Leverage

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Leverage

• Buying stock on Margin
• Buying or Selling Futures
• Buying or Writing Options

Buying stock on Margin

• An Investor has 10000$ to invest
• May buy stock
• May Borrow 10000 and invest 20000

Comparison

• Consider a simple example where the stock price is 100.
• Assume the investment is short term and the interest paid on the borrowing is negligible.

Results

• Stock Price  Regular with Margin
  • 101  100$ gain  200$ gain
  • 99   100$ loss  200$ loss
  • 105  500$ gain  1000$ gain
  • 95   500$ loss  1000$ loss

Other concerns with futures and options

• Some may not be liquid
• Tend to be short term investment.
Are futures riskier than stock?

Futures and leverage

- When you buy a futures you normally use margin.
- Margin is less than the full value of the contract.
- Sort of like a security deposit
- May be required to put up additional margin if the market moves against you.
- This results in leverage

Example of a contract

- Crude oil Futures
- 1000 barrels of Oil
- Price of the November contract on Sept 30
  91.76
- Initial Margin 4,510
- Value of the contract 91,760 dollars

Results

<table>
<thead>
<tr>
<th>Price drops to</th>
<th>loss</th>
<th>loss % of margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.26</td>
<td>500$</td>
<td>11.086%</td>
</tr>
<tr>
<td>90.76</td>
<td>1000$</td>
<td>22.173%</td>
</tr>
</tbody>
</table>

Which is Riskier?

- Oil Futures
- Buying stock in a large oil company

Result leverage

- Oil Futures without the leverage of a futures contract are slightly riskier.
- This result depends upon the firm selected and the time horizon.
- With the leverage the oil futures are a lot riskier.
Call options

• Option to buy a share at the striking price
• Not required to purchase the share it is an option
• It involves substantial leverage.

Example

• Stock price is 50
• Exercise price is 50
• Interest rate is 2%
• Time to maturity is .18 years
• No dividends on this stock
• Volatility .40

Results from the Black Scholes model

<table>
<thead>
<tr>
<th>Stock price</th>
<th>Option premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>3.466</td>
</tr>
<tr>
<td>51</td>
<td>4.031</td>
</tr>
<tr>
<td>52</td>
<td>4.641</td>
</tr>
<tr>
<td>53</td>
<td>5.294</td>
</tr>
<tr>
<td>54</td>
<td>5.987</td>
</tr>
<tr>
<td>55</td>
<td>6.717</td>
</tr>
</tbody>
</table>

Percentage changes

<table>
<thead>
<tr>
<th>Stock price</th>
<th>Option value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 %</td>
<td>16.313%</td>
</tr>
<tr>
<td>4%</td>
<td>33.922</td>
</tr>
<tr>
<td>6%</td>
<td>52.762</td>
</tr>
<tr>
<td>8%</td>
<td>72.759</td>
</tr>
<tr>
<td>10%</td>
<td>93.830</td>
</tr>
</tbody>
</table>

Results based on the Black Scholes Merton model

<table>
<thead>
<tr>
<th>Stock price</th>
<th>Gain in option value</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>.565</td>
</tr>
<tr>
<td>52</td>
<td>1.176</td>
</tr>
<tr>
<td>53</td>
<td>1.829</td>
</tr>
<tr>
<td>54</td>
<td>2.522</td>
</tr>
<tr>
<td>55</td>
<td>3.252</td>
</tr>
</tbody>
</table>