**Minneapolis Options Report – April 4th**

*Banks*
Trading was relatively light across the universe of banks that we follow with a few exceptions: BBT, C, and USB. Volumes at strikes at least 20% below the current spot price continue to decline:

Aggregate Volumes for Options on CCAR Banks



% of Volume < 0          % of Volume < -20%
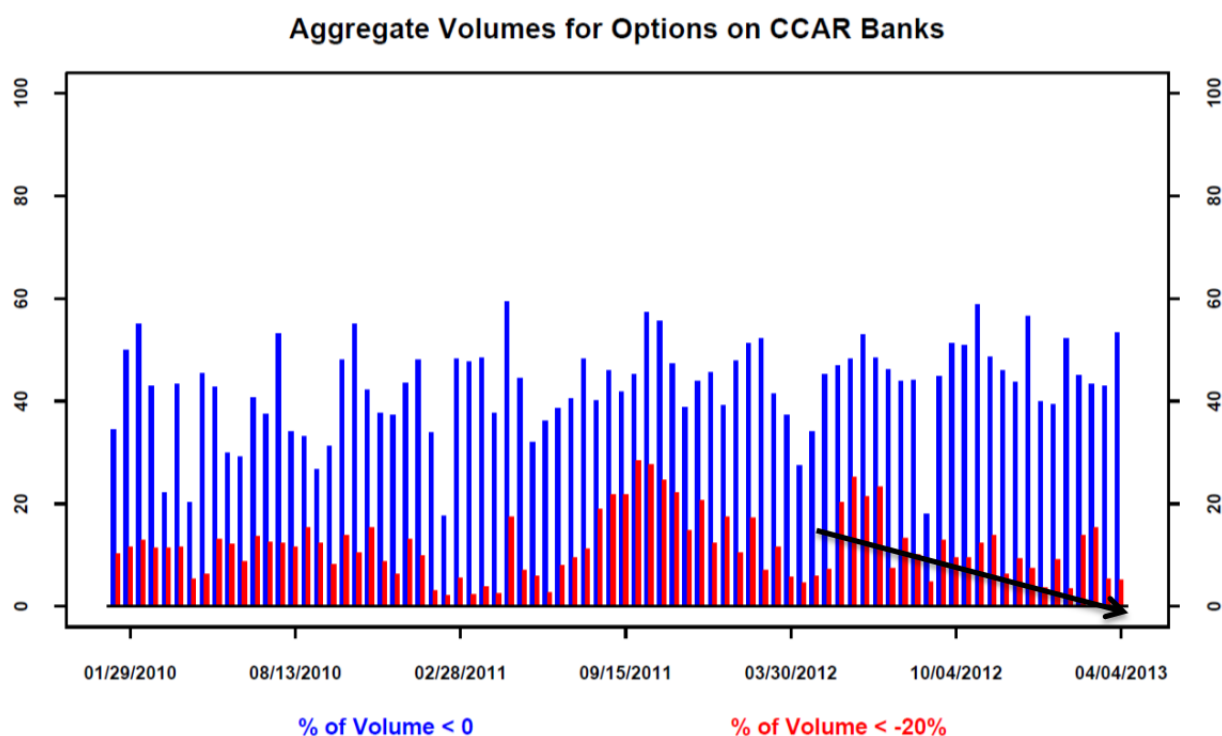
The median RNPD standard deviation rose this week in the CCAR universe. Notable increases occurred for FITB, PNC, and STI.

Additional notes:
- BBT experienced large trades below the current spot. Its shares underperformed the BKX last week. (*See upper panel of the BBT report for volumes*)
- The jump in trading on USB options coincided with a decline in its RNPD standard deviation and a less negative RNPD skew.

*Other Commodity Markets*
Trading was light across the other markets we follow with the exception of options on dollar-pound and yen-dollar exchange rate futures. Trading in options on the S&P 500 index with approximately 12 months to expiry were about average. Standard deviations of RNPDs derived from options across the markets were generally lower.
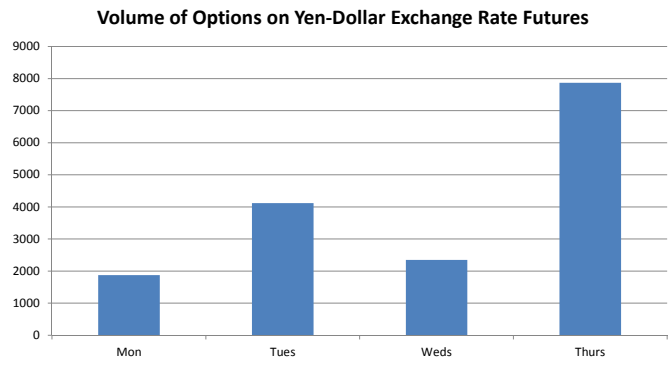
- RNPDs derived from options on the S&P 500 index remained stable with relatively low standard deviations and skews that are back to 2010 levels. The risk-neutral probability of a 20% upside move over the next 6 months has declined to nearly zero. Relative to the same expectation over the next 12 months, this is very low. (*see S&P 500 reports*)

**Difference in Risk-neutral Probability of +20% Price Change
12m Expiry less 6m Expiry**
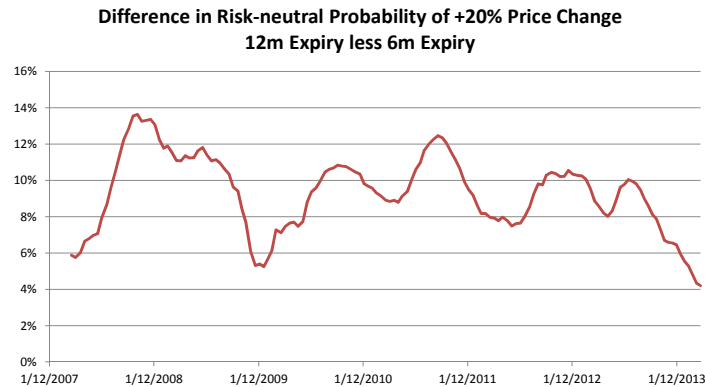


- Since the beginning of March, the RNPD standard deviations for soybeans and wheat have fallen. The standard deviation of the corn RNPD is down relative to two weeks ago. This is somewhat surprising given recent headlines related to avian flu in China and potential disruption in demand for feed. (*see individual reports*)
- Tail risks have remained stable in the precious metals markets since November. Large change probabilities remain in decline and RNPD skews are close to zero. (*See Gold and Silver reports*)

**Standard Deviations of RNPDs
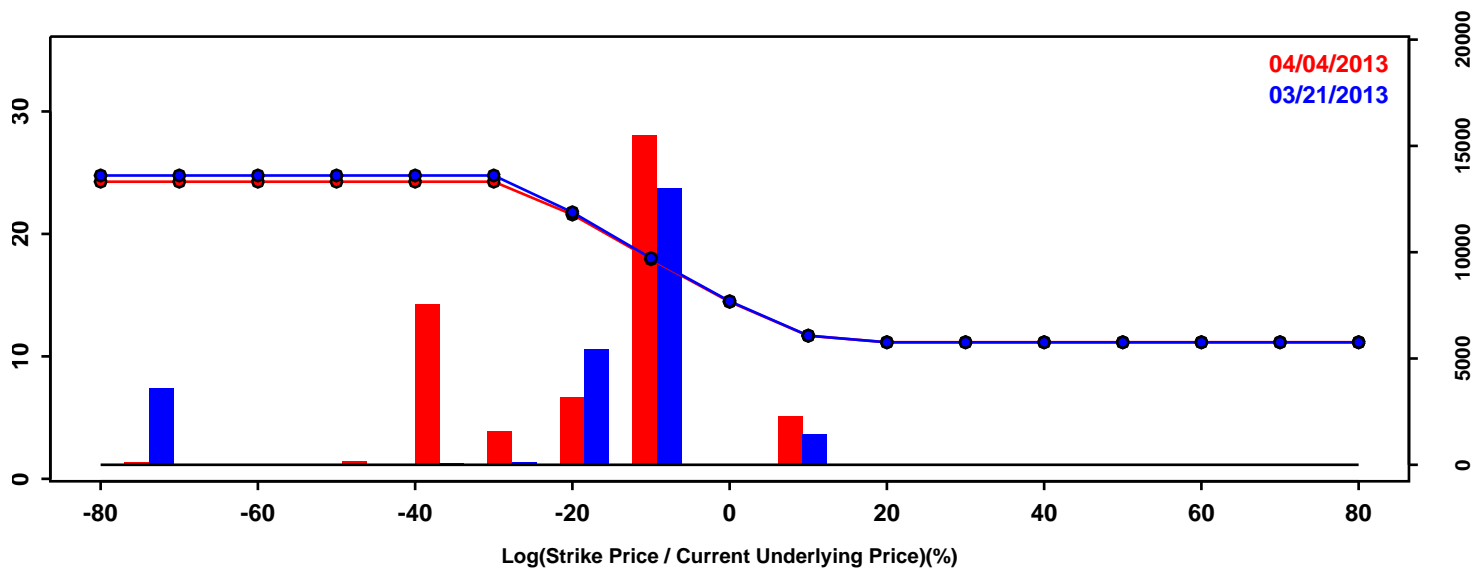Derived from Options on Silver and Gold Futures**



Source: Bloomberg
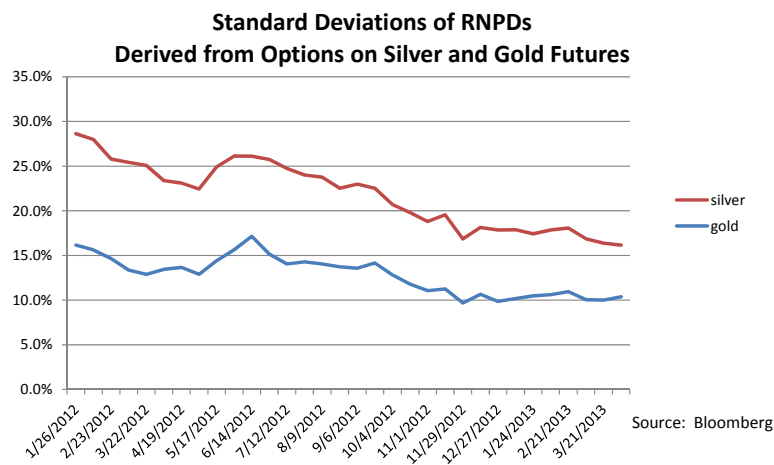
- Trading in options on Yen-Dollar exchange rate futures remained strong last week jumping on Thursday after the BOJ announcement. Despite the news of increased monetary easing, RNPD statistics remained stable. (*see Yen report*)
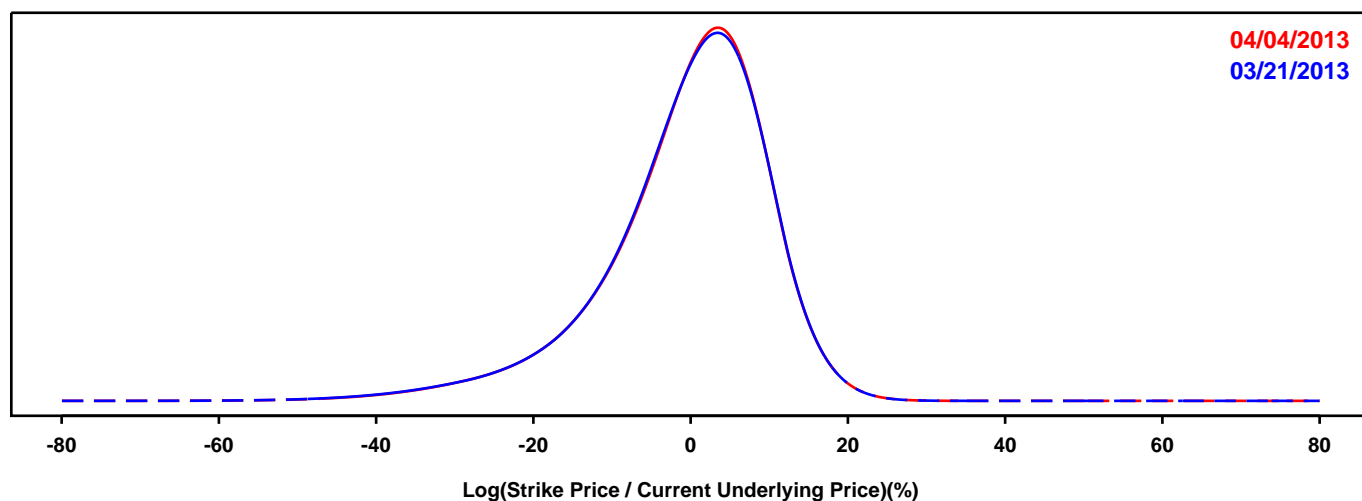
**Volume of Options on Yen-Dollar Exchange Rate Futures**

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

*Log returns are based on the risk neutral density function of the underlying asset
derived from options that expire in approximately 6 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Probability of a Large Change

Decrease <=20%     Increase >= 20%

### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -14.51% | -14.43% | 0.09% |
| **50th Pct** | 1.02% | 1.11% | 0.09% |
| **90th Pct** | 10.92% | 10.92% | 0.00% |
|  |  |  |  |
| **Mean** | -0.66% | -0.60% | 0.07% |
| **Std Dev** | 10.79% | 10.71% | -0.08% |
| **Skew** | -1.10 | -1.08 | 0.02 |
| **Kurtosis** | 2.16 | 2.07 | -0.09 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

*Log returns are based on the risk neutral density function of the underlying asset
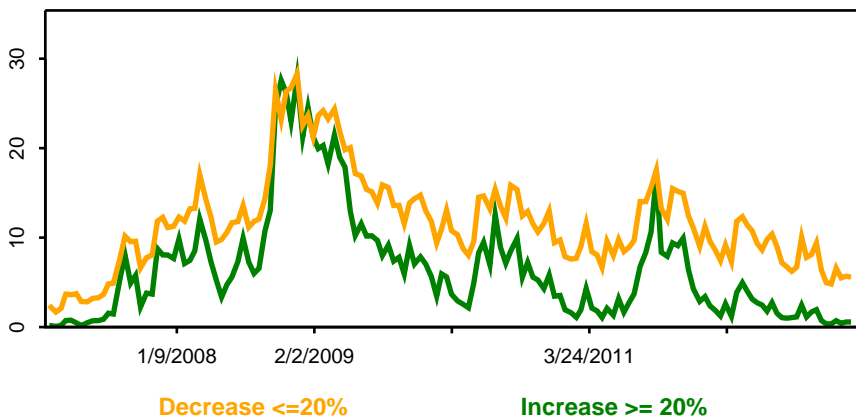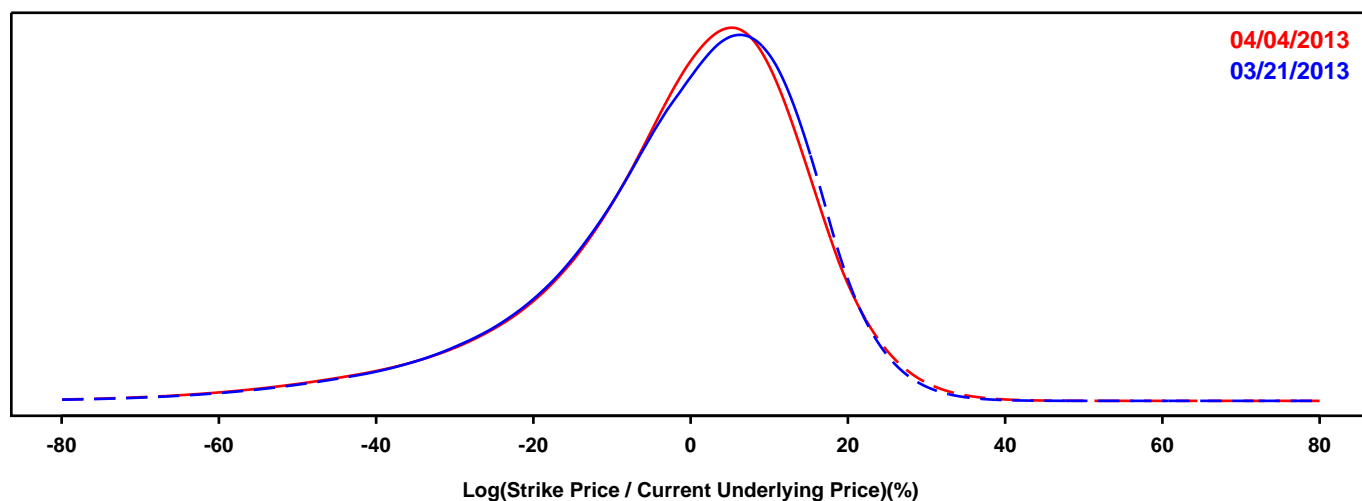derived from options that expire in approximately 12 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**　　　　**Increase >= 20%**

### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -23.91% | -24.12% | -0.21% |
| **50th Pct** | 1.38% | 1.18% | -0.20% |
| **90th Pct** | 16.21% | 16.20% | -0.01% |
|  |  |  |  |
| **Mean** | -1.65% | -1.80% | -0.15% |
| **Std Dev** | 16.83% | 17.04% | 0.21% |
| **Skew** | -1.14 | -1.14 | -0.01 |
| **Kurtosis** | 1.97 | 2.11 | 0.14 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (WTI)

*Log returns are based on the risk neutral density function of the underlying asset*
*derived from options that expire in approximately 6 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



### Risk Neutral PDF of the Log Return Distribution
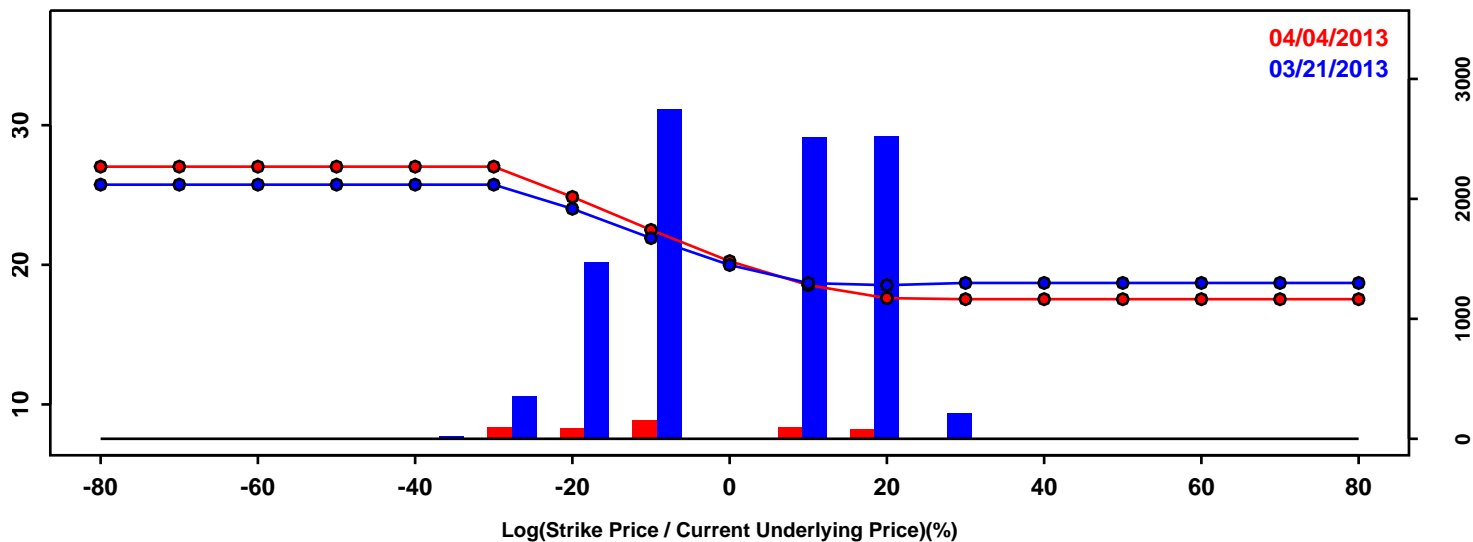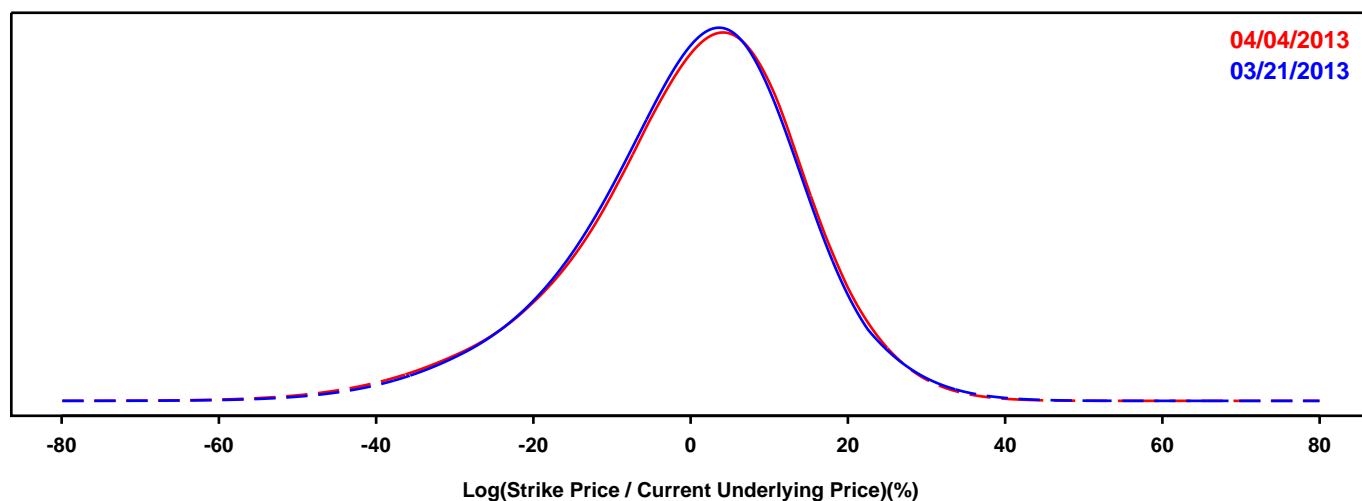
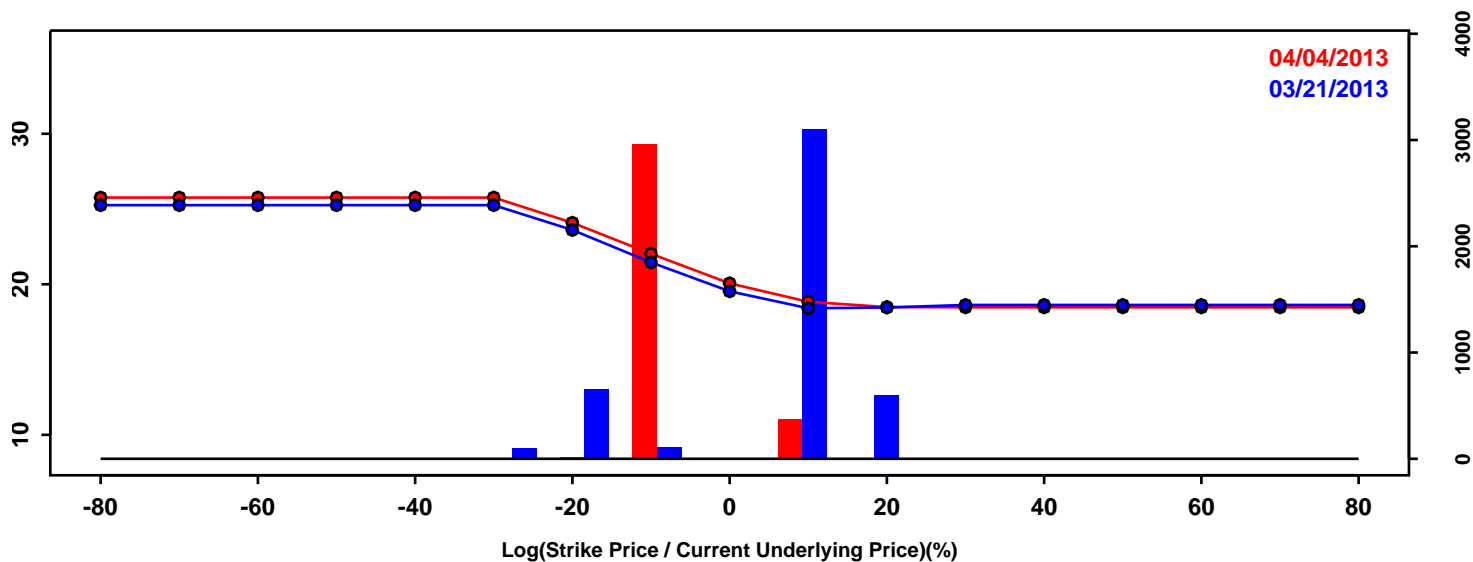

