

**GEMBA**  
**Energy Derivatives**  
**Professor Craig Pirrong**  
**Homework 2**

1. A put option on gold is struck at \$400. What happens if you exercise when the futures price is \$377 and the most recent settlement price is \$380?
2. The futures price of gold is \$960. A put and a call on this gold futures contract, both struck at \$950 both sell for \$10. The interest rate is 2 percent. The options both expire in one year, and both are European. Identify an arbitrage opportunity.
3. The March Natural Gas Futures price is \$6.290/mmBTU. A call on March NG struck at \$6.00 is currently selling at \$.577, and a put struck at \$6.00 is selling at \$.430. These prices are quoted as of 19 January, 2004. The option expires on 24 February, 2004. The relevant interest rate is 1.5 percent. The options are European. Identify an arbitrage opportunity. Indicate which option you should buy, which option you should sell, and whether you should buy or sell the futures contract.
4. If the options are American, is there still an arbitrage opportunity? If so, indicate the transactions you should undertake (what to buy, what to sell).