge and the option hedge will become equal; below these rates, forward hedge produces more dollars than the hedge with put options.



Put Option @1.75 Strike

Hedging Outcomes

ATM Put Option at Strike 1.7500

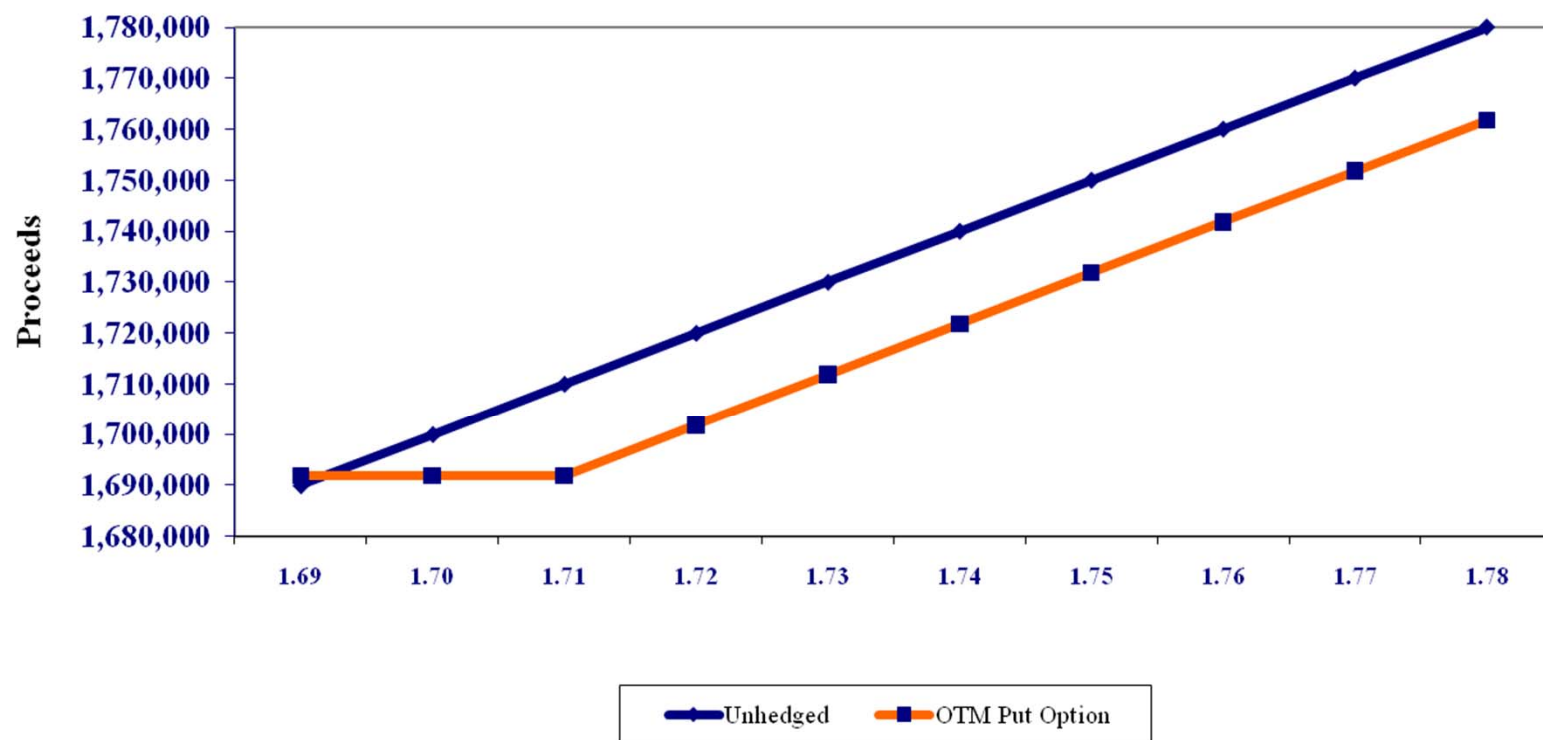




Put Option @1.71 Strike

Hedging Outcomes

OTM Put Option at Strike 1.7100

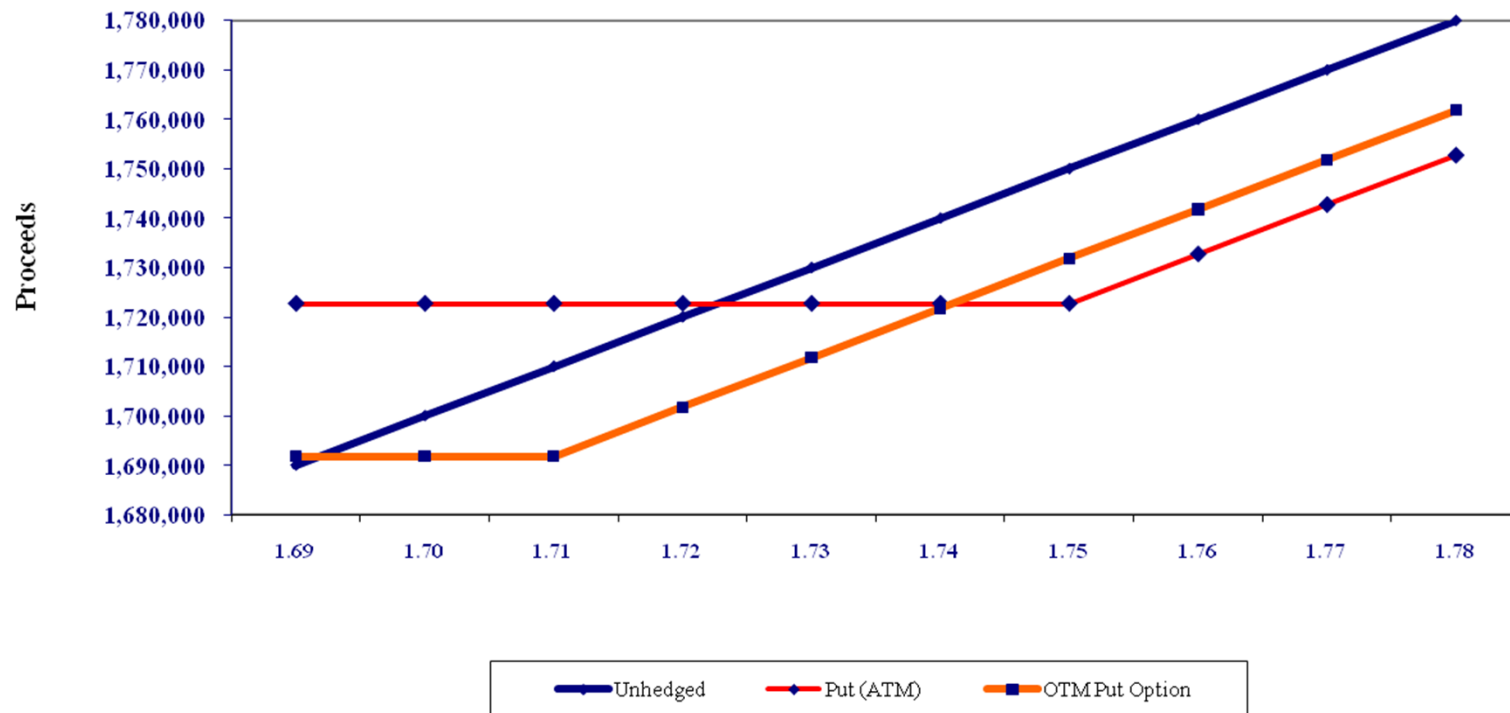




Comparative

Hedging Outcomes

Put Options: 1.75 vs 1.71





Comparative Analysis

Column1	Column2
Strategy	Expected Spot: 1.76
Uncovered	\$1,760,000.00
Forward cover	\$1,754,000.00
Money market hedge	\$1,746,790.00
ATM Put hedge	\$1,727,452.00
OTM Put hedge	\$1,743,417.00



Comparative Analysis : All Put Together

Hedging Outcomes