### Probability of a Large Change



**Decrease <=20%**   **Increase >= 20%**

### Statistics of the Log Return Distributions

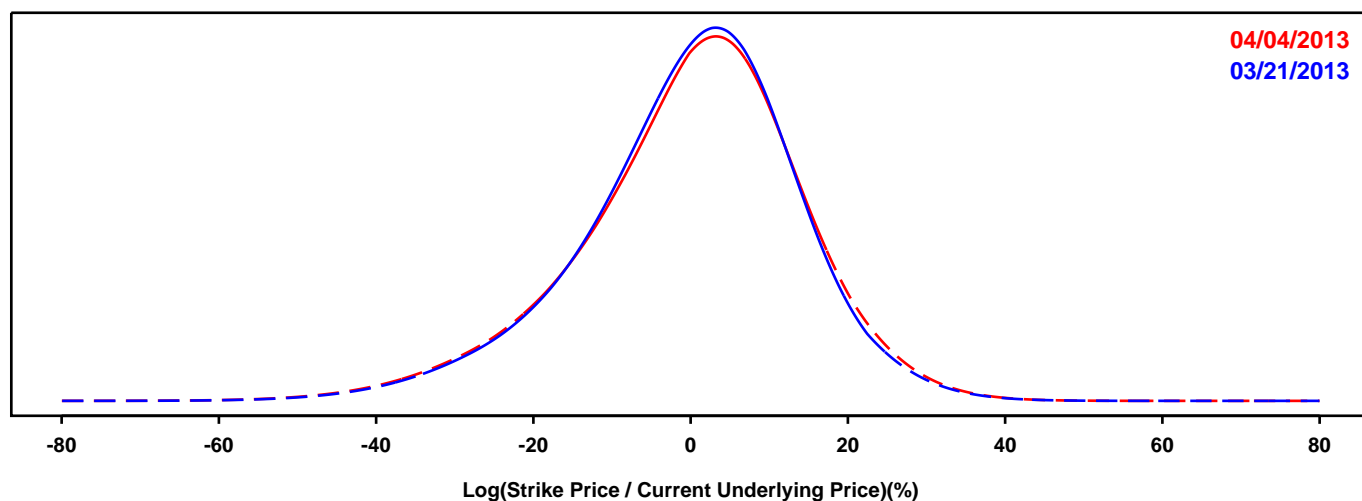|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| 10th Pct | -19.04% | -19.58% | -0.54% |
| 50th Pct | 1.15% | 1.36% | 0.21% |
| 90th Pct | 16.27% | 16.50% | 0.24% |
|  |  |  |  |
| Mean | -0.23% | -0.25% | -0.02% |
| Std Dev | 14.25% | 14.56% | 0.31% |
| Skew | -0.52% | -0.63 | -0.11 |
| Kurtosis | 0.70 | 0.80 | 0.11 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (Brent)

*Log returns are based on the risk neutral density function of the underlying asset
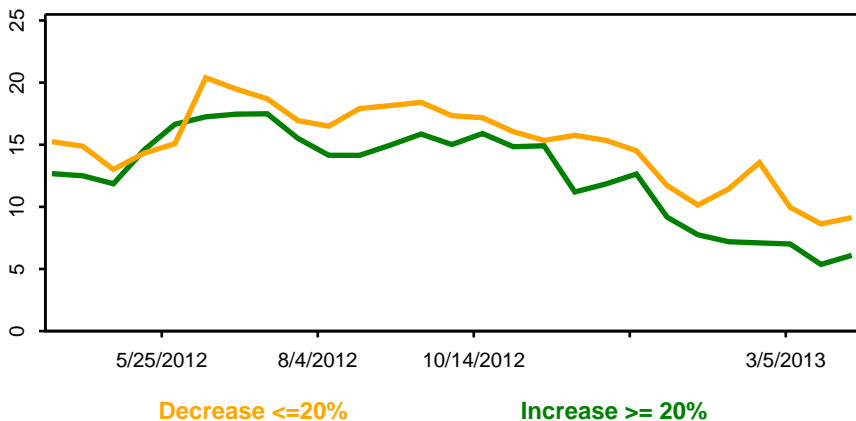derived from options that expire in approximately 6 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**      **Increase >= 20%**

### Statistics of the Log Return Distributions

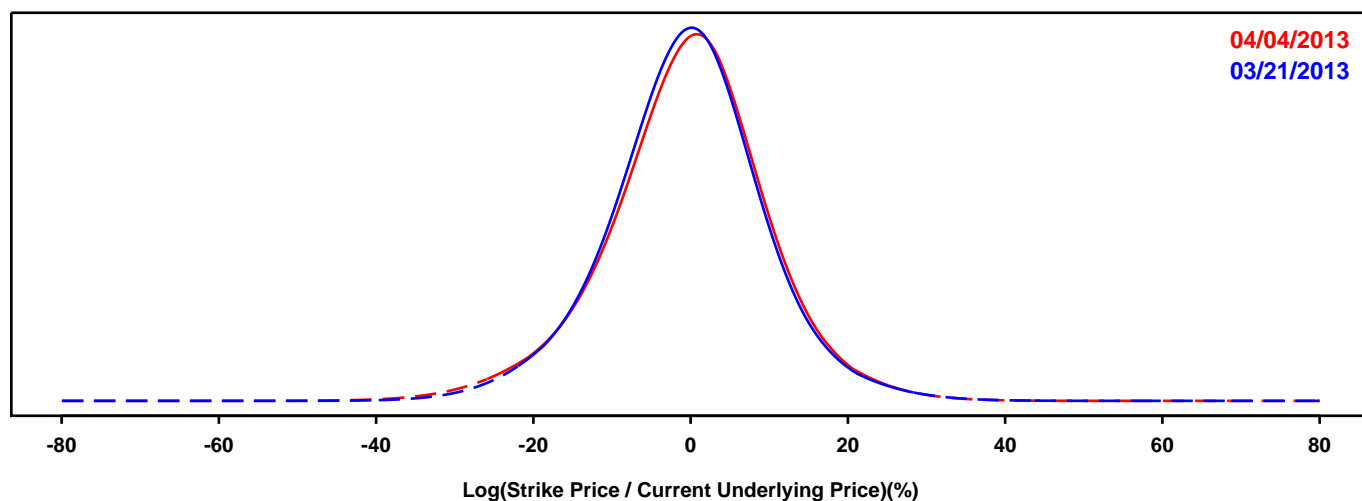|           | 03/21/2013 | 04/04/2013 | Change |
|-----------|-----------|-----------|--------|
| **10th Pct** | -18.46% | -19.00% | -0.54% |
| **50th Pct** | 1.06% | 1.22% | 0.16% |
| **90th Pct** | 15.96% | 16.70% | 0.74% |
|           |           |           |        |
| **Mean**  | -0.20% | -0.08% | 0.12% |
| **Std Dev** | 13.92% | 14.33% | 0.41% |
| **Skew**  | -0.50 | -0.51 | -0.01 |
| **Kurtosis** | 0.74 | 0.68 | -0.06 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLD FUTURES

*Log returns are based on the risk neutral density function of the underlying asset*
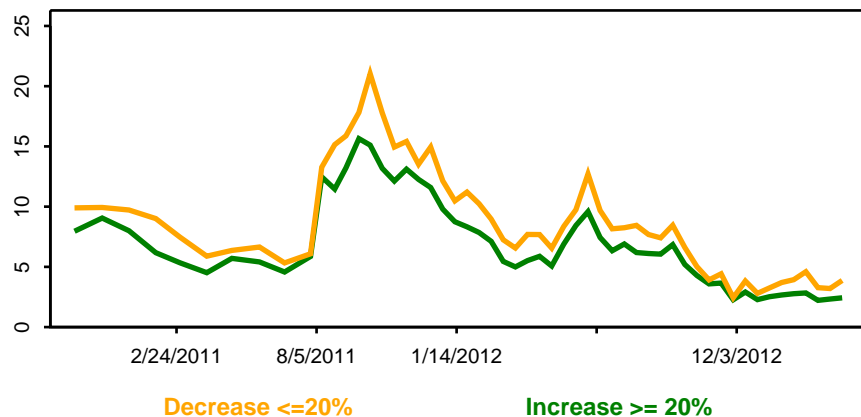*derived from options that expire in approximately 6 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**  **Increase >= 20%**

### Statistics of the Log Return Distributions

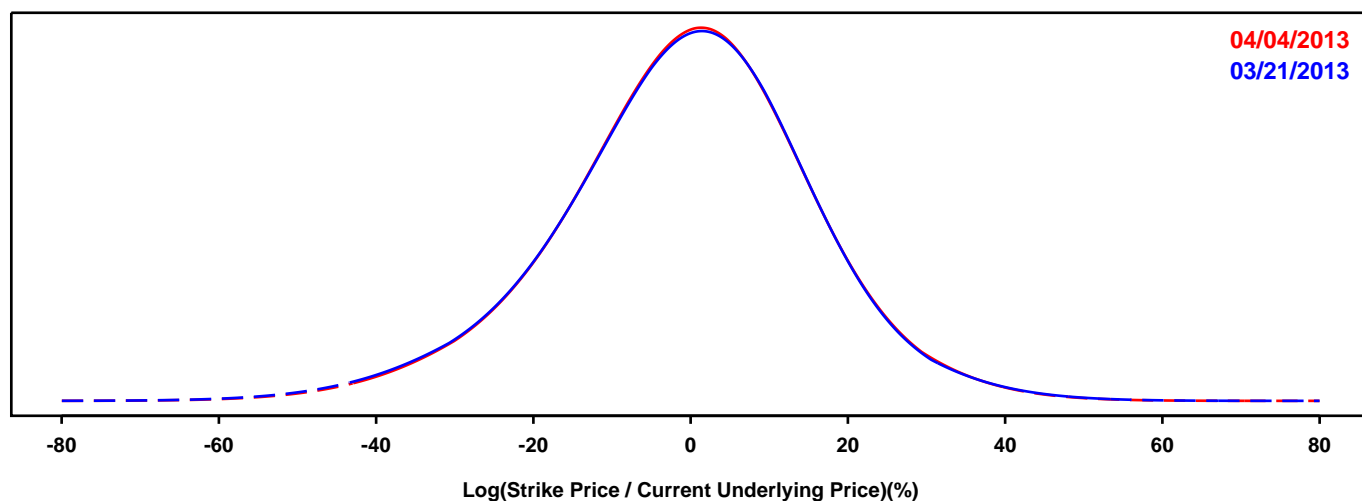| | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -12.93% | -13.36% | -0.43% |
| **50th Pct** | -0.31% | 0.00% | 0.31% |
| **90th Pct** | 11.52% | 11.95% | 0.43% |
| | | | |
| **Mean** | -0.48% | -0.36% | 0.11% |
| **Std Dev** | 10.00% | 10.37% | 0.38% |
| **Skew** | -0.05 | -0.21 | -0.17 |
| **Kurtosis** | 0.78 | 0.86 | 0.08 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SILVER FUTURES

*Log returns are based on the risk neutral density function of the underlying asset
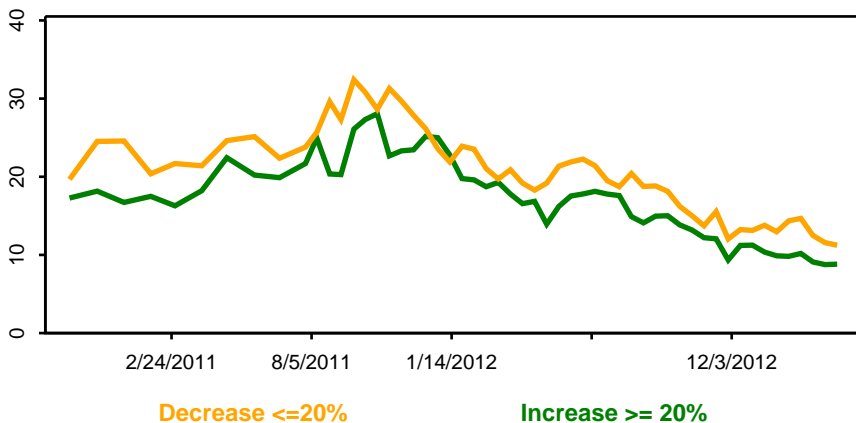derived from options that expire in approximately 6 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**          **Increase >= 20%**
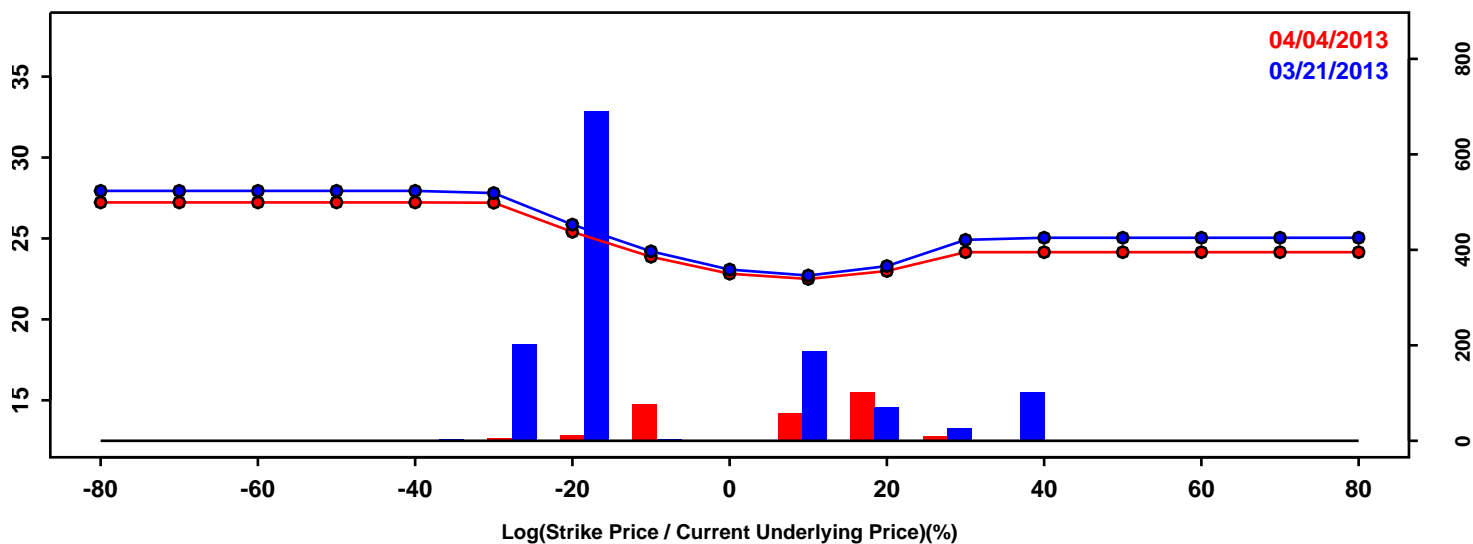
### Statistics of the Log Return Distributions

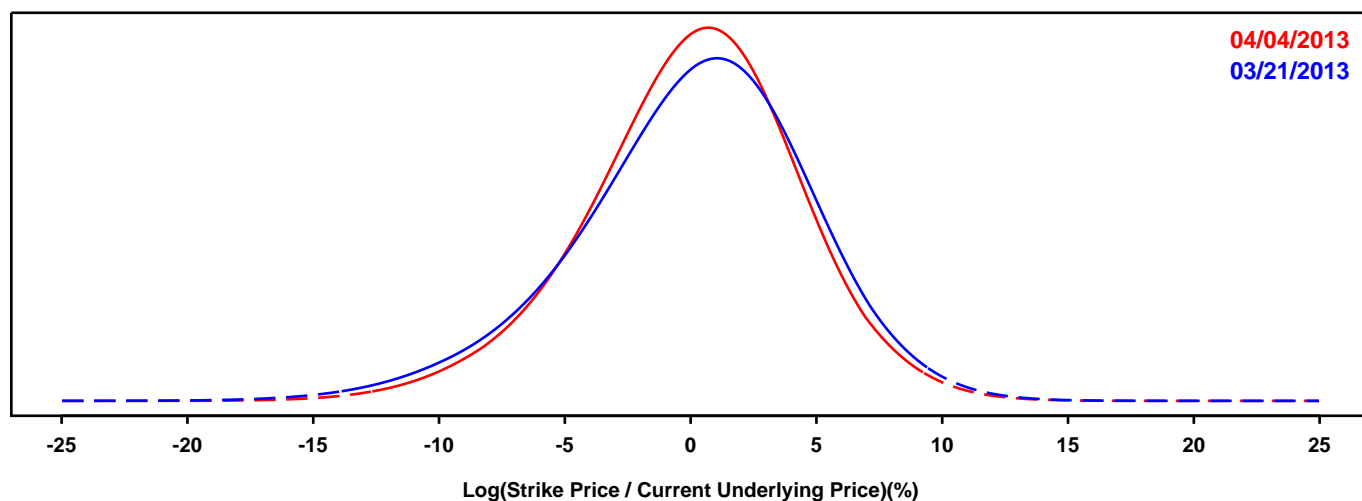| | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| 10th Pct | -21.65% | -21.27% | 0.38% |
| 50th Pct | 0.00% | 0.05% | 0.05% |
| 90th Pct | 18.82% | 18.90% | 0.08% |
| | | | |
| Mean | -0.75% | -0.61% | 0.14% |
| Std Dev | 16.36% | 16.16% | -0.20% |
| Skew | -0.25 | -0.23 | 0.02 |
| Kurtosis | 0.59 | 0.53 | -0.07 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-EURO EXCHANGE RATE FUTURES

*Log returns are based on the risk neutral density function of the underlying asset*
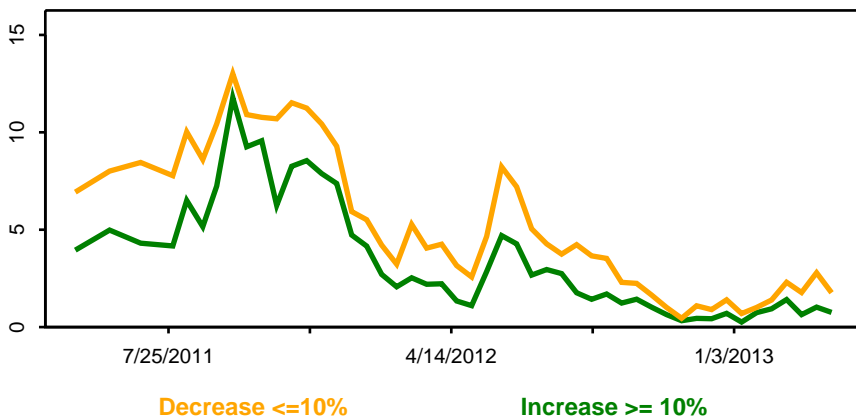*derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)
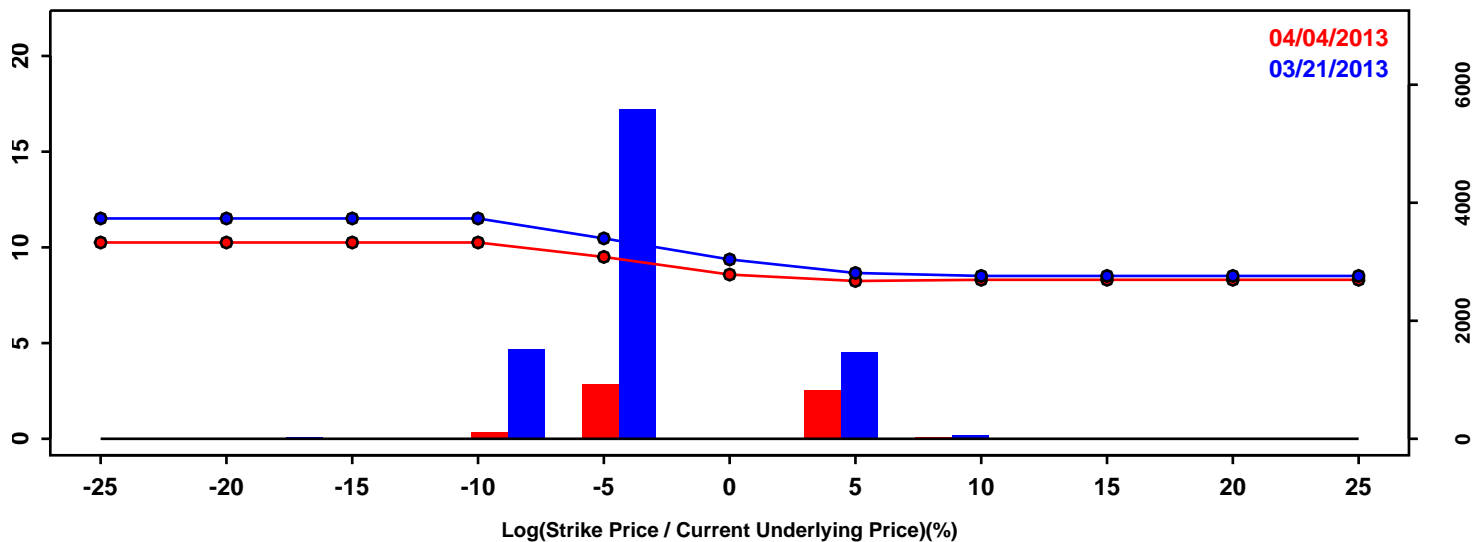
### Probability of a Large Change

**Statistics of the Log Return Distributions**

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -6.11% | -5.52% | 0.58% |
| **50th Pct** | 0.44% | 0.27% | -0.17% |
| **90th Pct** | 5.69% | 5.23% | -0.46% |
|  |  |  |  |
| **Mean** | 0.09% | 0.07% | -0.02% |
| **Std Dev** | 4.70% | 4.29% | -0.41% |
| **Skew** | -0.41% | -0.29 | 0.12 |
| **Kurtosis** | 0.45 | 0.41 | -0.04 |

7/25/2011          4/14/2012          1/3/2013

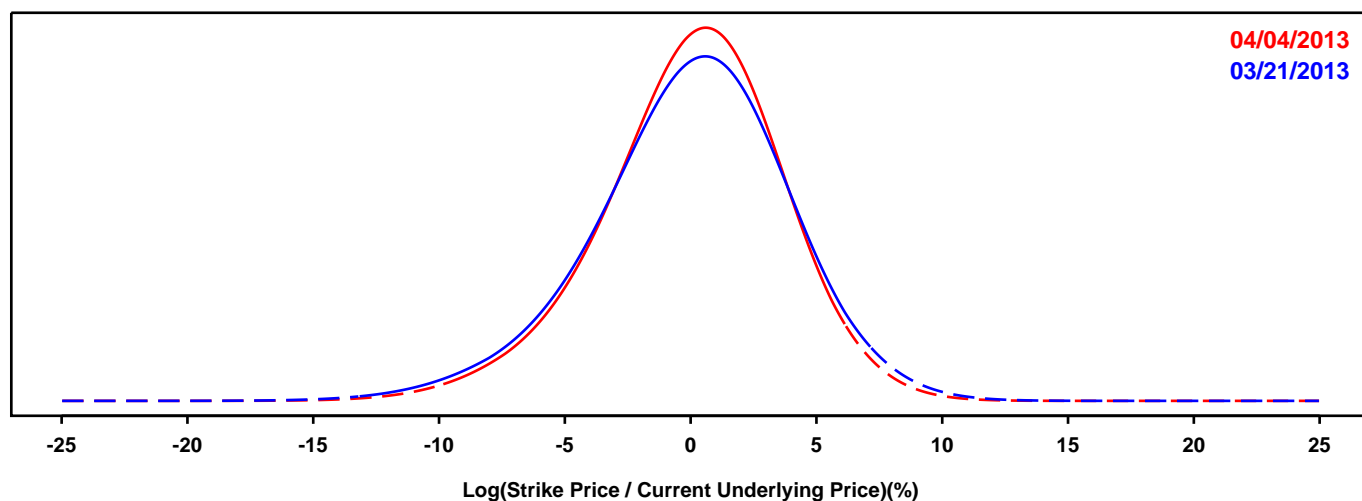**Decrease <=10%**          **Increase >= 10%**

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-POUND EXCHANGE RATE FUTURES

*Log returns are based on the risk neutral density function of the underlying asset*
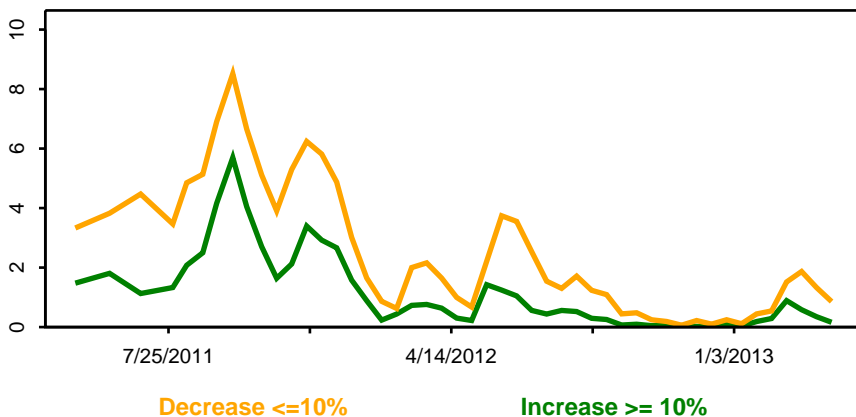*derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=10%**          **Increase >= 10%**
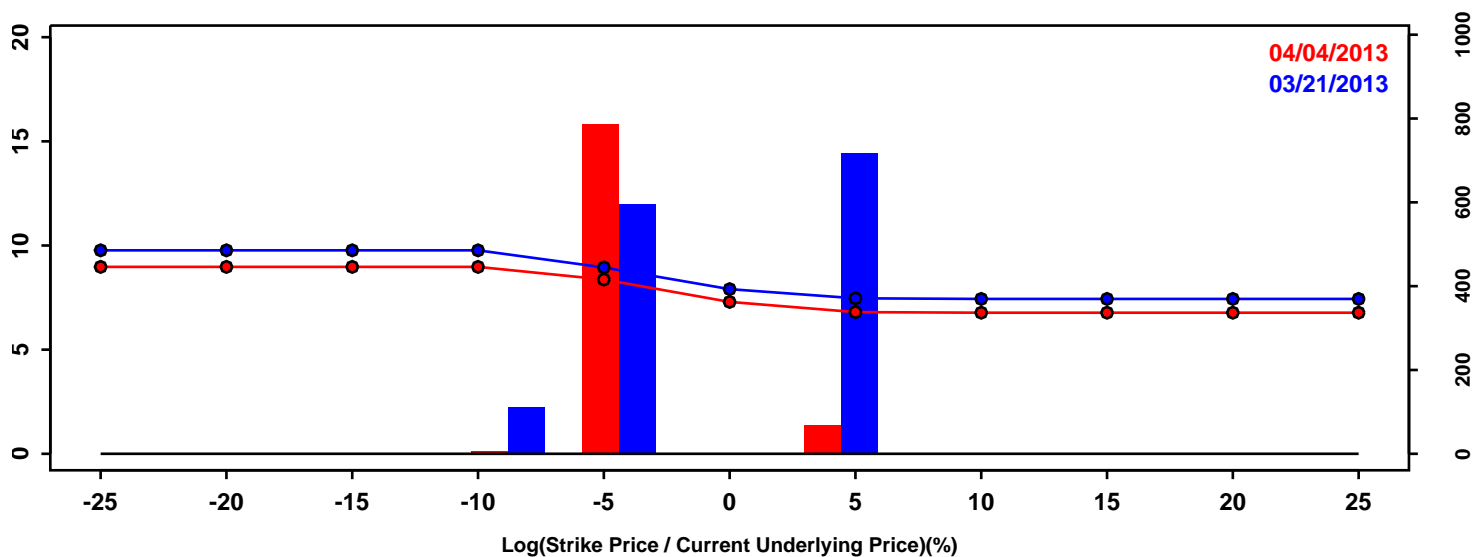
### Statistics of the Log Return Distributions

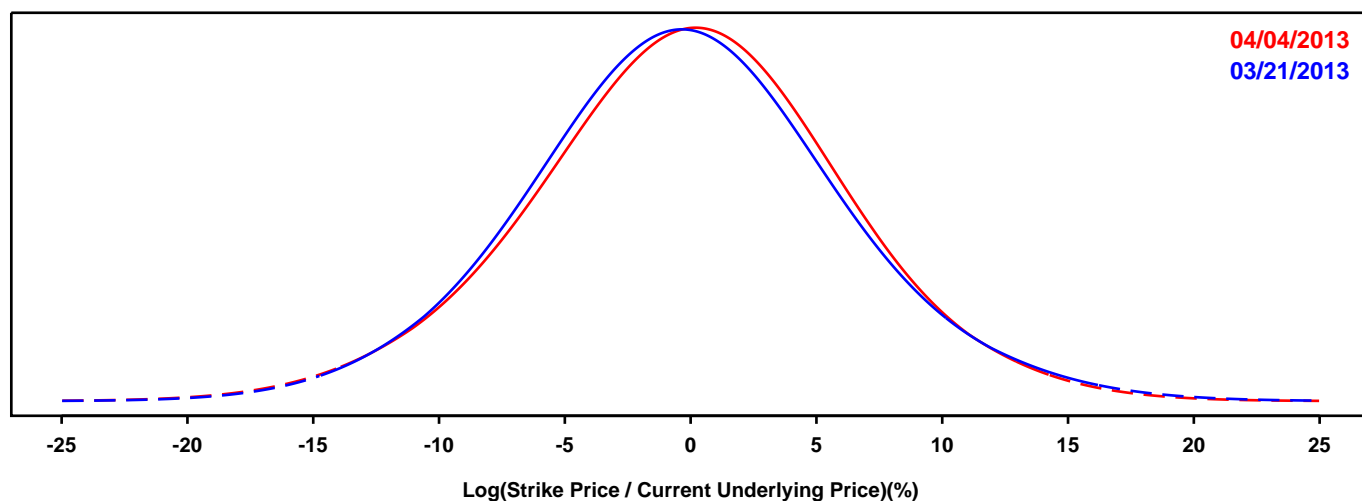|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -5.13% | -4.69% | 0.44% |
| **50th Pct** | 0.20% | 0.22% | 0.02% |
| **90th Pct** | 4.81% | 4.46% | -0.35% |
| **Mean** | 0.02% | 0.05% | 0.03% |
| **Std Dev** | 3.96% | 3.65% | -0.31% |
| **Skew** | -0.34% | -0.36% | -0.01% |
| **Kurtosis** | 0.47 | 0.45 | -0.02 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- YEN-DOLLAR EXCHANGE RATE FUTURES

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
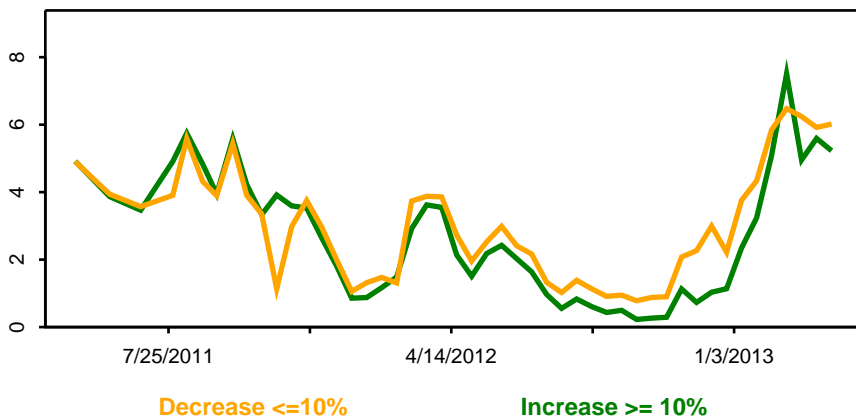
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=10%**    **Increase >= 10%**
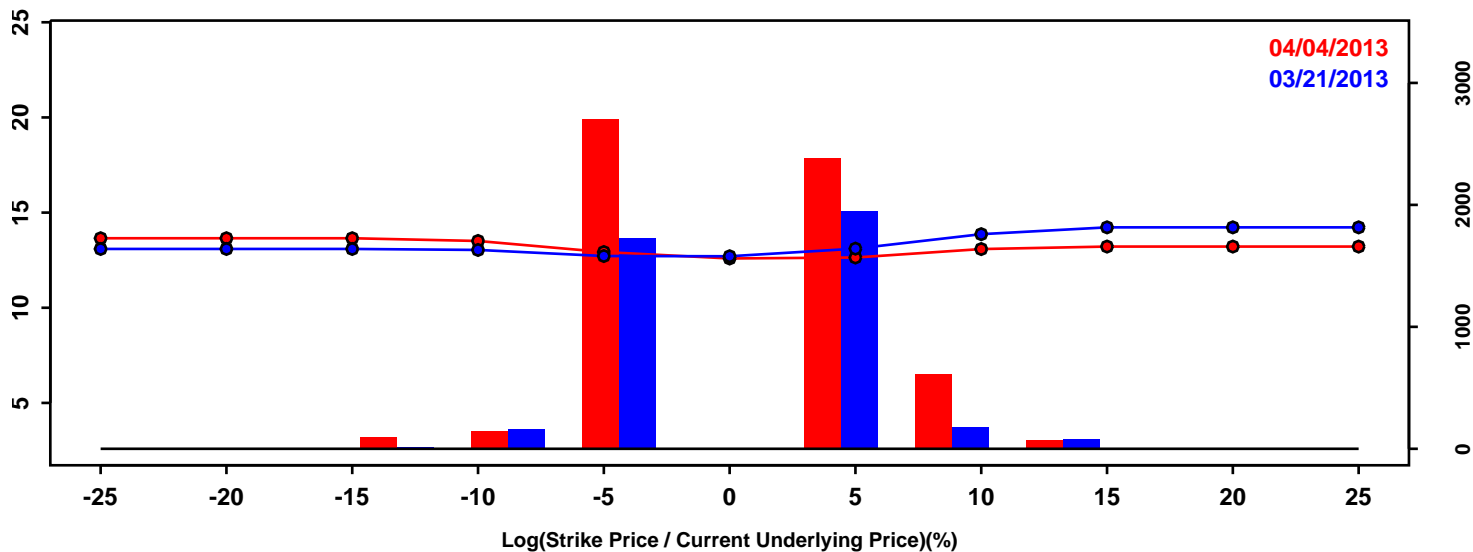
### Statistics of the Log Return Distributions

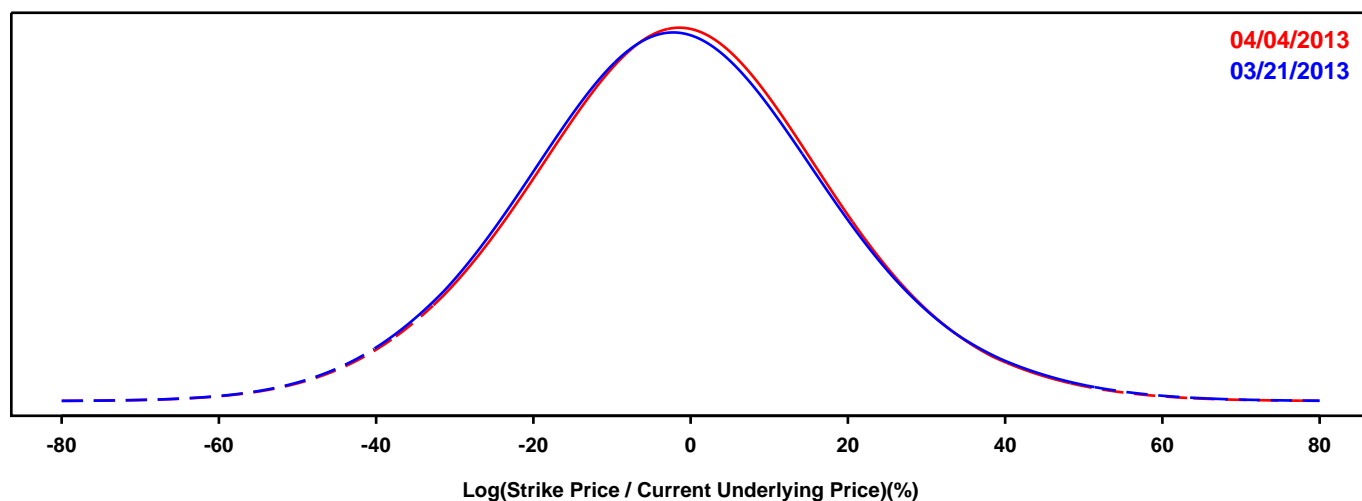|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| 10th Pct | -8.13% | -8.07% | 0.06% |
| 50th Pct | -0.29% | 0.00% | 0.29% |
| 90th Pct | 7.80% | 7.76% | -0.03% |
| | | | |
| Mean | -0.18% | -0.06% | 0.12% |
| Std Dev | 6.33% | 6.28% | -0.05% |
| Skew | 0.08 | -0.06 | -0.15 |
| Kurtosis | 0.30 | 0.27 | -0.04 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CORN FUTURES

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.*
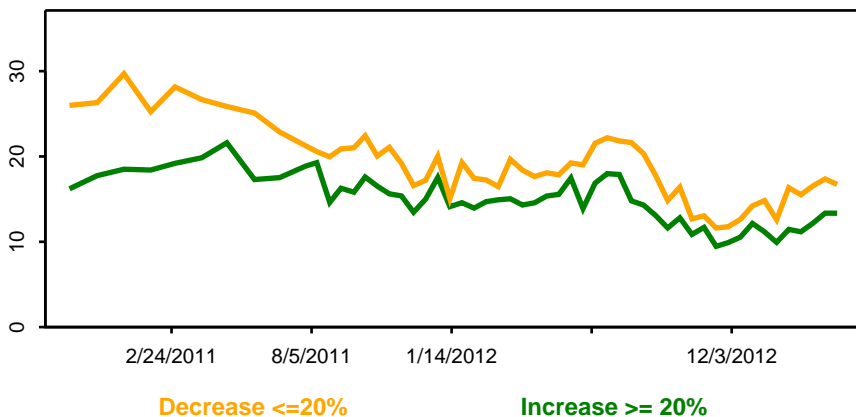
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



Decrease <=20%          Increase >= 20%
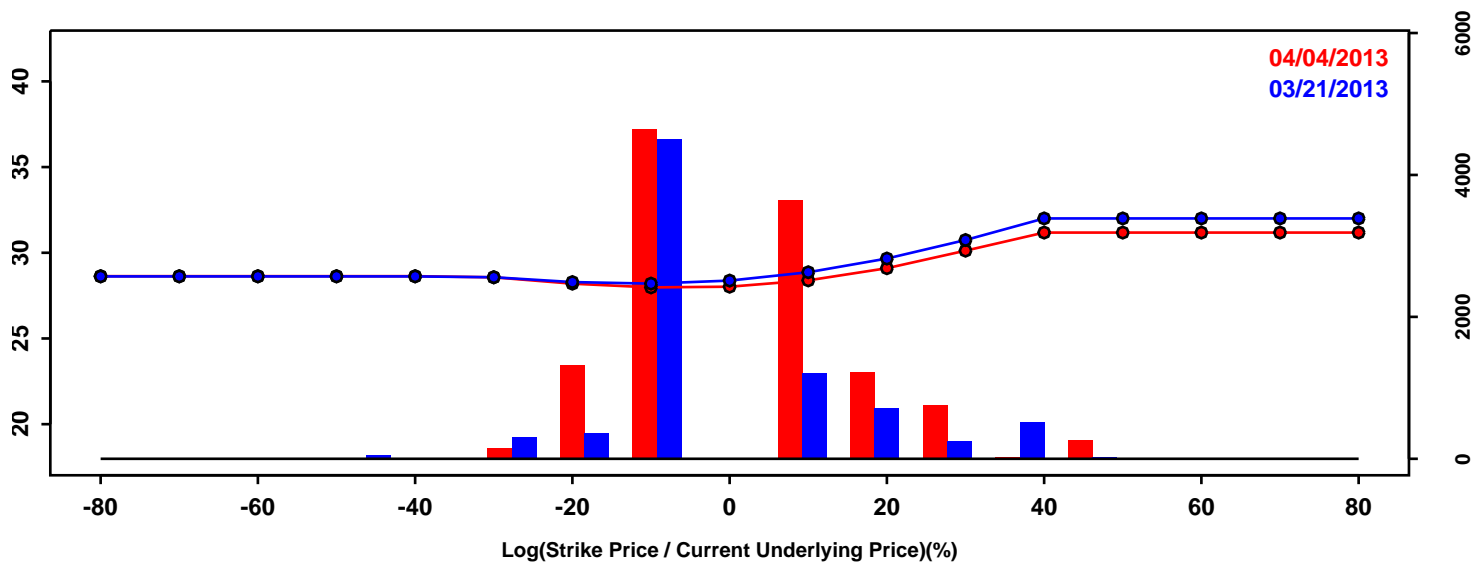
### Statistics of the Log Return Distributions

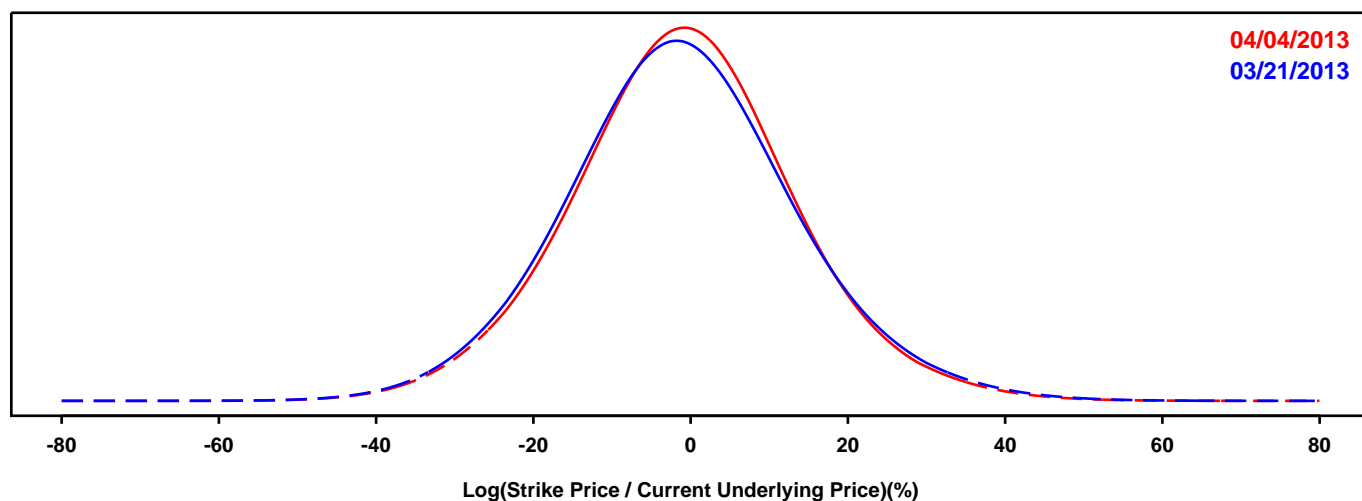|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -26.80% | -26.35% | 0.46% |
| **50th Pct** | -1.91% | -1.48% | 0.43% |
| **90th Pct** | 23.67% | 23.51% | -0.15% |
| | | | |
| **Mean** | -1.65% | -1.36% | 0.29% |
| **Std Dev** | 19.98% | 19.73% | -0.25% |
| **Skew** | 0.10 | 0.06 | -0.04 |
| **Kurtosis** | 0.26 | 0.25 | -0.01 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SOYBEAN FUTURES

*Log returns are based on the risk neutral density function of the underlying asset
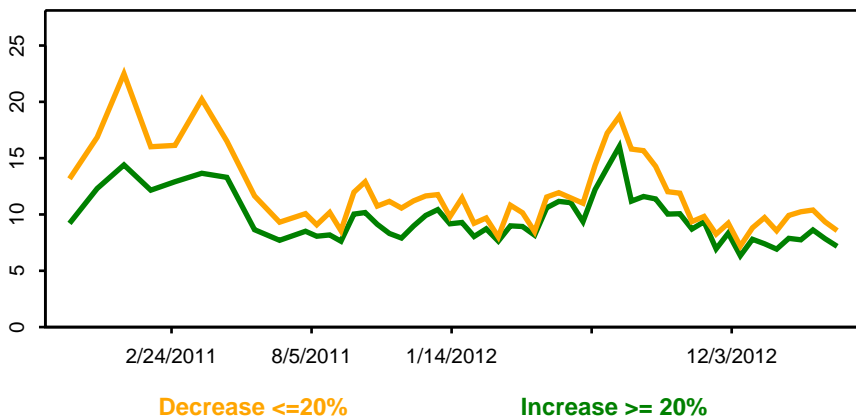derived from options that expire in approximately 6 months.*

## Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

## Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

## Probability of a Large Change

**Decrease <=20%**   **Increase >= 20%**
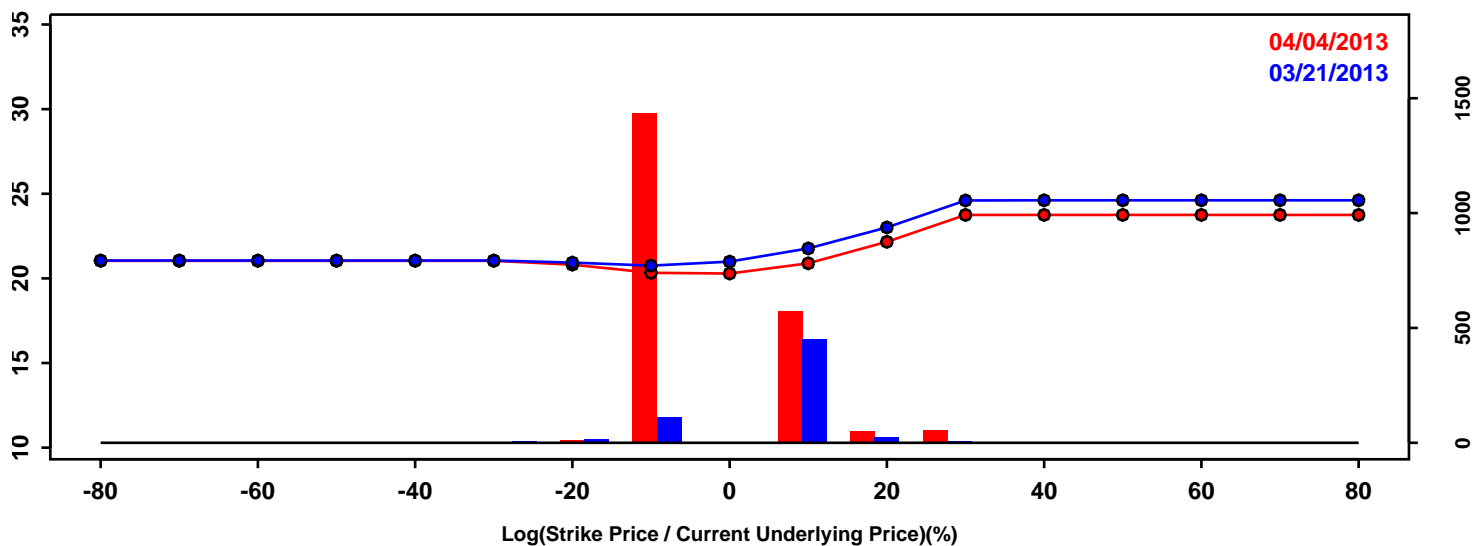
### Statistics of the Log Return Distributions

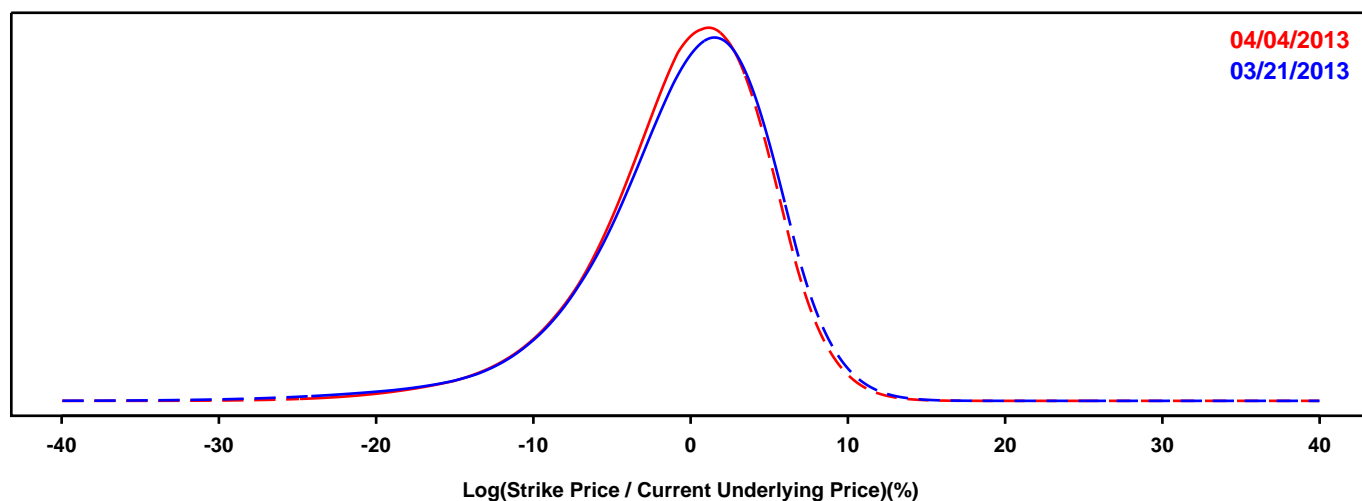|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -19.40% | -18.72% | 0.68% |
| **50th Pct** | -1.32% | -0.87% | 0.45% |
| **90th Pct** | 17.75% | 17.13% | -0.62% |
|  |  |  |  |
| **Mean** | -0.97% | -0.74% | 0.23% |
| **Std Dev** | 14.79% | 14.29% | -0.50% |
| **Skew** | 0.15 | 0.09 | -0.07 |
| **Kurtosis** | 0.36 | 0.40 | 0.03 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- iSHARES DOW JONES US REAL ESTATE

*Log returns are based on the risk neutral density function of the underlying asset*
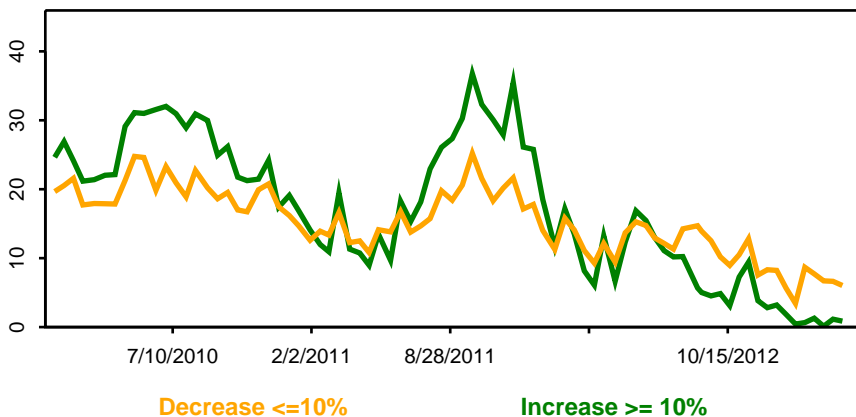*derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=10%**          **Increase >= 10%**
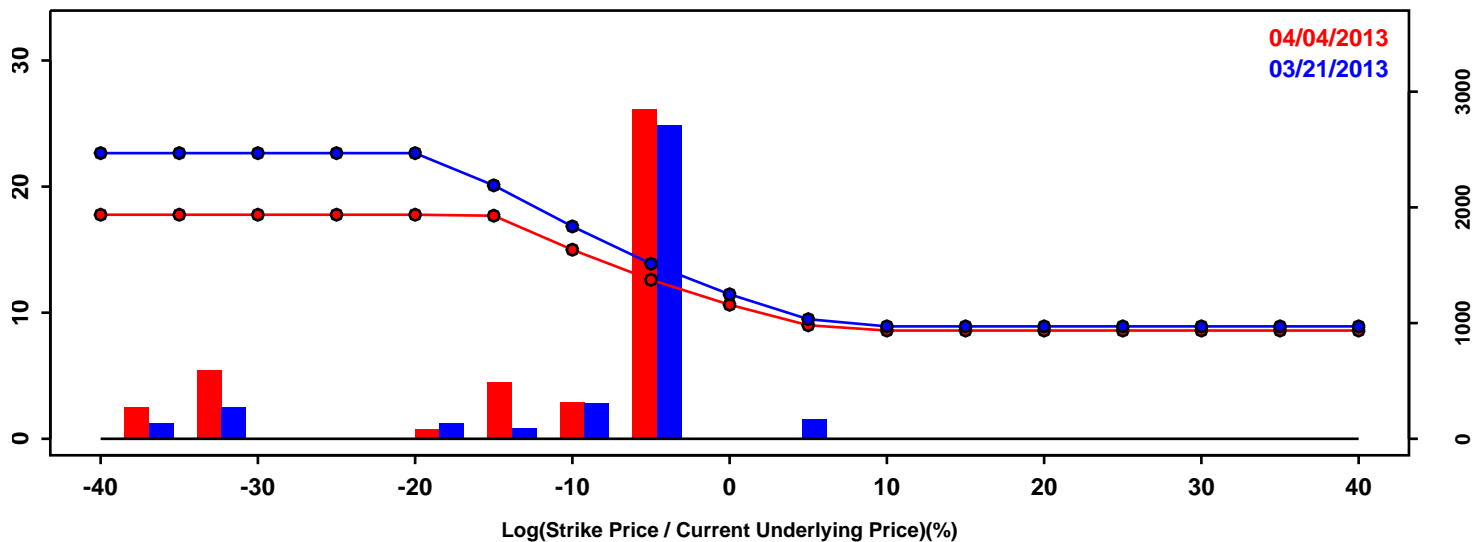
### Statistics of the Log Return Distributions

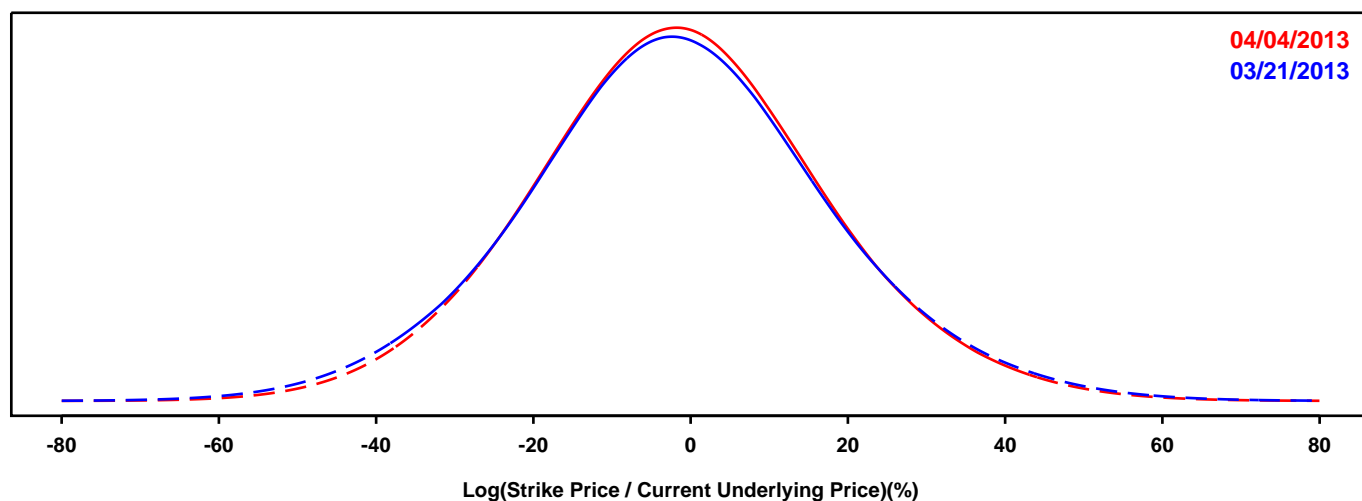|          | 03/21/2013 | 04/04/2013 | Change |
|----------|-----------|-----------|--------|
| 10th Pct | -8.01%    | -7.77%    | 0.24%  |
| 50th Pct | 0.27%     | 0.05%     | -0.22% |
| 90th Pct | 5.96%     | 5.62%     | -0.34% |
|          |           |           |        |
| Mean     | -0.57%    | -0.61%    | -0.04% |
| Std Dev  | 6.02%     | 5.56%     | -0.45% |
| Skew     | -1.17     | -0.89     | 0.27   |
| Kurtosis | 2.88      | 1.63      | -1.26  |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WHEAT FUTURES

*Log returns are based on the risk neutral density function of the underlying asset
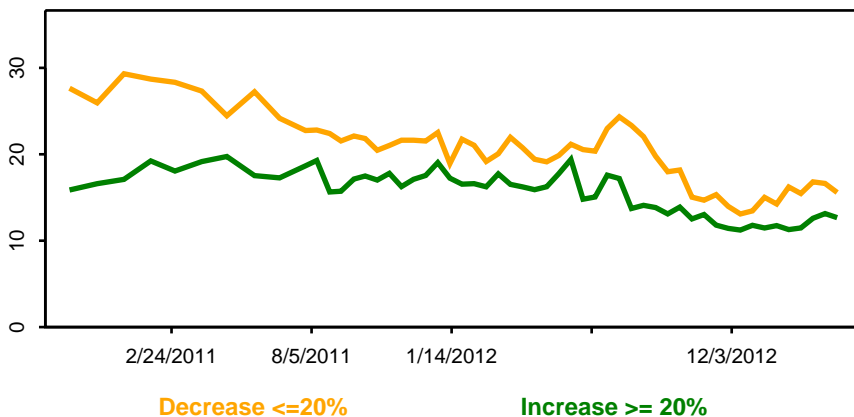derived from options that expire in approximately 6 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)
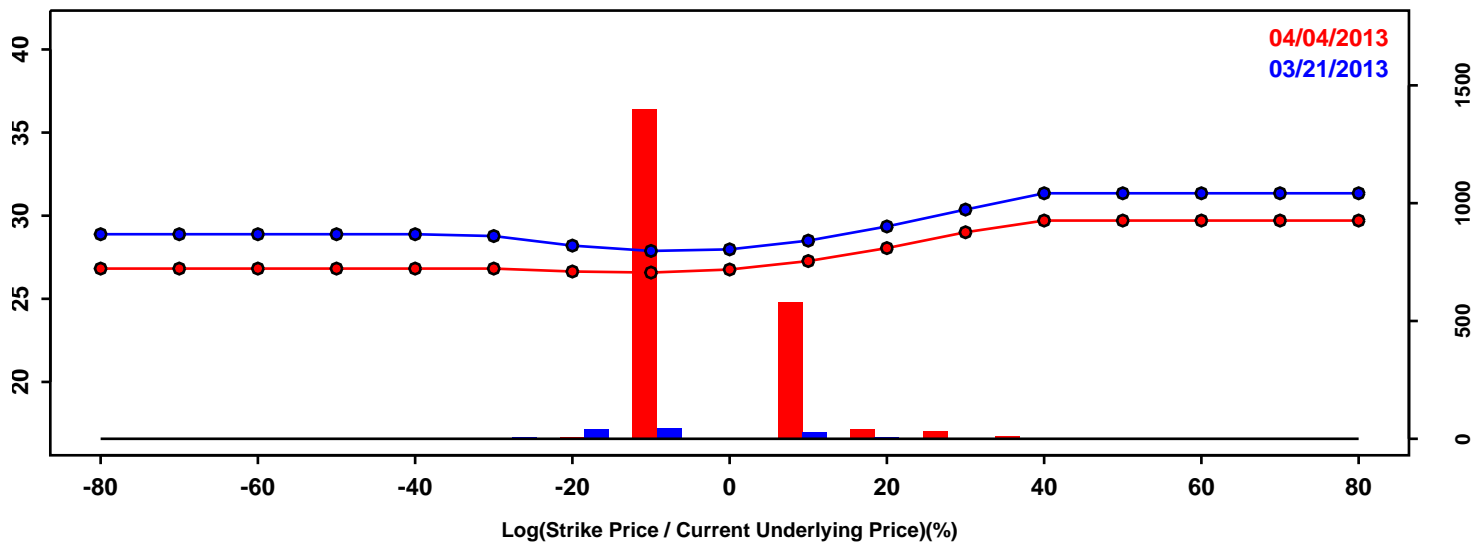
### Probability of a Large Change

| Statistics of the Log Return Distributions | | | |
|---|---|---|---|
| | 03/21/2013 | 04/04/2013 | Change |
| 10th Pct | -26.24% | -25.07% | 1.17% |
| 50th Pct | -1.82% | -1.54% | 0.28% |
| 90th Pct | 23.47% | 22.85% | -0.62% |
| Mean | -1.52% | -1.25% | 0.28% |
| Std Dev | 19.73% | 18.90% | -0.83% |
| Skew | 0.08 | 0.10 | 0.02 |
| Kurtosis | 0.32 | 0.23 | -0.09 |

2/24/2011    8/5/2011    1/14/2012    12/3/2012

**Decrease <=20%**    **Increase >= 20%**

## Aggregate Volumes for Options on CCAR Banks



01/29/2010　08/13/2010　02/28/2011　09/15/2011　03/30/2012　10/04/2012　04/04/2013

**% of Volume < 0**　　　　**% of Volume < -20%**

## Volumes for Options on CCAR Banks



AXP　BAC　BBT　BK　CITI　FITB　GS　JPM　KEY　MS　PNC　RF　STI　STT　USB　WFC
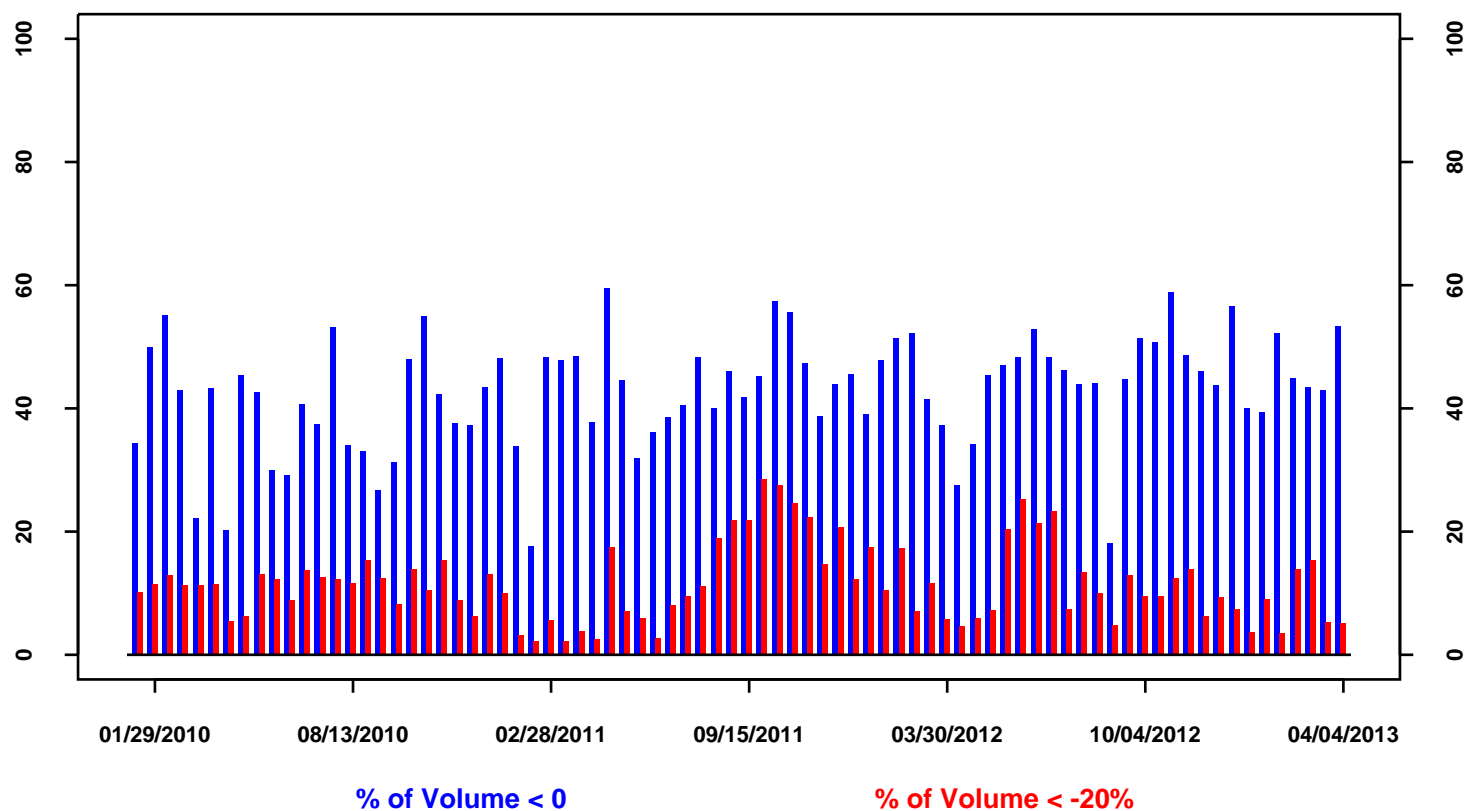
**% of Volume < 0**　　　　**% of Volume < -20%**
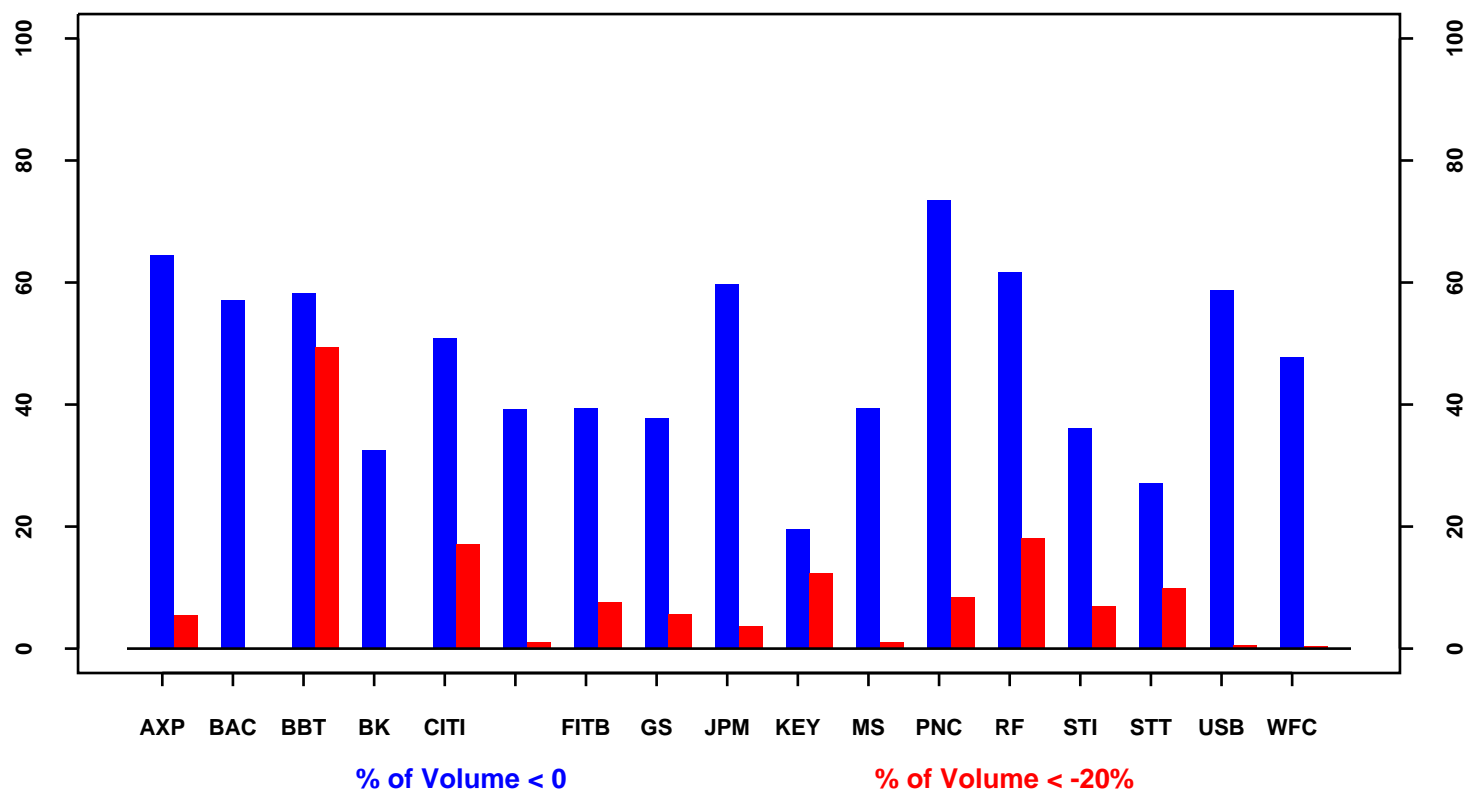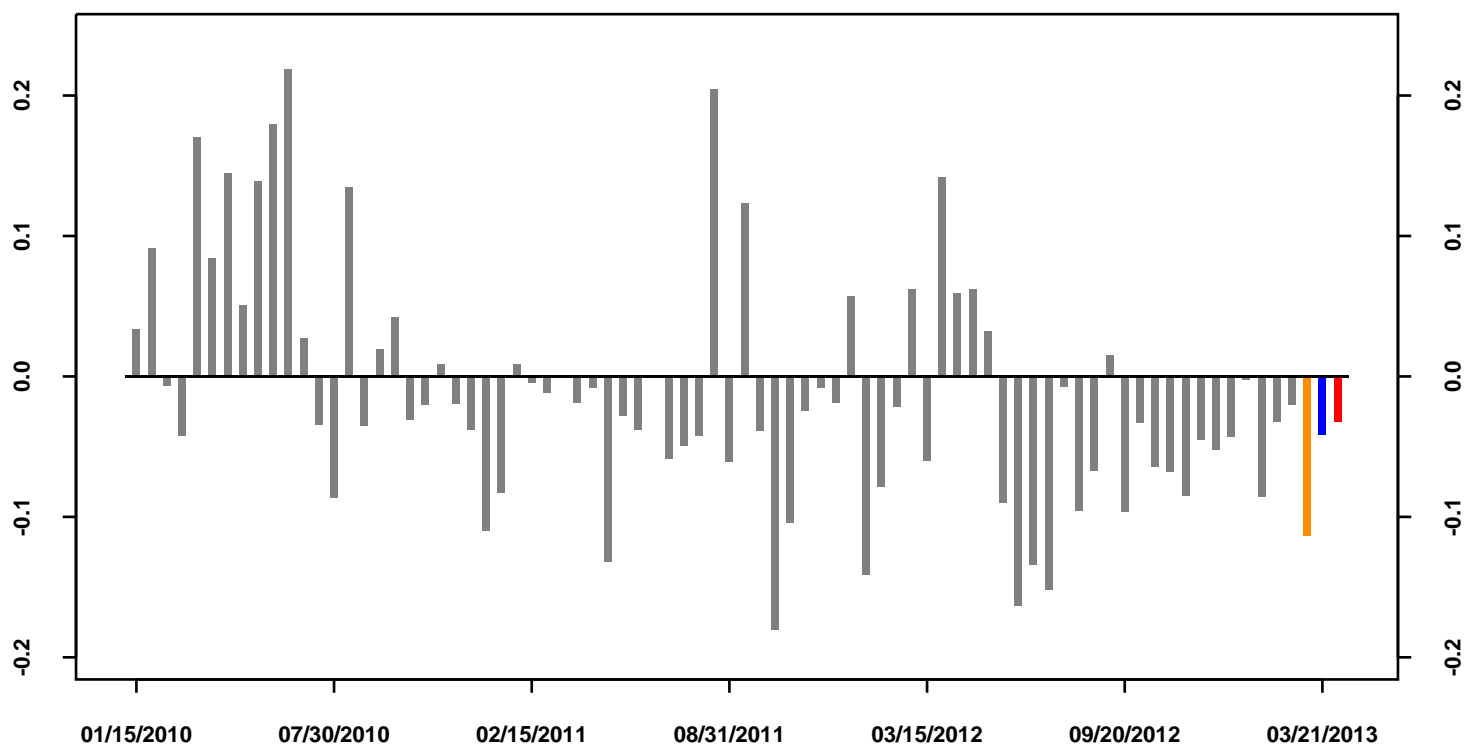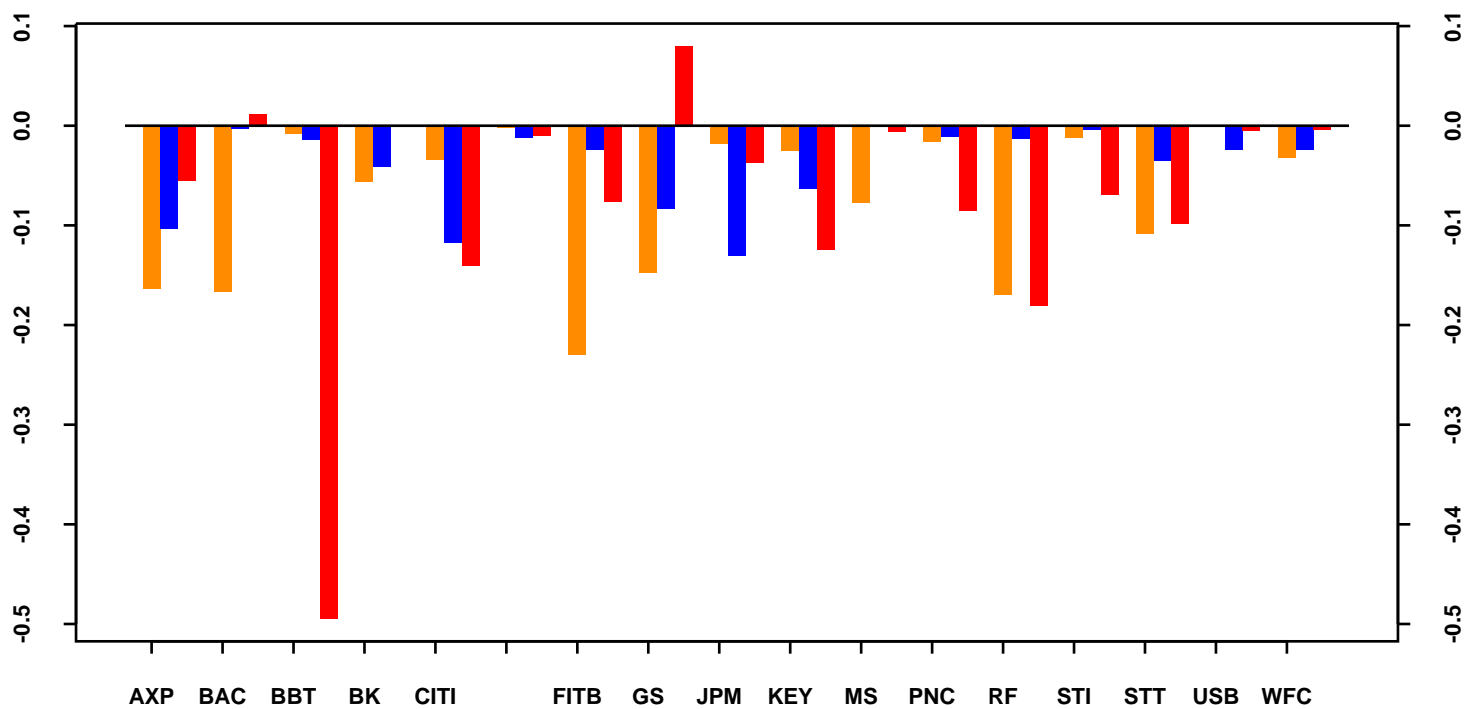
## Aggregate Volume Skew--CCAR Banks

**(% of volume traded in deep out-of-the-money calls LESS % of volume traded in deep out-of-the-money puts)**



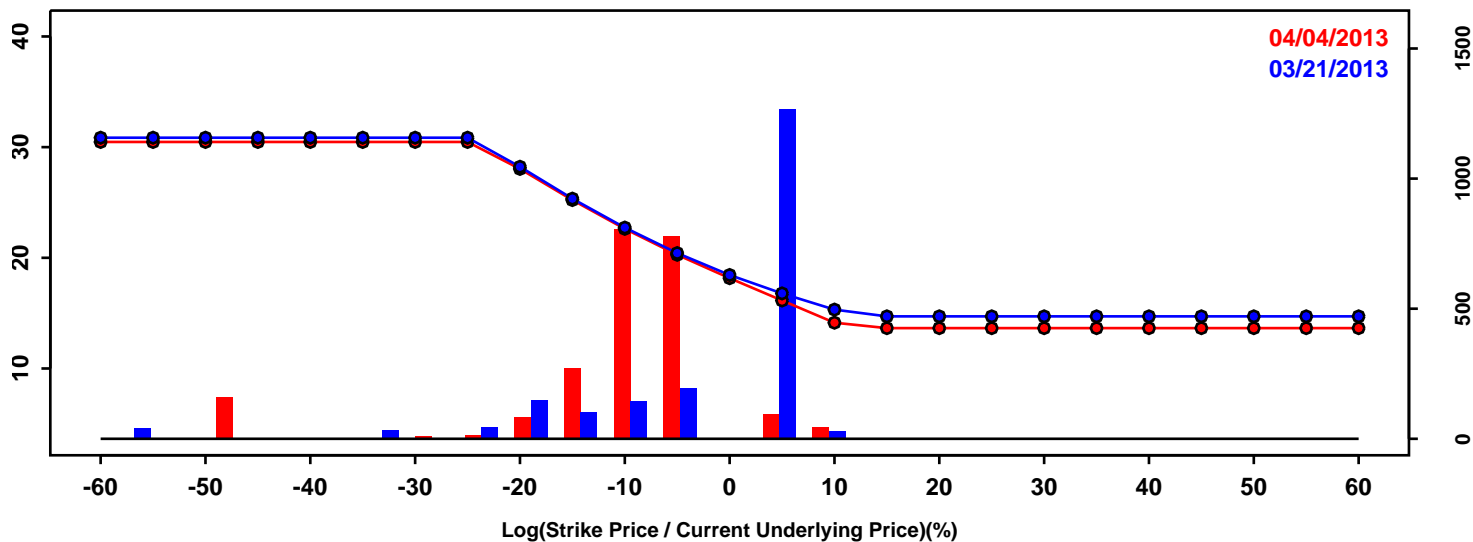## CCAR Bank Volume Skew -- Last Three Periods



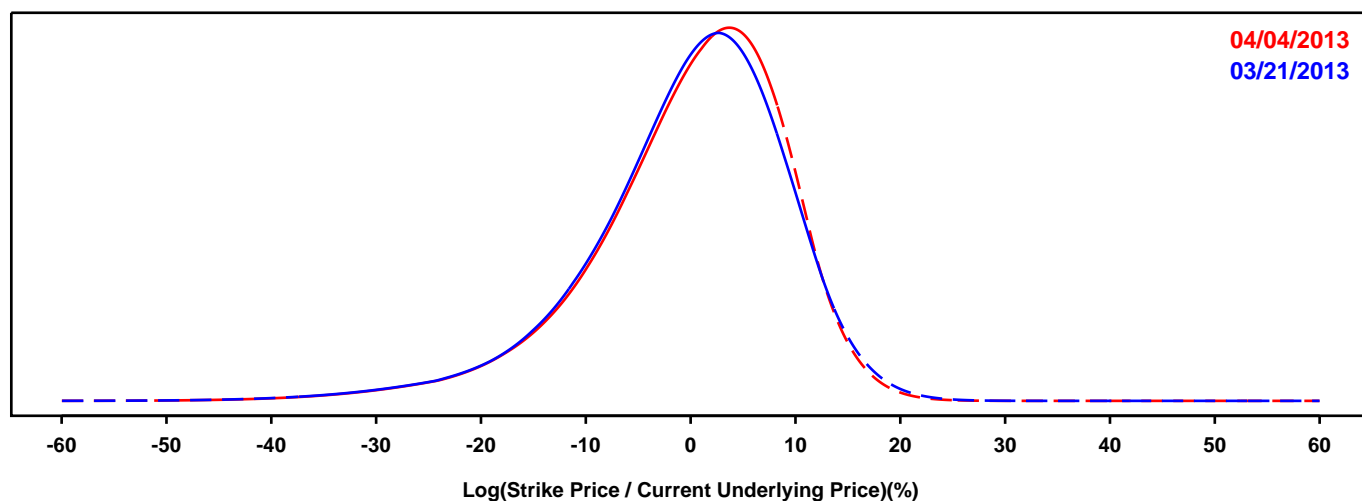**03/07/2013**          **03/21/2013**          **04/04/2013**

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AMERICAN EXPRESS

*Log returns are based on the risk neutral density function of the underlying asset*
*derived from options that expire in approximately 3 months.*

**Implied Volatilities (lines--left axis) and Volume (bars--right axis)**



Log(Strike Price / Current Underlying Price)(%)

**Risk Neutral PDF of the Log Return Distribution**



Log(Strike Price / Current Underlying Price)(%)

**Probability of a Large Change**



**Decrease <=20%**        **Increase >= 20%**

### Statistics of the Log Return Distributions

|          | 03/21/2013 | 04/04/2013 | Change |
|----------|-----------|-----------|--------|
| 10th Pct | -12.44%   | -12.19%   | 0.25%  |
| 50th Pct | 0.89%     | 1.23%     | 0.34%  |
| 90th Pct | 10.40%    | 10.25%    | -0.15% |
|          |           |           |        |
| Mean     | -0.30%    | -0.10%    | 0.20%  |
| Std Dev  | 9.54%     | 9.39%     | -0.14% |
| Skew     | -0.91     | -0.99     | -0.07  |
| Kurtosis | 1.77      | 1.82      | 0.04   |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF AMERICA

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
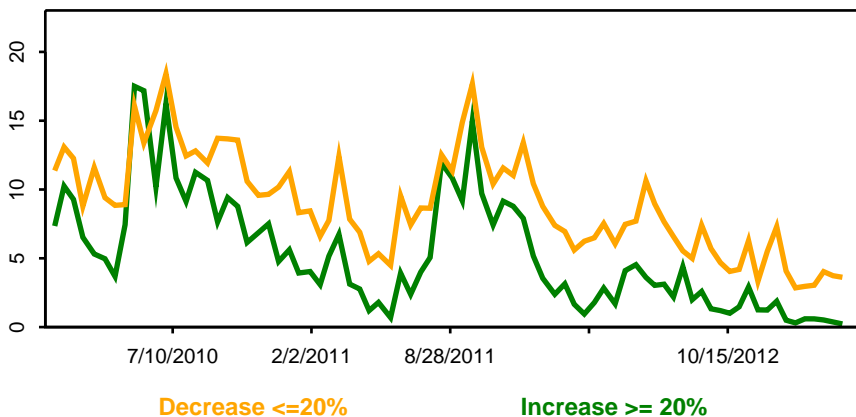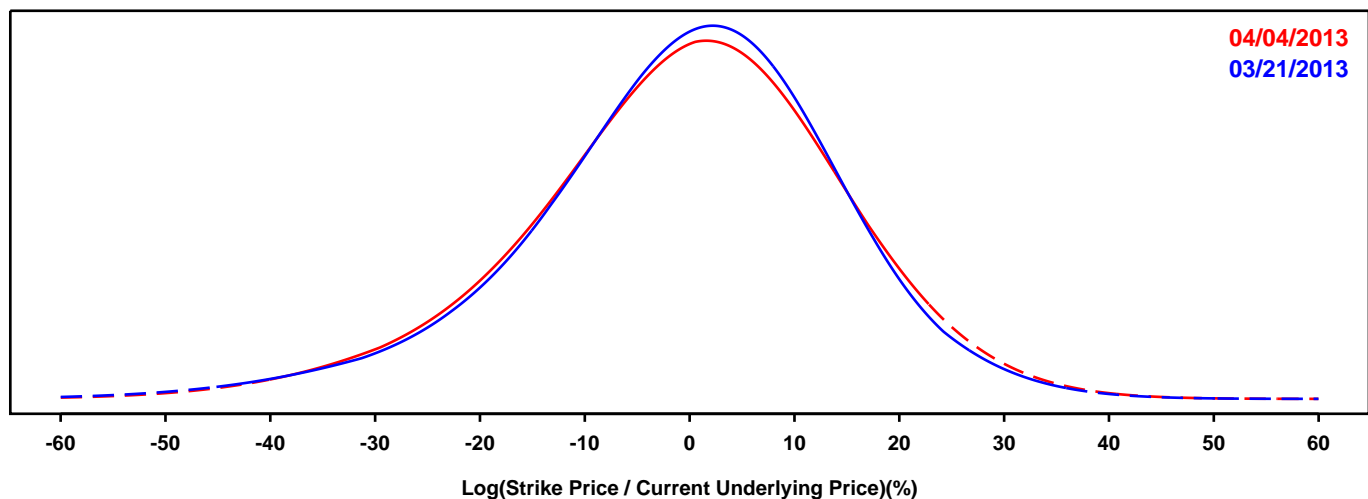
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**          **Increase >= 20%**
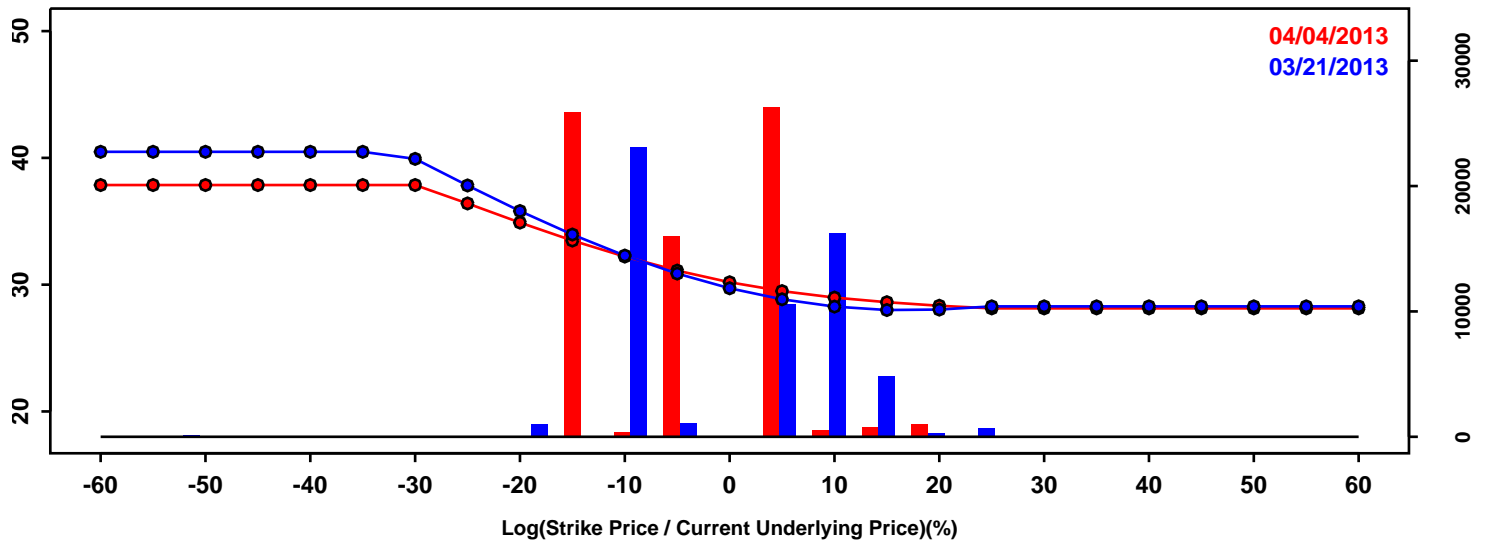
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -19.77% | -20.19% | -0.42% |
| **50th Pct** | 0.49% | 0.39% | -0.10% |
| **90th Pct** | 17.01% | 17.89% | 0.88% |
|  |  |  |  |
| **Mean** | -0.63% | -0.50% | 0.12% |
| **Std Dev** | 15.01% | 15.23% | 0.23% |
| **Skew** | -0.50% | -0.38 | 0.12 |
| **Kurtosis** | 0.88 | 0.52 | -0.36 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BB&T

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
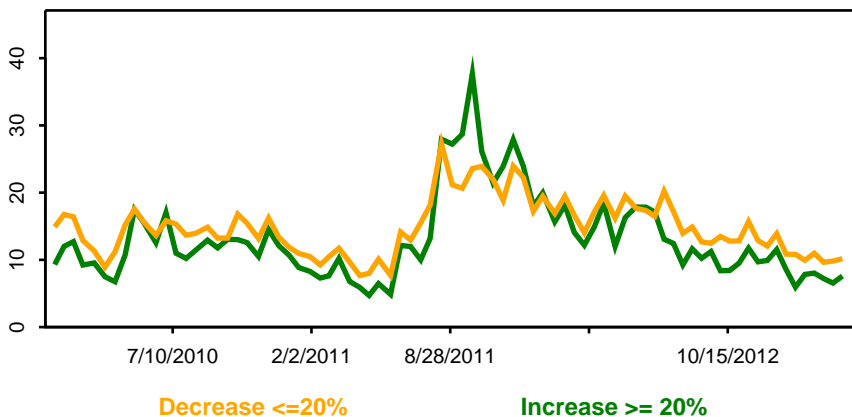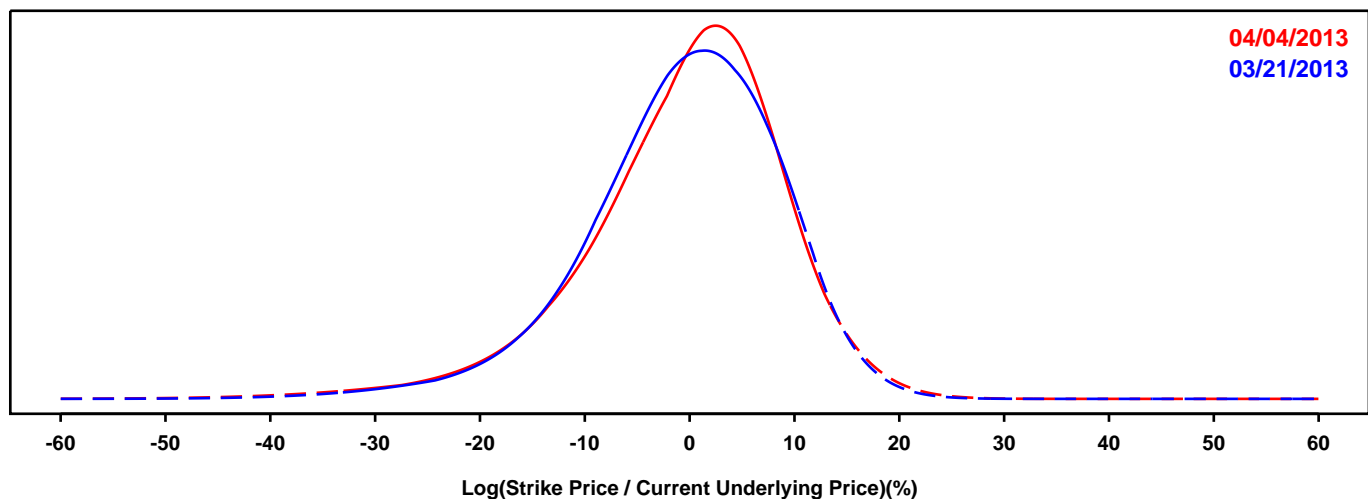
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Probability of a Large Change



Decrease <=20%          Increase >= 20%
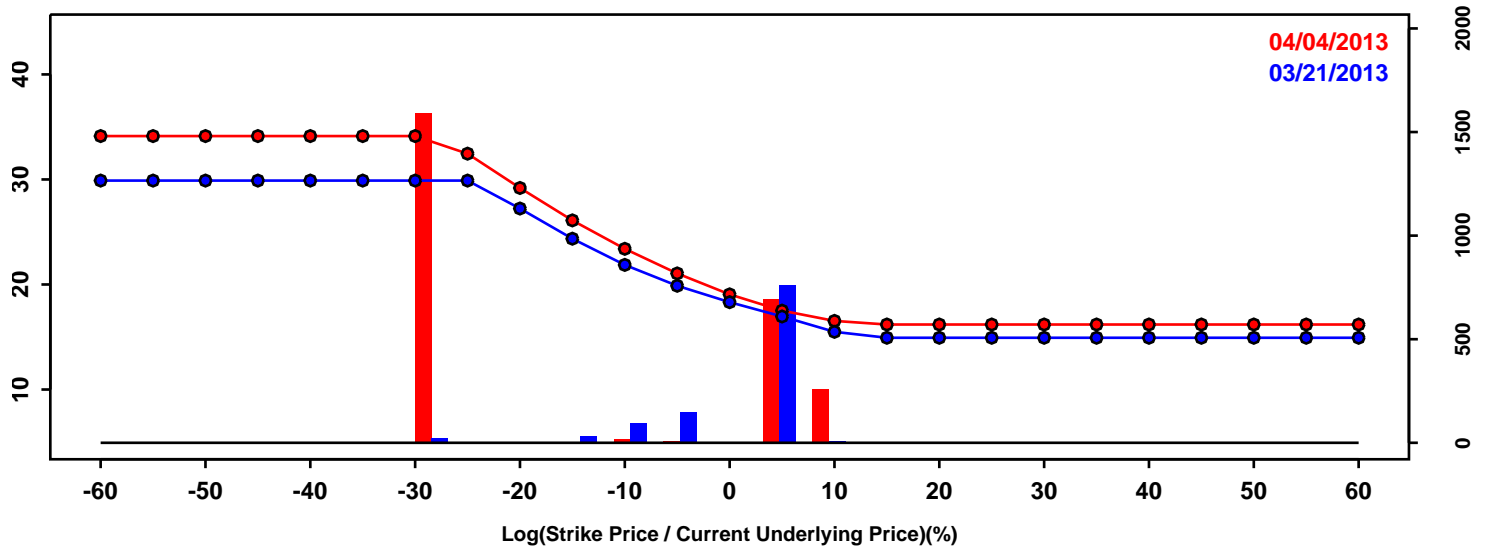
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -12.40% | -12.79% | -0.40% |
| **50th Pct** | 0.22% | 0.67% | 0.45% |
| **90th Pct** | 10.30% | 10.30% | -0.00% |
|  |  |  |  |
| **Mean** | -0.60% | -0.53% | 0.07% |
| **Std Dev** | 9.37% | 9.77% | 0.40% |
| **Skew** | -0.75% | -0.93 | -0.18 |
| **Kurtosis** | 1.40 | 2.11 | 0.71 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF NEW YORK MELLON

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*

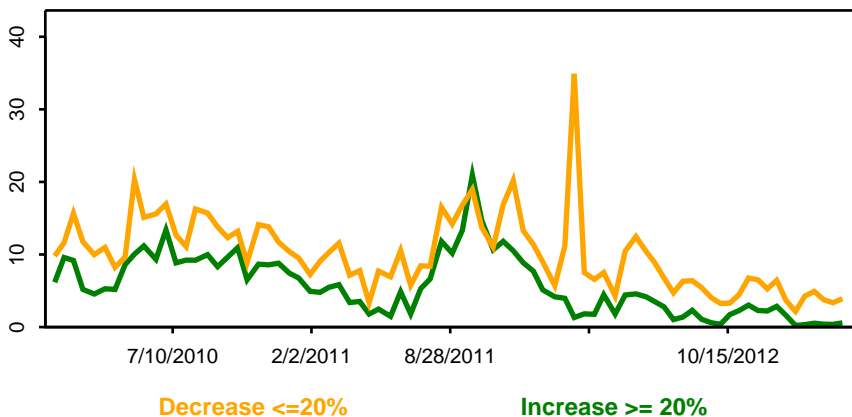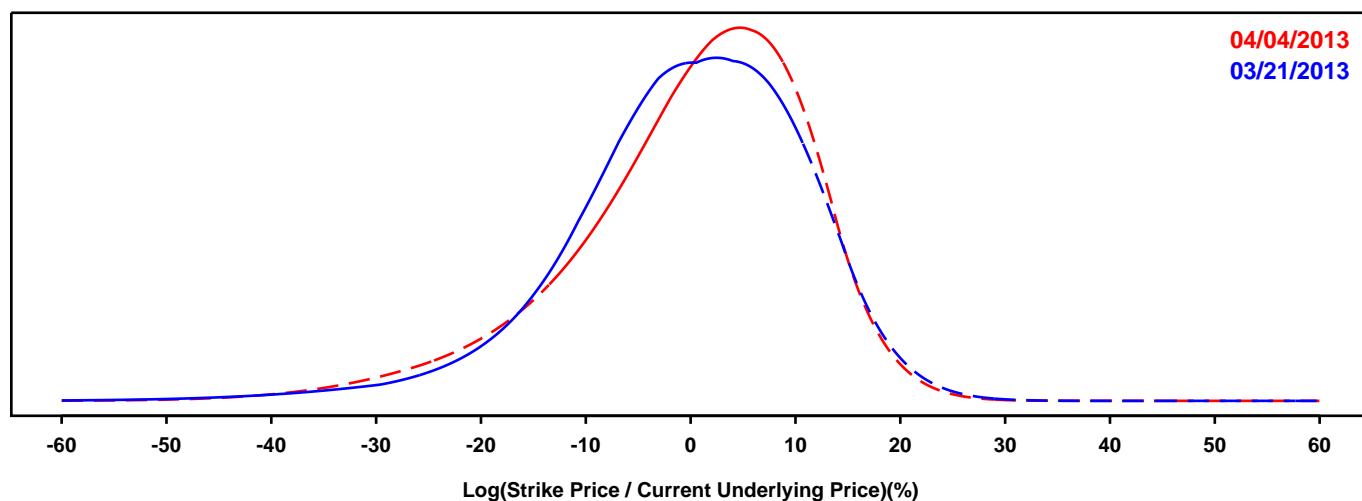## Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

## Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

## Probability of a Large Change

**Decrease <=20%**          **Increase >= 20%**
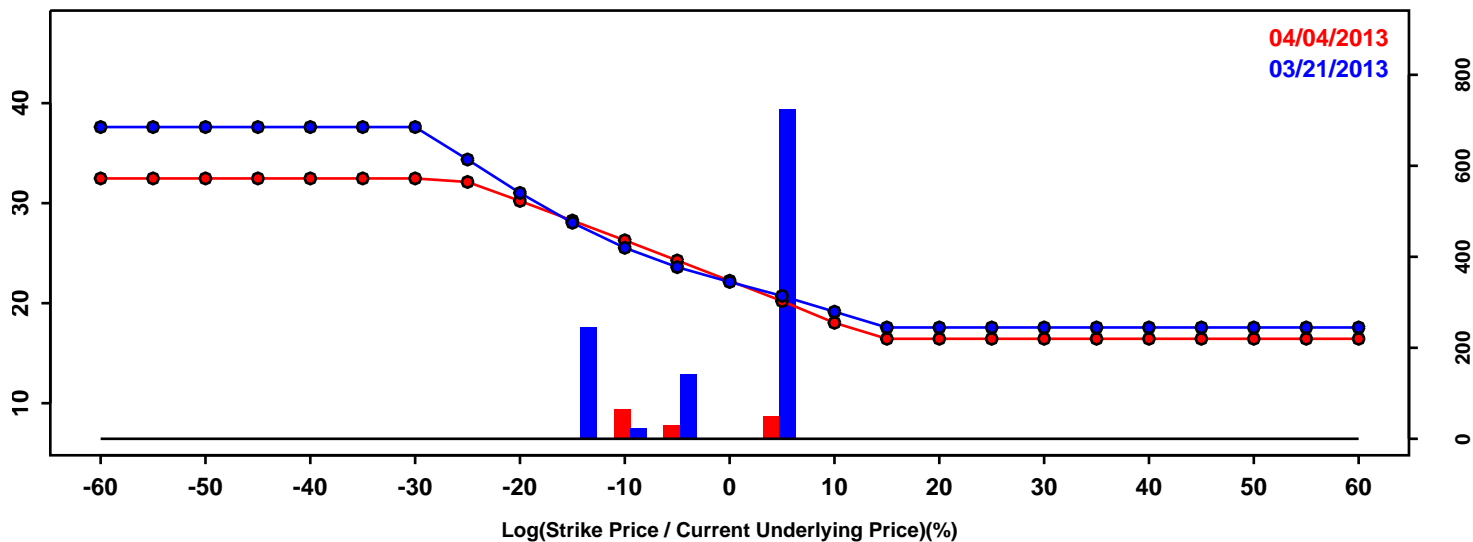
### Statistics of the Log Return Distributions

|           | 03/21/2013 | 04/04/2013 | Change  |
|-----------|-----------|-----------|---------|
| 10th Pct  | -14.28%   | -15.42%   | -1.14%  |
| 50th Pct  | 0.67%     | 1.67%     | 1.00%   |
| 90th Pct  | 12.84%    | 12.68%    | -0.16%  |
|           |           |           |         |
| Mean      | -0.27%    | -0.06%    | 0.21%   |
| Std Dev   | 11.27%    | 11.46%    | 0.19%   |
| Skew      | -0.78     | -0.88     | -0.10   |
| Kurtosis  | 1.58      | 1.16      | -0.42   |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CITIGROUP

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*

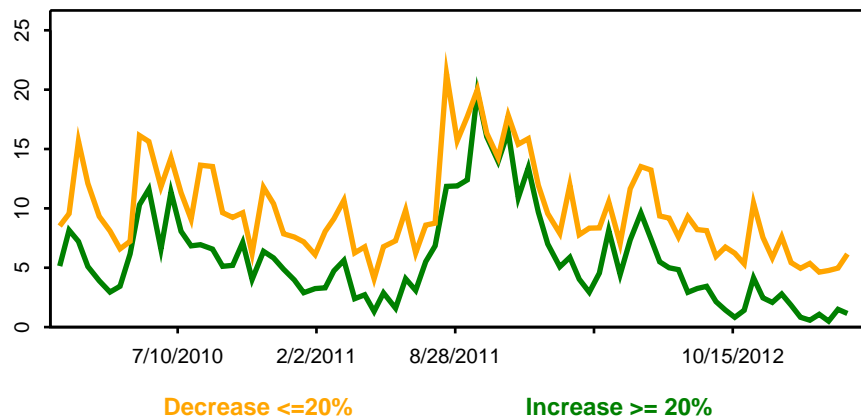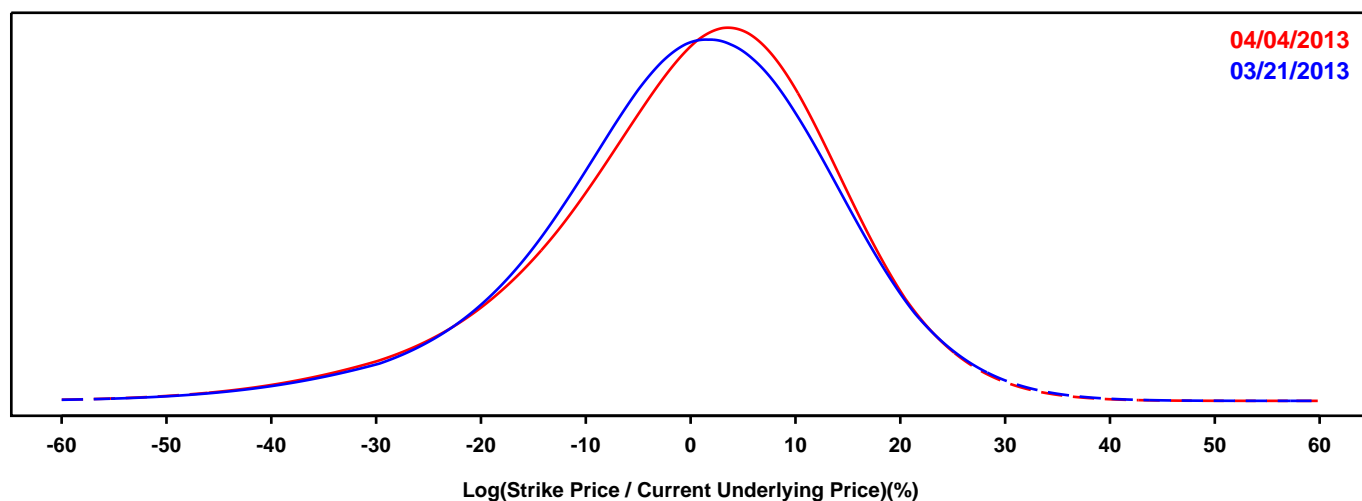### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**   **Increase >= 20%**
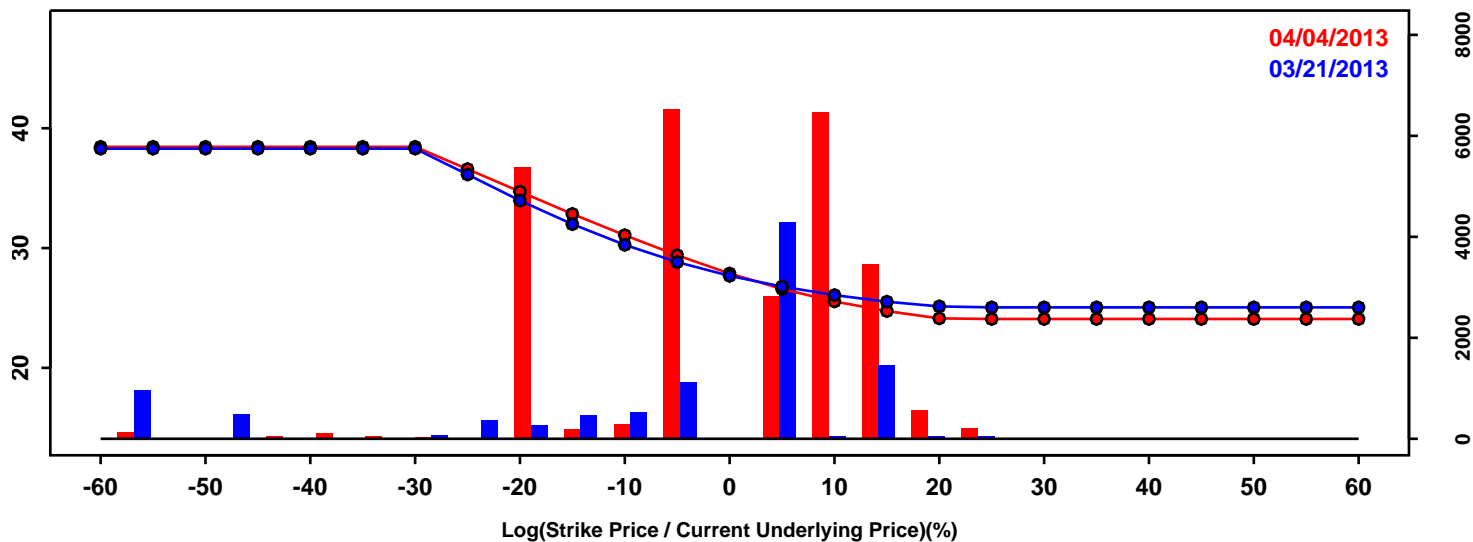
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -18.26% | -18.58% | -0.31% |
| **50th Pct** | 0.58% | 1.34% | 0.76% |
| **90th Pct** | 16.22% | 16.25% | 0.03% |
|  |  |  |  |
| **Mean** | -0.41% | -0.10% | 0.31% |
| **Std Dev** | 14.02% | 14.13% | 0.11% |
| **Skew** | -0.52% | -0.64 | -0.11 |
| **Kurtosis** | 0.85 | 0.91 | 0.06 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CAPITAL ONE

*Log returns are based on the risk neutral density function of the underlying asset*
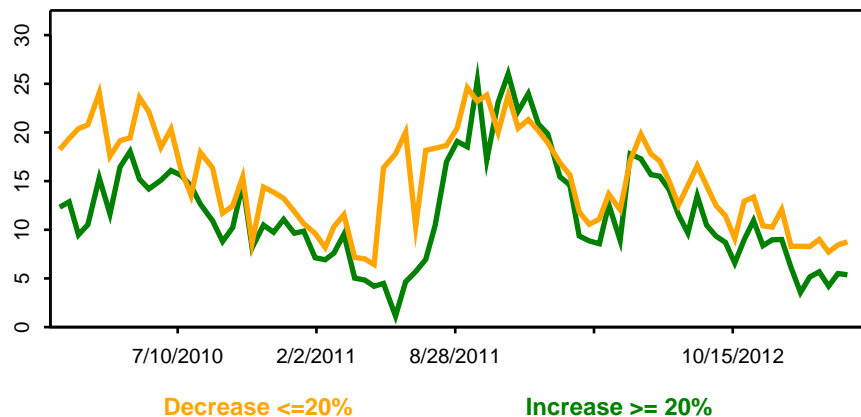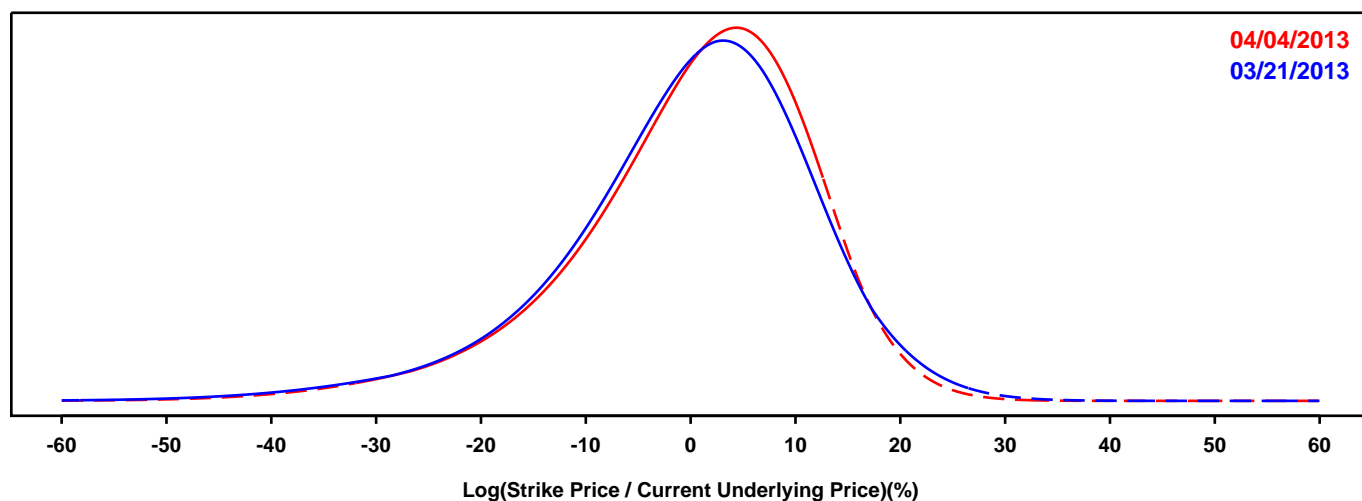*derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**          **Increase >= 20%**
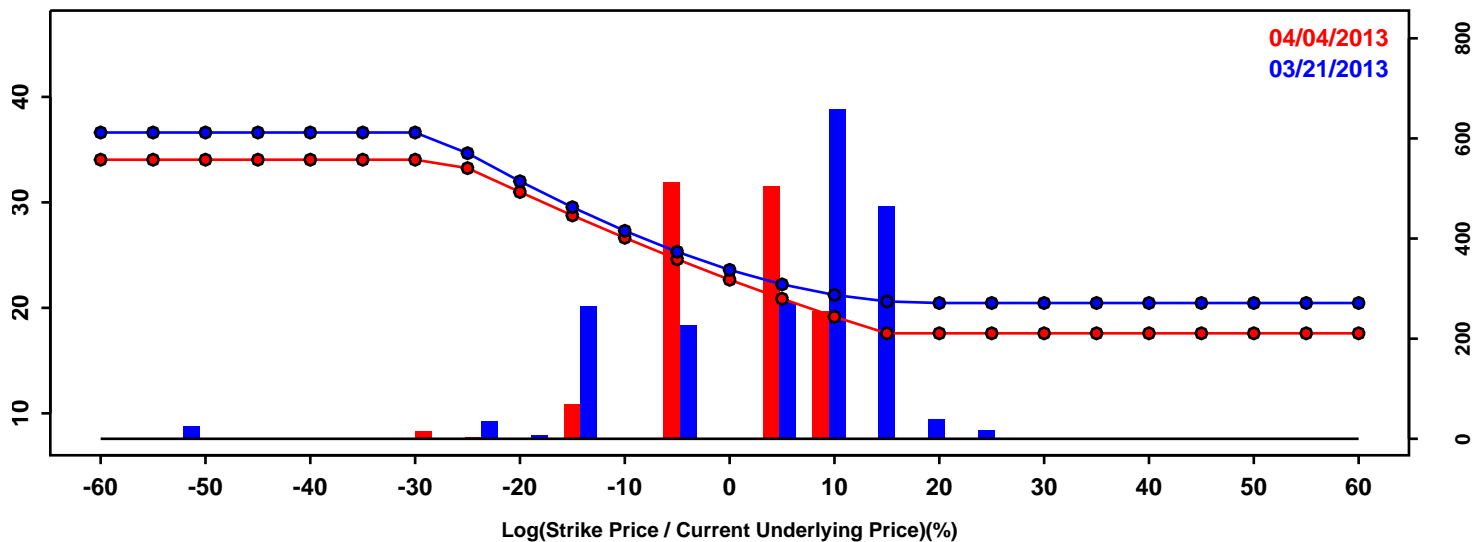
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -15.62% | -15.04% | 0.59% |
| **50th Pct** | 1.11% | 1.72% | 0.61% |
| **90th Pct** | 13.50% | 13.19% | -0.31% |
|  |  |  |  |
| **Mean** | -0.21% | 0.18% | 0.39% |
| **Std Dev** | 12.08% | 11.57% | -0.51% |
| **Skew** | -0.77% | -0.85 | -0.08 |
| **Kurtosis** | 1.43 | 1.29 | -0.13 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- FIFTH THIRD

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*

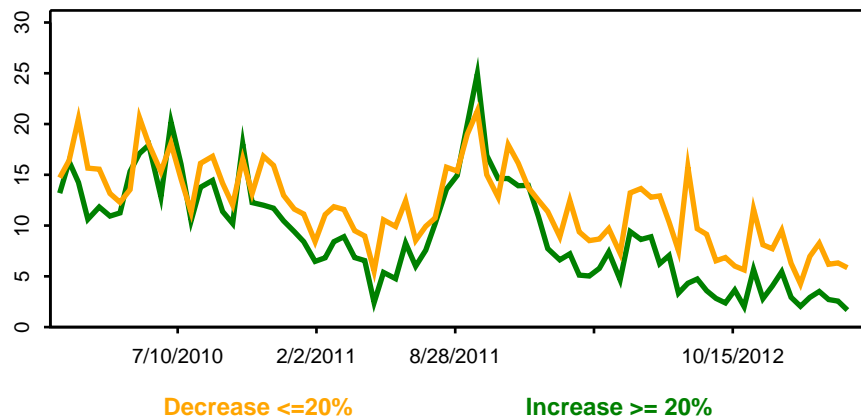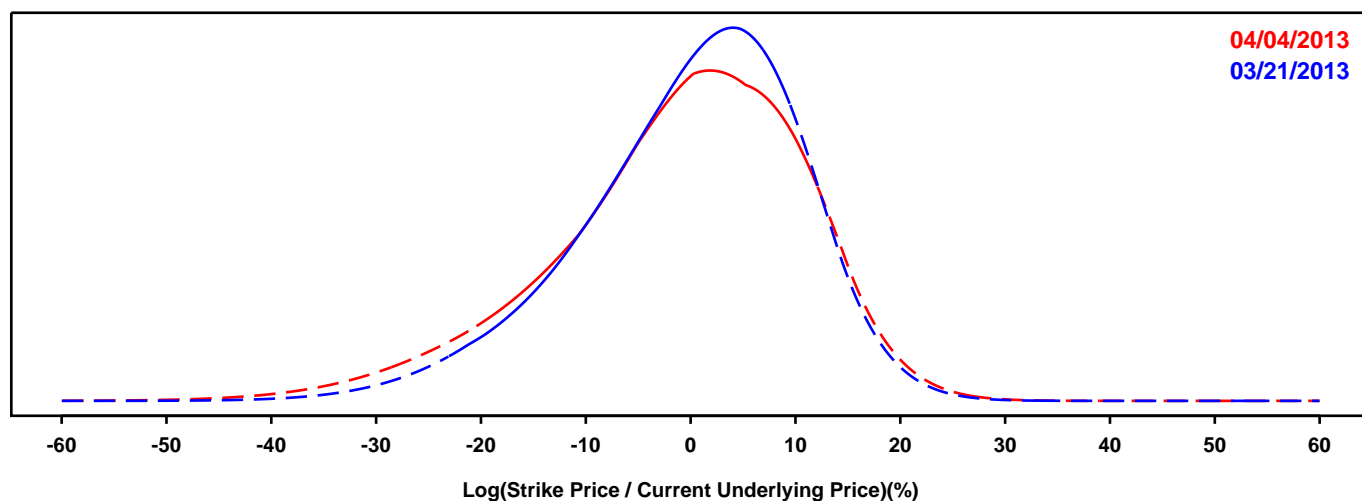### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Probability of a Large Change



**Decrease <=20%**      **Increase >= 20%**
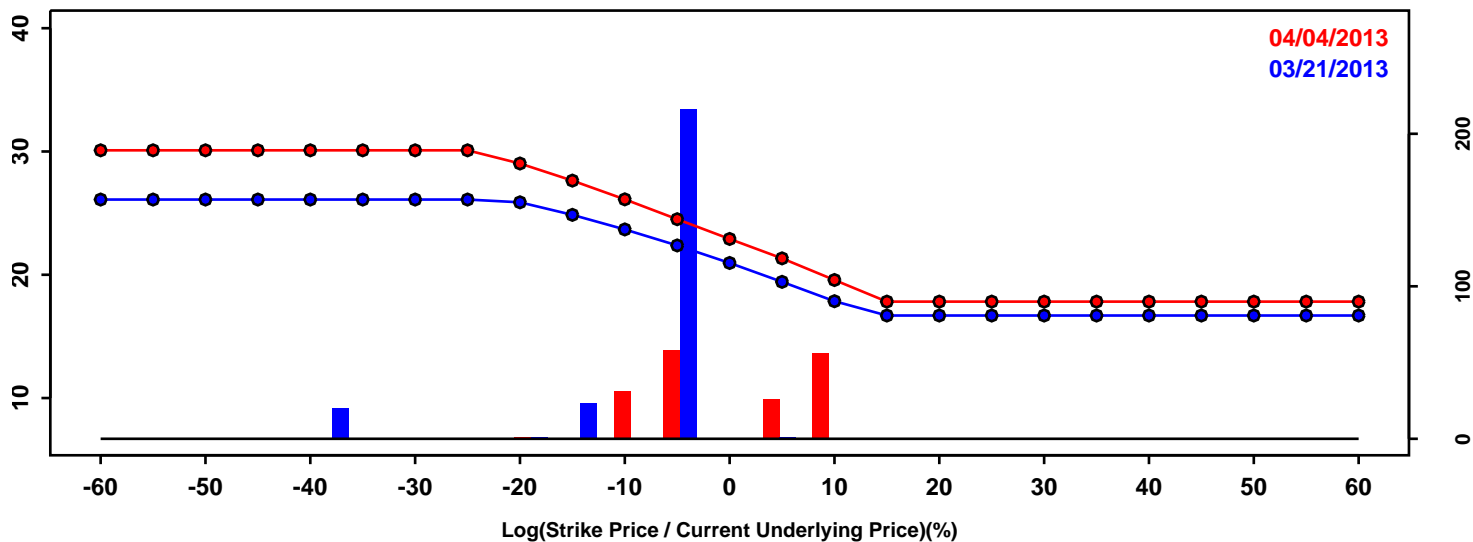
### Statistics of the Log Return Distributions

| | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -14.52% | -17.48% | -2.96% |
| **50th Pct** | 1.18% | 0.33% | -0.85% |
| **90th Pct** | 12.26% | 12.76% | 0.50% |
| | | | |
| **Mean** | -0.09% | -1.13% | -1.04% |
| **Std Dev** | 10.62% | 11.99% | 1.37% |
| **Skew** | -0.60 | -0.67 | -0.07 |
| **Kurtosis** | 0.43 | 0.56 | 0.13 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLDMAN SACHS

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*

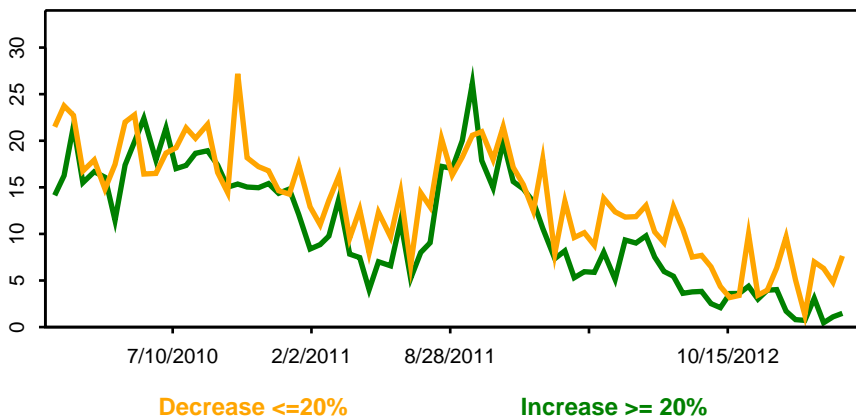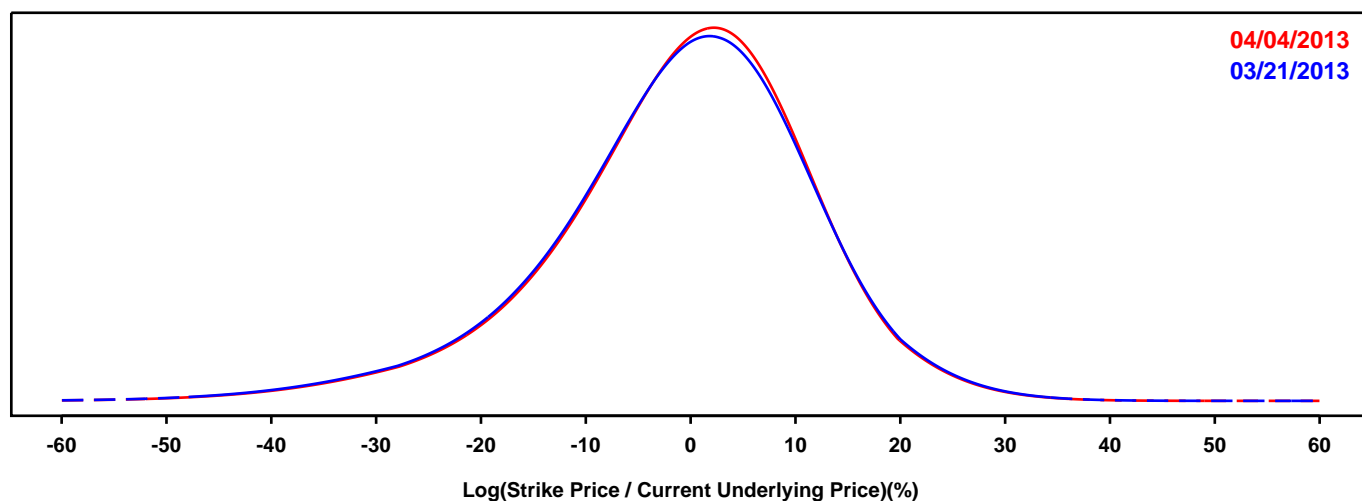### Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Probability of a Large Change

**Decrease <=20%**   **Increase >= 20%**
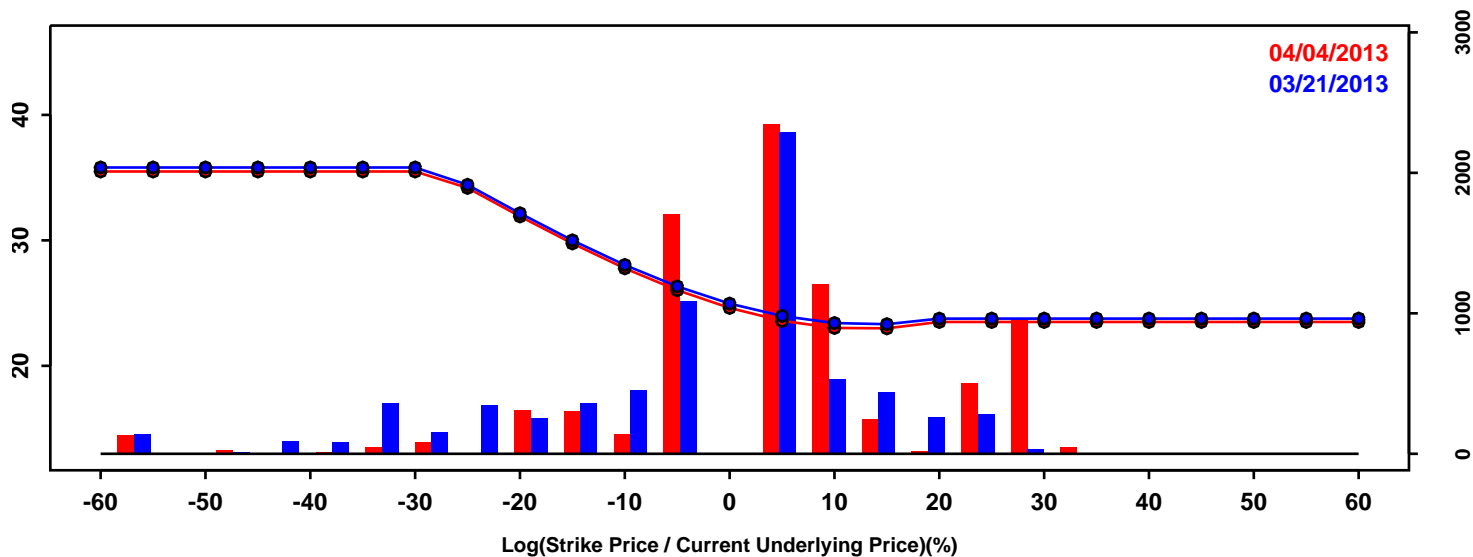
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -17.19% | -16.82% | 0.37% |
| **50th Pct** | 0.20% | 0.37% | 0.18% |
| **90th Pct** | 13.76% | 13.62% | -0.14% |
|  |  |  |  |
| **Mean** | -0.94% | -0.78% | 0.16% |
| **Std Dev** | 12.75% | 12.54% | -0.20% |
| **Skew** | -0.61% | -0.62 | -0.01 |
| **Kurtosis** | 1.11 | 1.14 | 0.03 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- JP MORGAN

*Log returns are based on the risk neutral density function of the underlying asset*
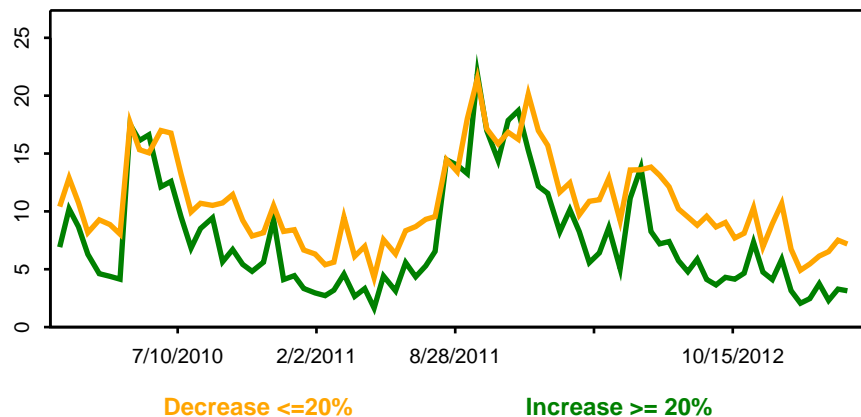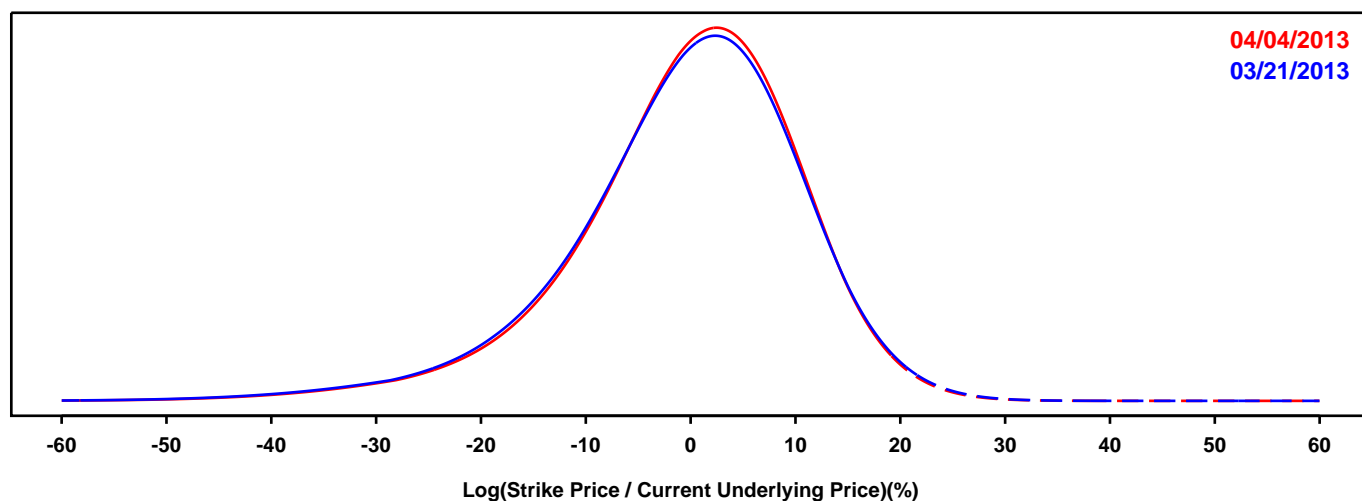*derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Risk Neutral PDF of the Log Return Distribution

04/04/2013
03/21/2013

**Log(Strike Price / Current Underlying Price)(%)**

### Probability of a Large Change

**Decrease <=20%**    **Increase >= 20%**
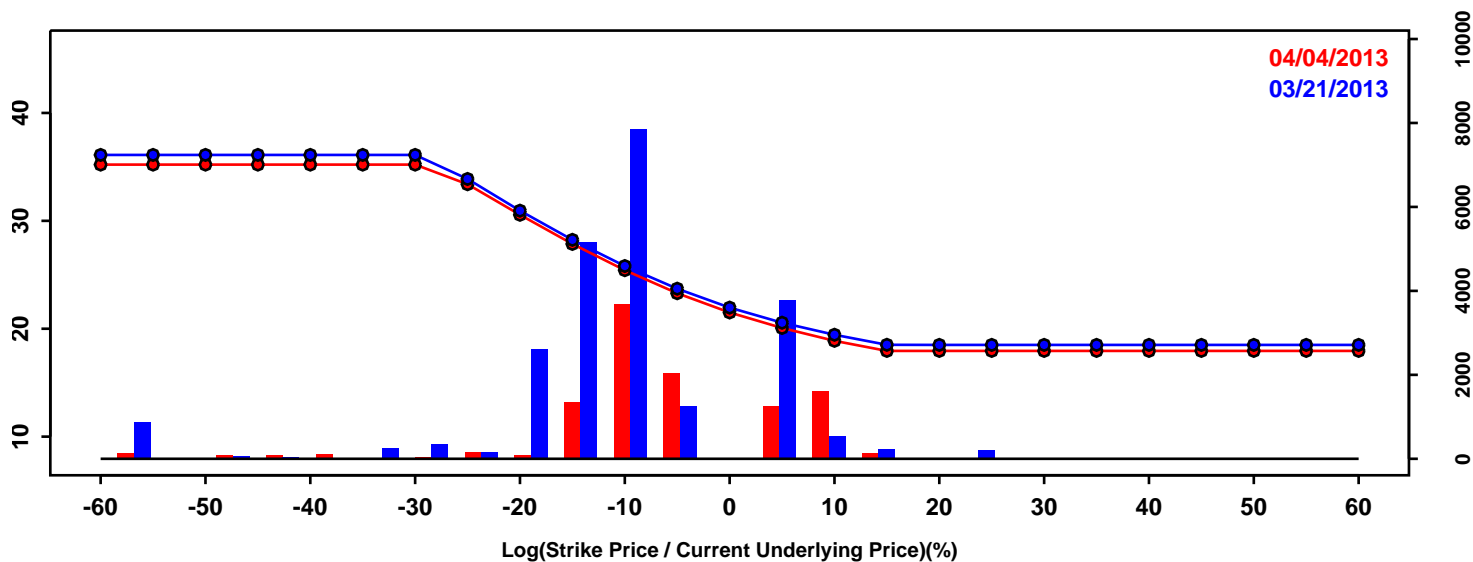
### Statistics of the Log Return Distributions

|          | 03/21/2013 | 04/04/2013 | Change |
|----------|-----------|-----------|--------|
| 10th Pct | -14.85%   | -14.27%   | 0.58%  |
| 50th Pct | 0.62%     | 0.82%     | 0.19%  |
| 90th Pct | 12.29%    | 12.16%    | -0.13% |
|          |           |           |        |
| Mean     | -0.57%    | -0.36%    | 0.21%  |
| Std Dev  | 11.31%    | 11.02%    | -0.29% |
| Skew     | -0.83     | -0.83     | -0.01  |
| Kurtosis | 1.64      | 1.65      | 0.00   |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- KEYCORP

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
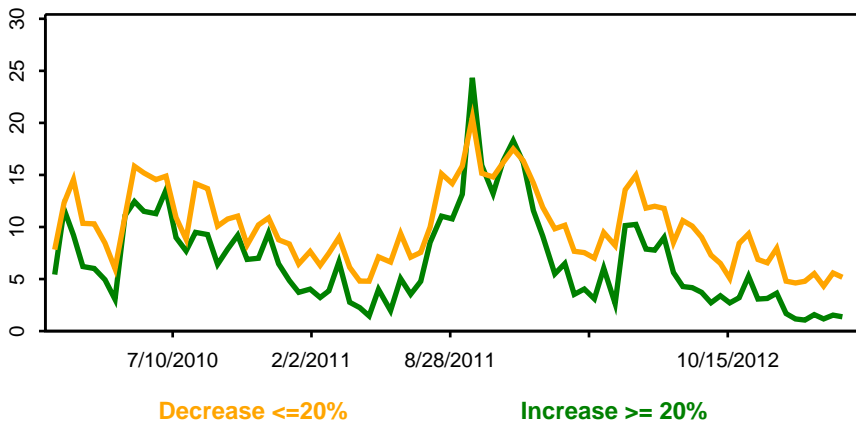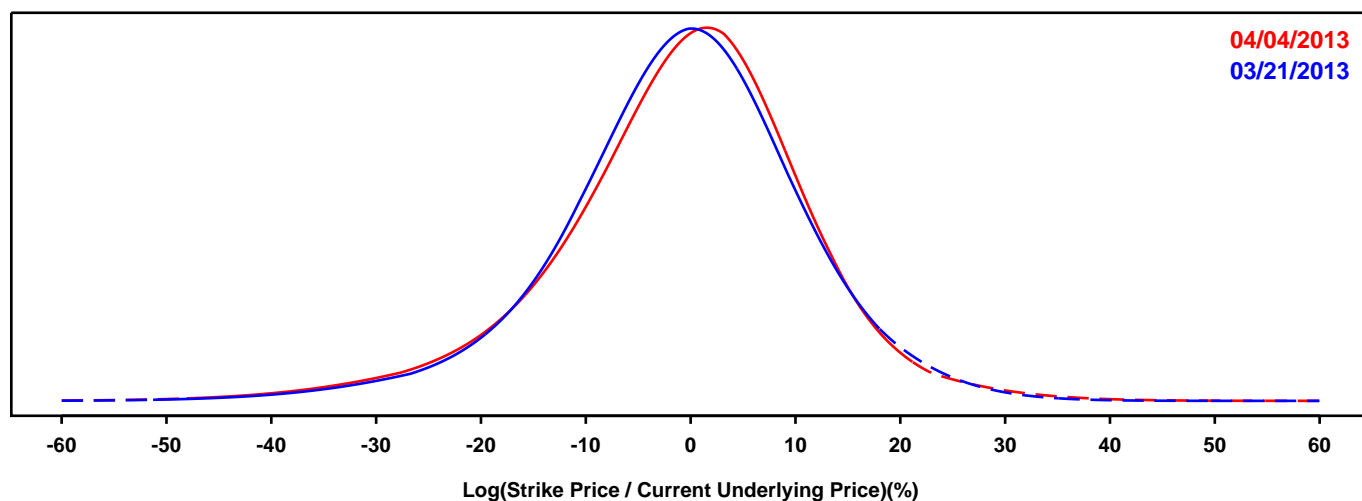
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**    **Increase >= 20%**
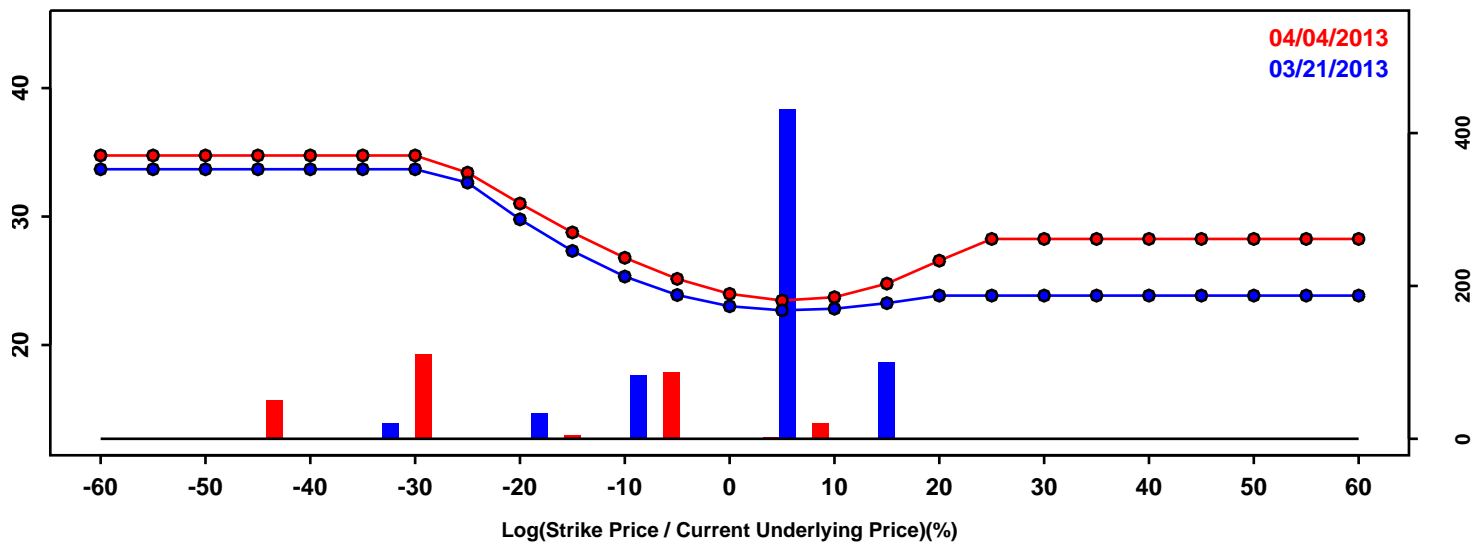
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| 10th Pct | -15.16% | -15.81% | -0.66% |
| 50th Pct | -0.36% | 0.10% | 0.45% |
| 90th Pct | 13.03% | 12.98% | -0.06% |
|  |  |  |  |
| Mean | -0.85% | -0.75% | 0.10% |
| Std Dev | 11.67% | 12.07% | 0.40% |
| Skew | -0.41 | -0.47 | -0.06 |
| Kurtosis | 1.14 | 1.35 | 0.22 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- MORGAN STANLEY

*Log returns are based on the risk neutral density function of the underlying asset
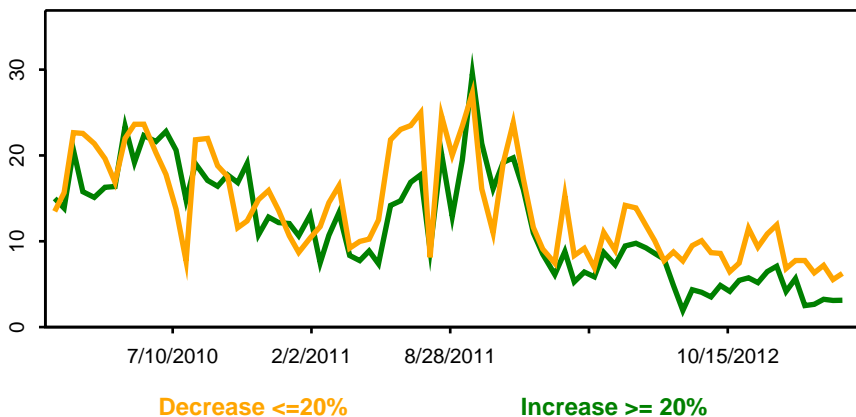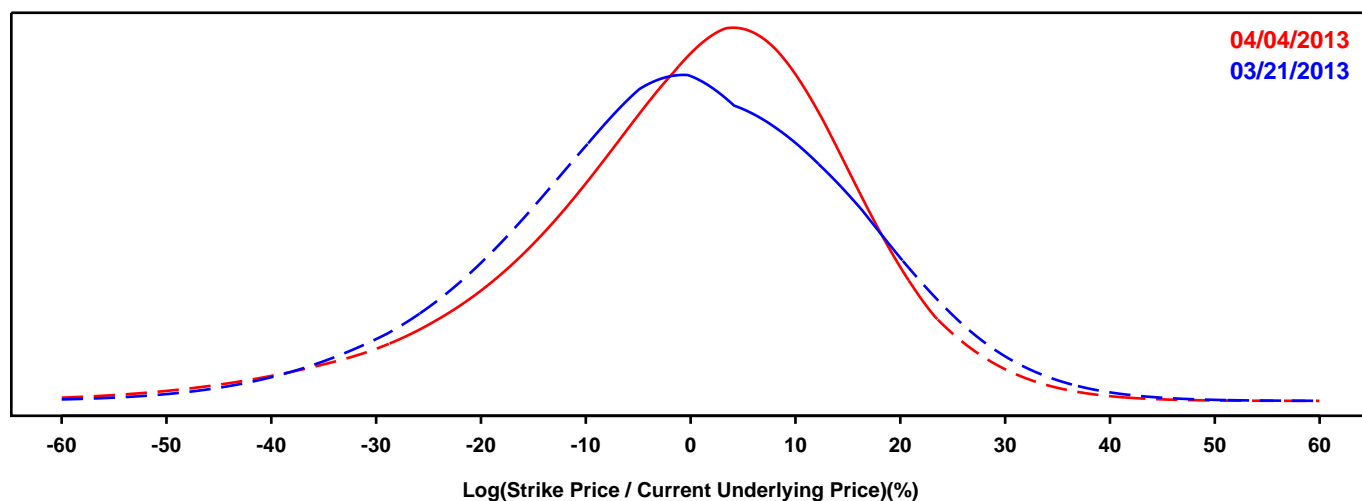derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



Decrease <=20%          Increase >= 20%
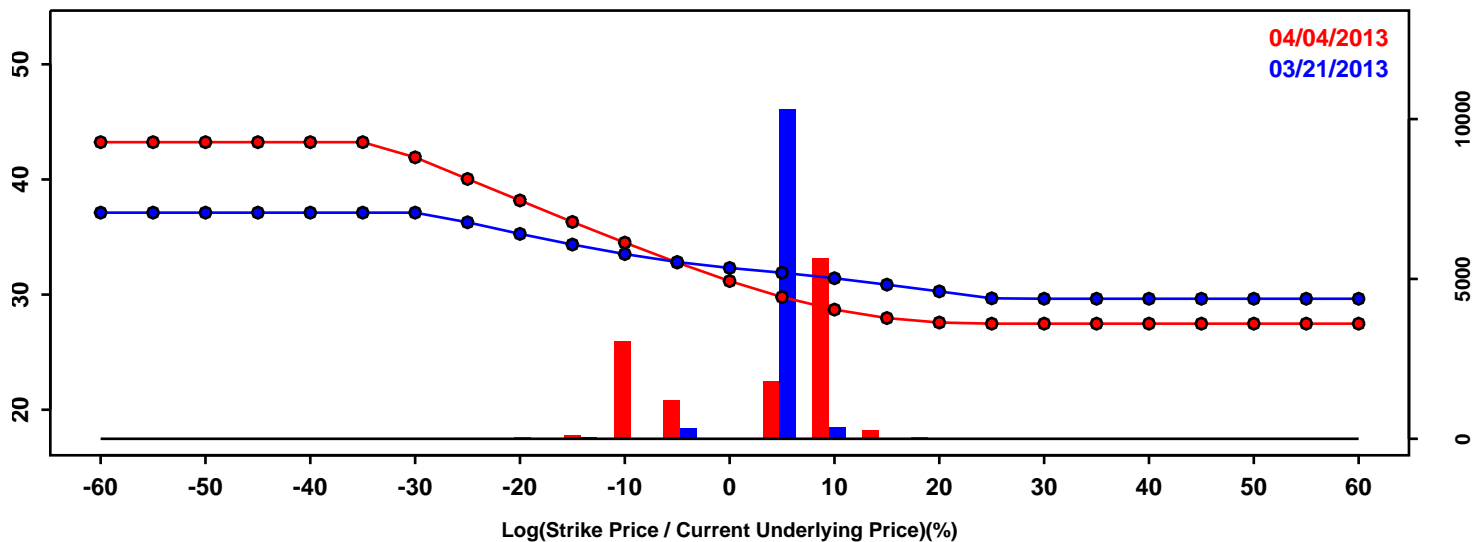
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -22.19% | -21.30% | 0.89% |
| **50th Pct** | -0.62% | 1.39% | 2.01% |
| **90th Pct** | 19.24% | 17.60% | -1.63% |
|  |  |  |  |
| **Mean** | -1.08% | -0.46% | 0.62% |
| **Std Dev** | 16.30% | 15.84% | -0.46% |
| **Skew** | -0.25% | -0.67 | -0.42 |
| **Kurtosis** | 0.20 | 0.98 | 0.78 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PNC FINANCIAL

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
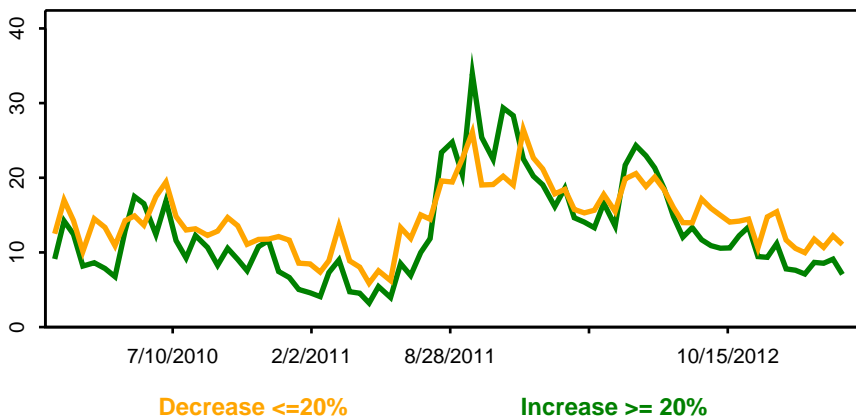
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)
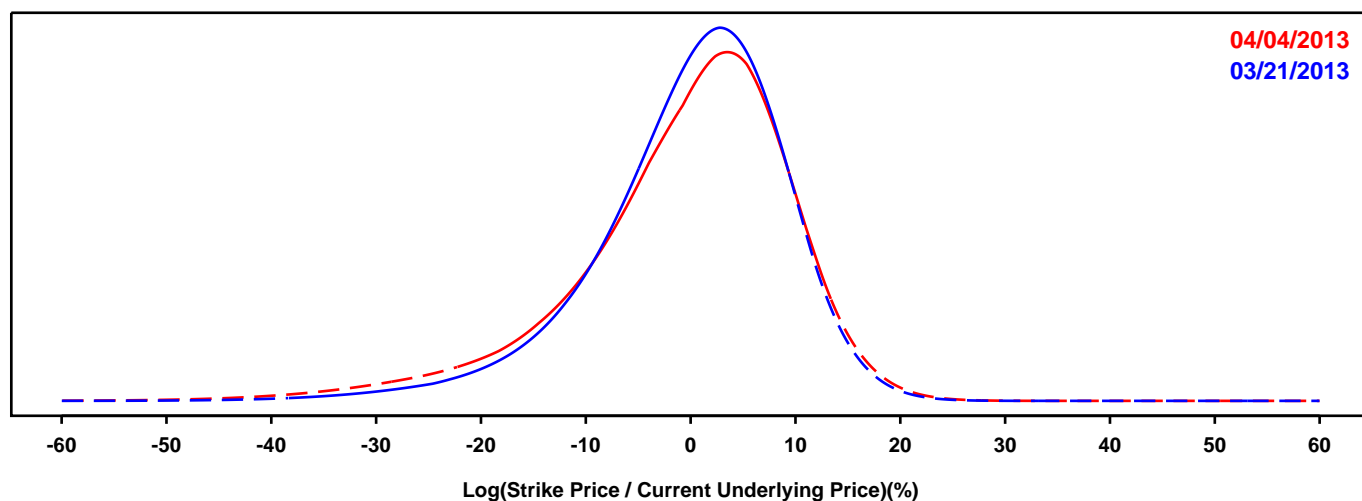


Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**　　　　**Increase >= 20%**
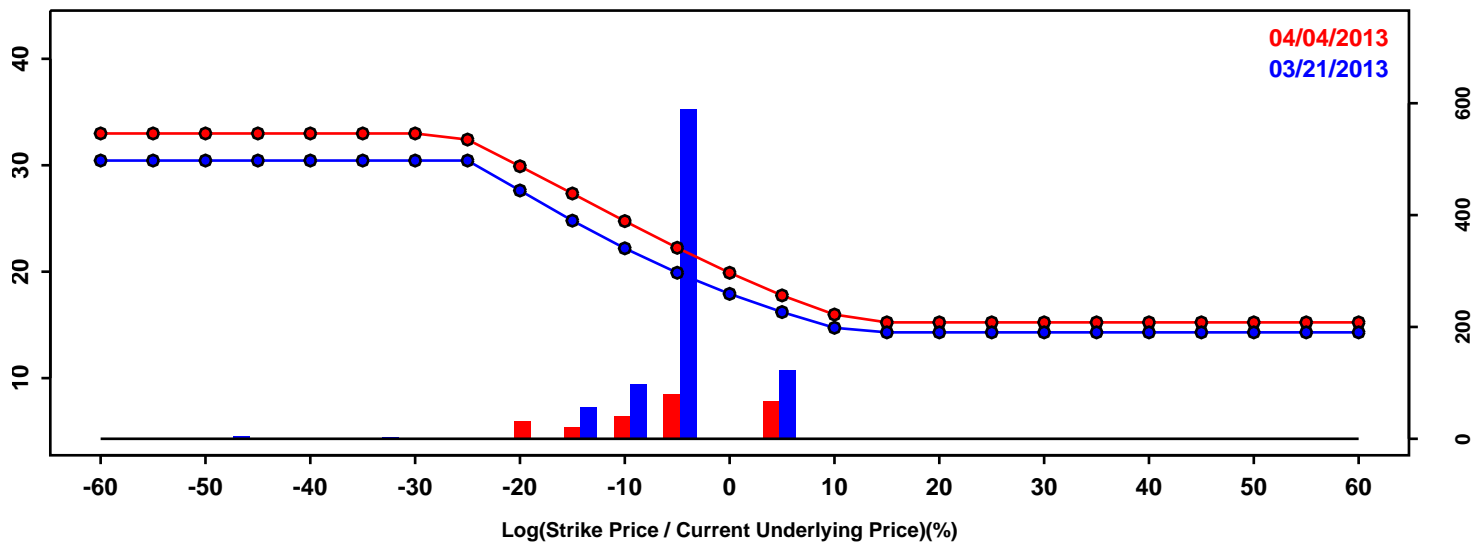
**Statistics of the Log Return Distributions**

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -11.78% | -14.40% | -2.62% |
| **50th Pct** | 1.12% | 0.95% | -0.17% |
| **90th Pct** | 10.20% | 10.62% | 0.42% |
|  |  |  |  |
| **Mean** | -0.05% | -0.75% | -0.70% |
| **Std Dev** | 9.19% | 10.55% | 1.36% |
| **Skew** | -0.92 | -1.07 | -0.15 |
| **Kurtosis** | 1.82 | 1.97 | 0.15 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- REGIONS FINANCIAL

*Log returns are based on the risk neutral density function of the underlying asset
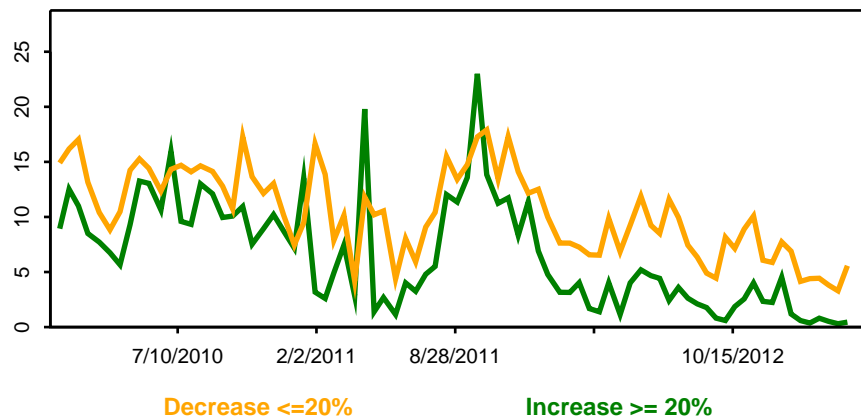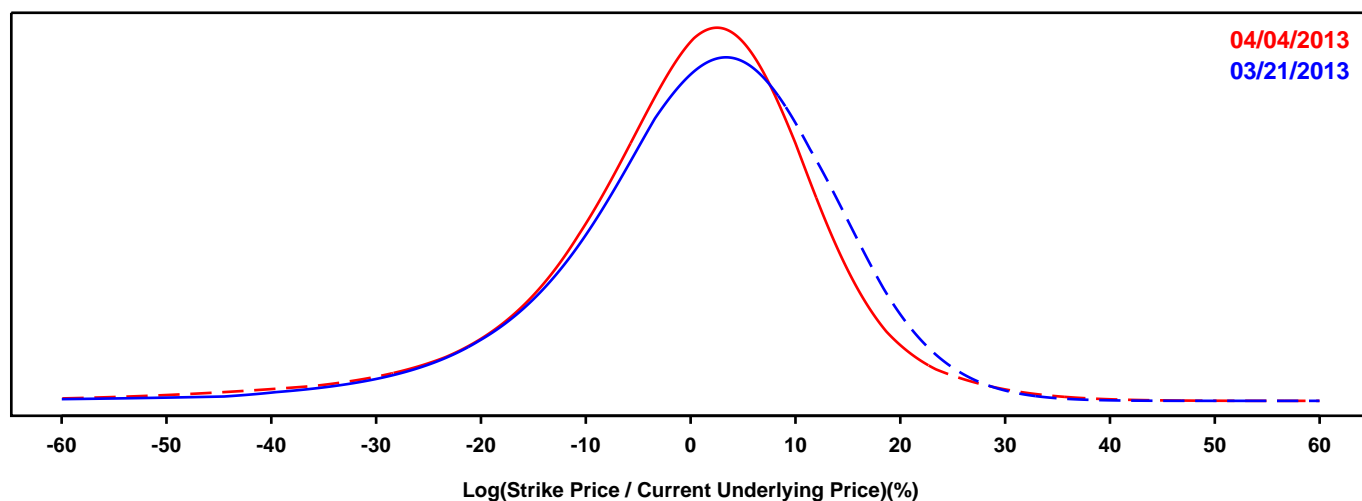derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



**04/04/2013**
**03/21/2013**

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**          **Increase >= 20%**
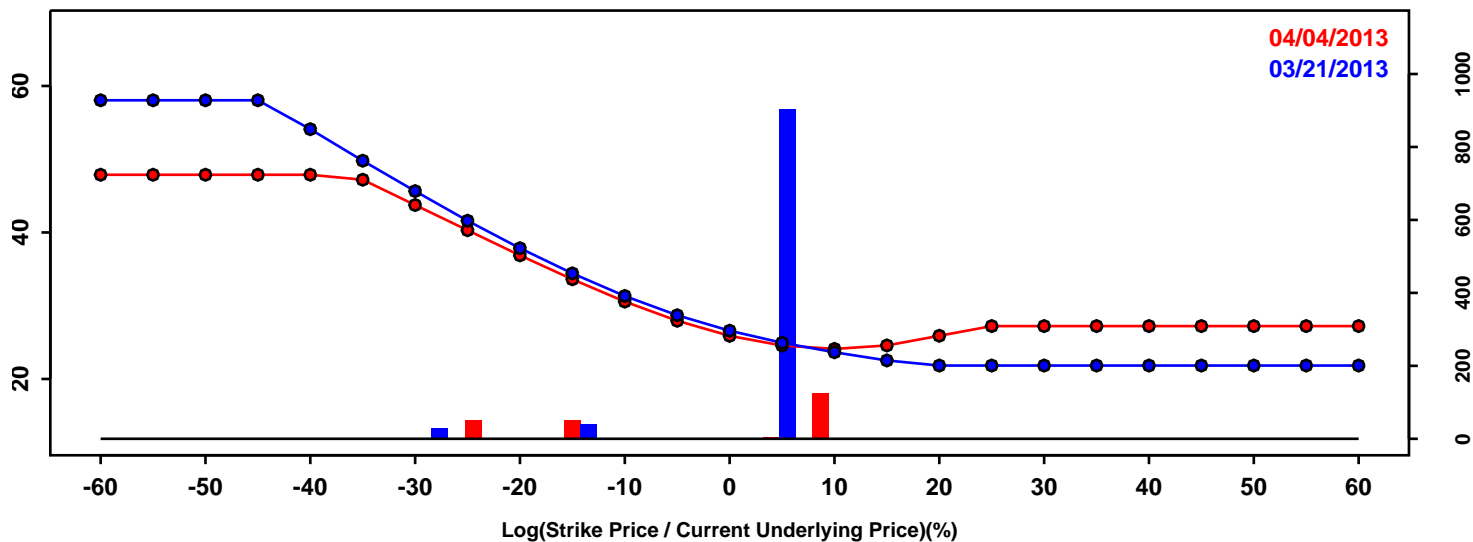
### Statistics of the Log Return Distributions

|          | 03/21/2013 | 04/04/2013 | Change |
|----------|-----------|-----------|--------|
| 10th Pct | -15.47%   | -16.53%   | -1.06% |
| 50th Pct | 1.95%     | 0.84%     | -1.11% |
| 90th Pct | 15.63%    | 13.70%    | -1.93% |
|          |           |           |        |
| Mean     | 0.70%     | -0.64%    | -1.33% |
| Std Dev  | 13.17%    | 13.38%    | 0.21%  |
| Skew     | -0.98     | -1.01     | -0.02  |
| Kurtosis | 2.90      | 2.95      | 0.04   |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SUNTRUST

*Log returns are based on the risk neutral density function of the underlying asset
derived from options that expire in approximately 3 months.*

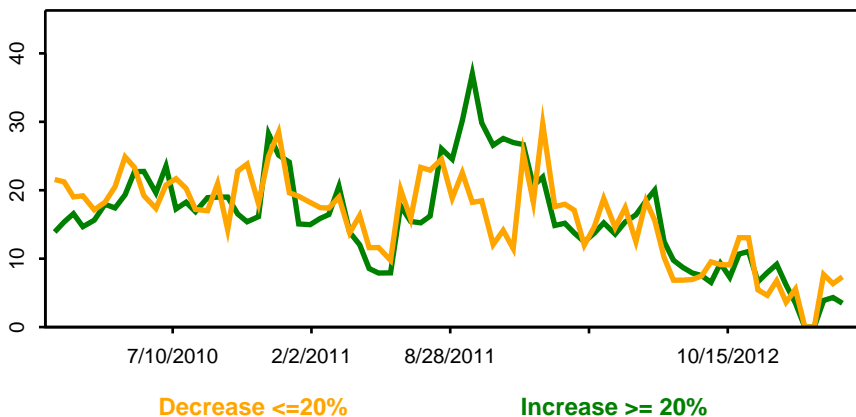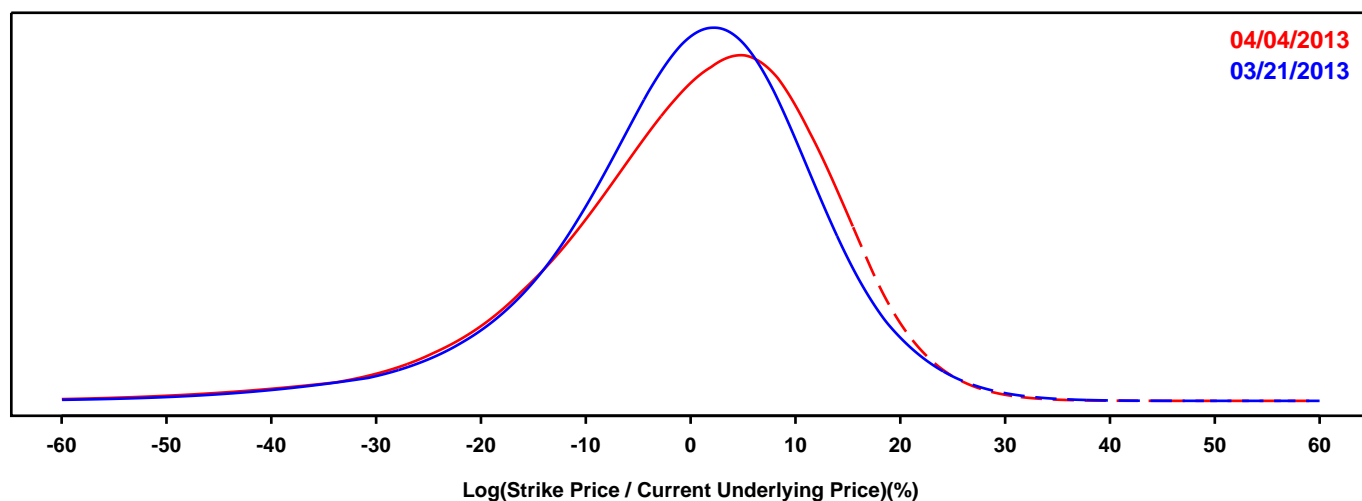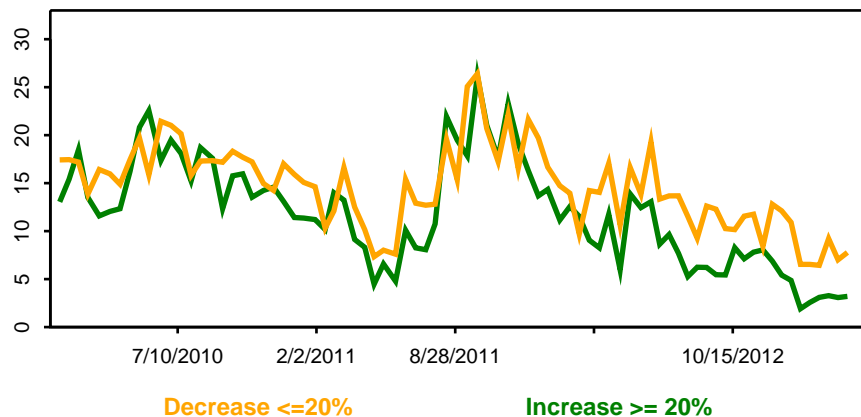## Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

## Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

## Probability of a Large Change



Decrease <=20%          Increase >= 20%
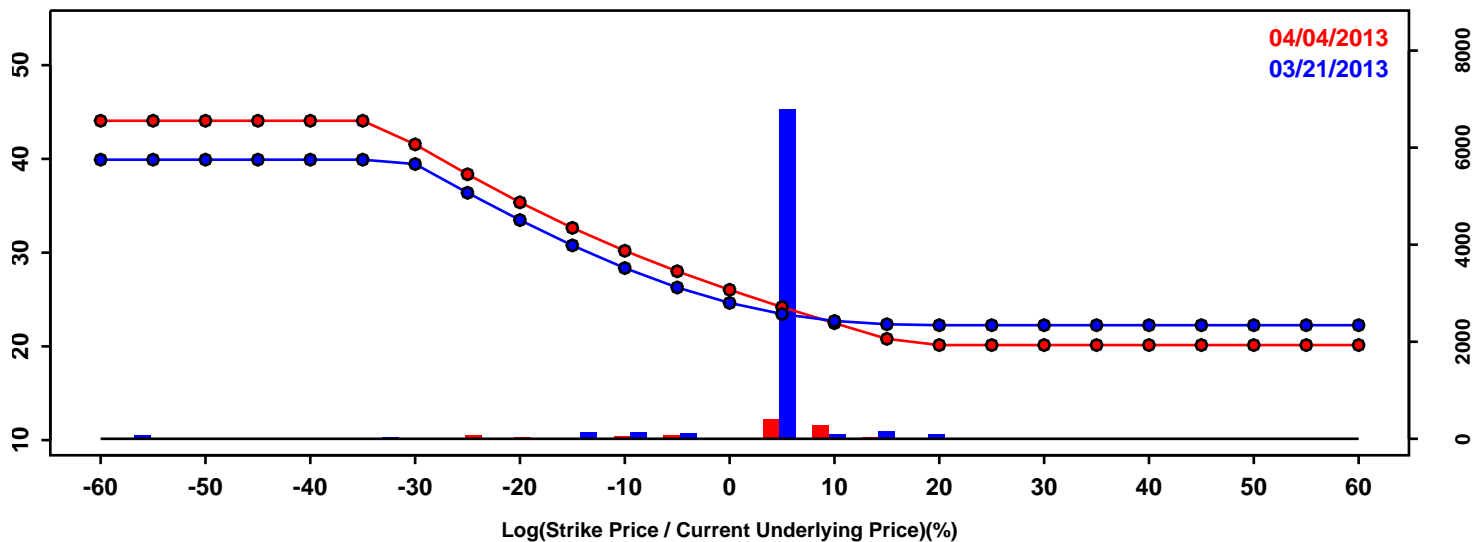
### Statistics of the Log Return Distributions

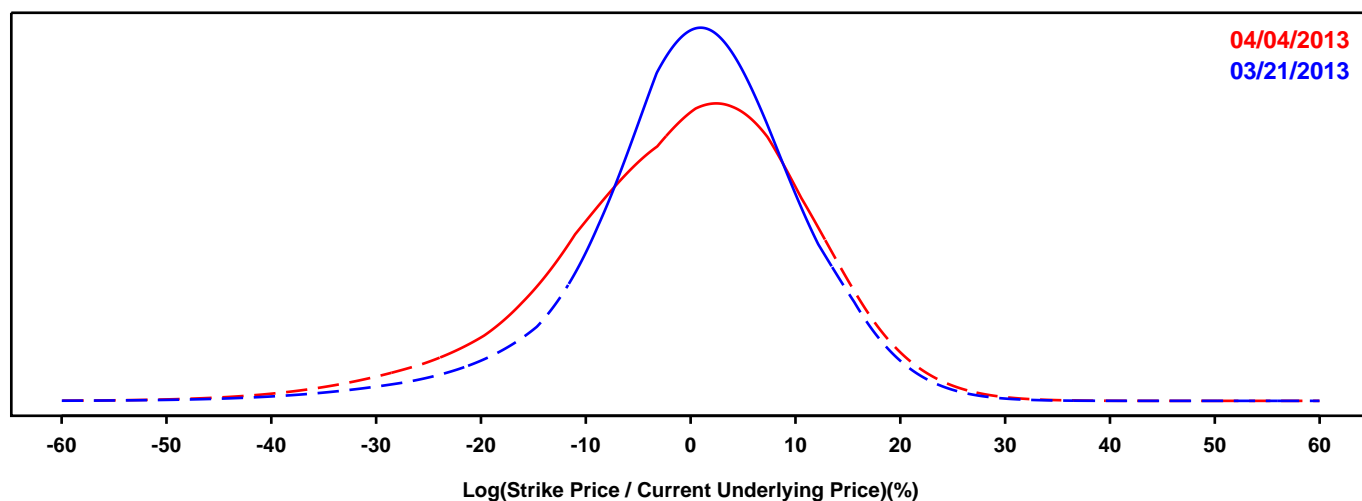|           | 03/21/2013 | 04/04/2013 | Change |
|-----------|-----------|-----------|--------|
| 10th Pct  | -16.49%   | -17.37%   | -0.88% |
| 50th Pct  | 0.58%     | 1.47%     | 0.89%  |
| 90th Pct  | 13.69%    | 14.79%    | 1.10%  |
|           |           |           |        |
| Mean      | -0.67%    | -0.27%    | 0.40%  |
| Std Dev   | 12.66%    | 13.43%    | 0.77%  |
| Skew      | -0.78     | -0.94     | -0.16  |
| Kurtosis  | 1.69      | 1.82      | 0.13   |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- STATE STREET

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
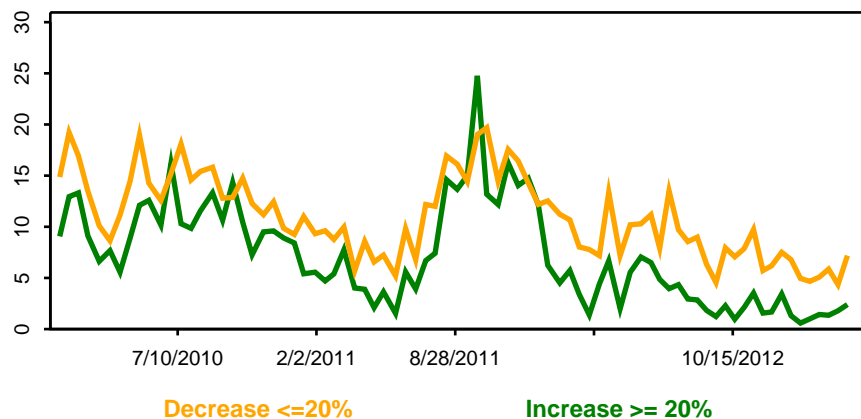
**Implied Volatilities (lines--left axis) and Volume (bars--right axis)**

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

**Risk Neutral PDF of the Log Return Distribution**

04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

**Probability of a Large Change**



**Decrease <=20%**   **Increase >= 20%**
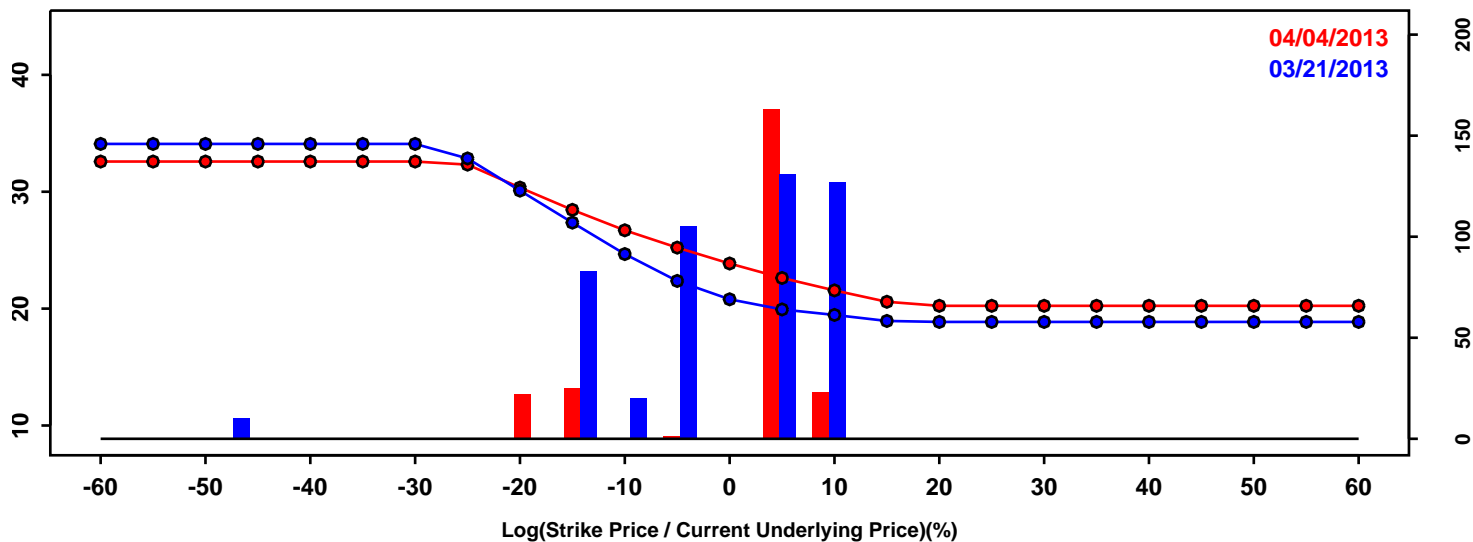
**Statistics of the Log Return Distributions**

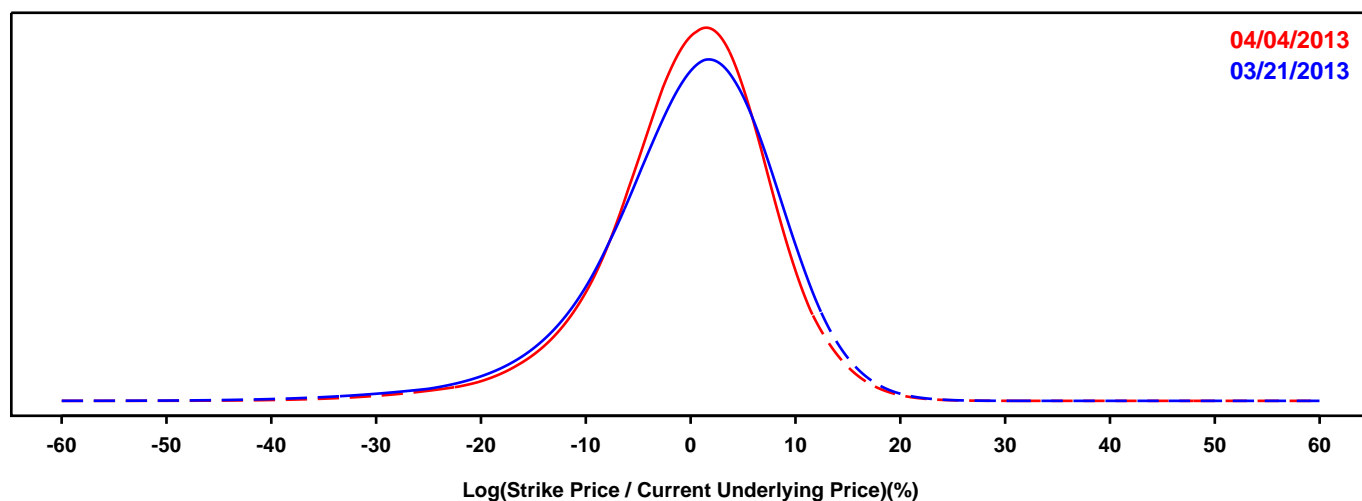| | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -12.64% | -16.89% | -4.25% |
| **50th Pct** | 0.73% | 0.15% | -0.58% |
| **90th Pct** | 12.46% | 13.32% | 0.86% |
| | | | |
| **Mean** | 0.07% | -1.05% | -1.12% |
| **Std Dev** | 10.58% | 12.25% | 1.67% |
| **Skew** | -0.72 | -0.60 | 0.11 |
| **Kurtosis** | 1.76 | 0.77 | -0.99 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- US BANCORP

*Log returns are based on the risk neutral density function of the underlying asset
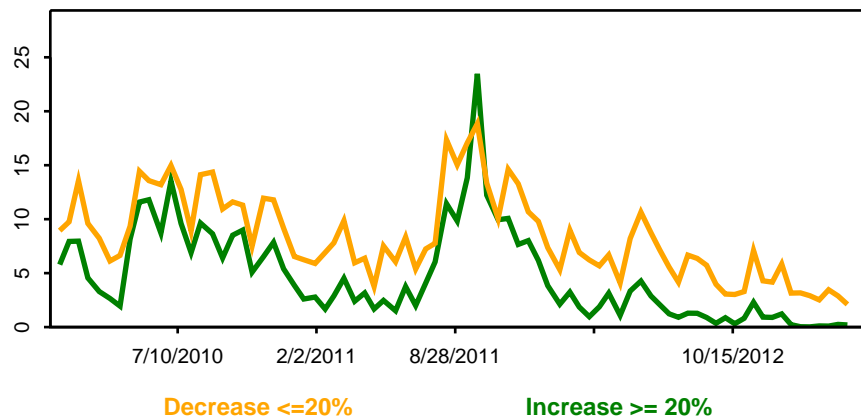derived from options that expire in approximately 3 months.*

### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



**Decrease <=20%**        **Increase >= 20%**
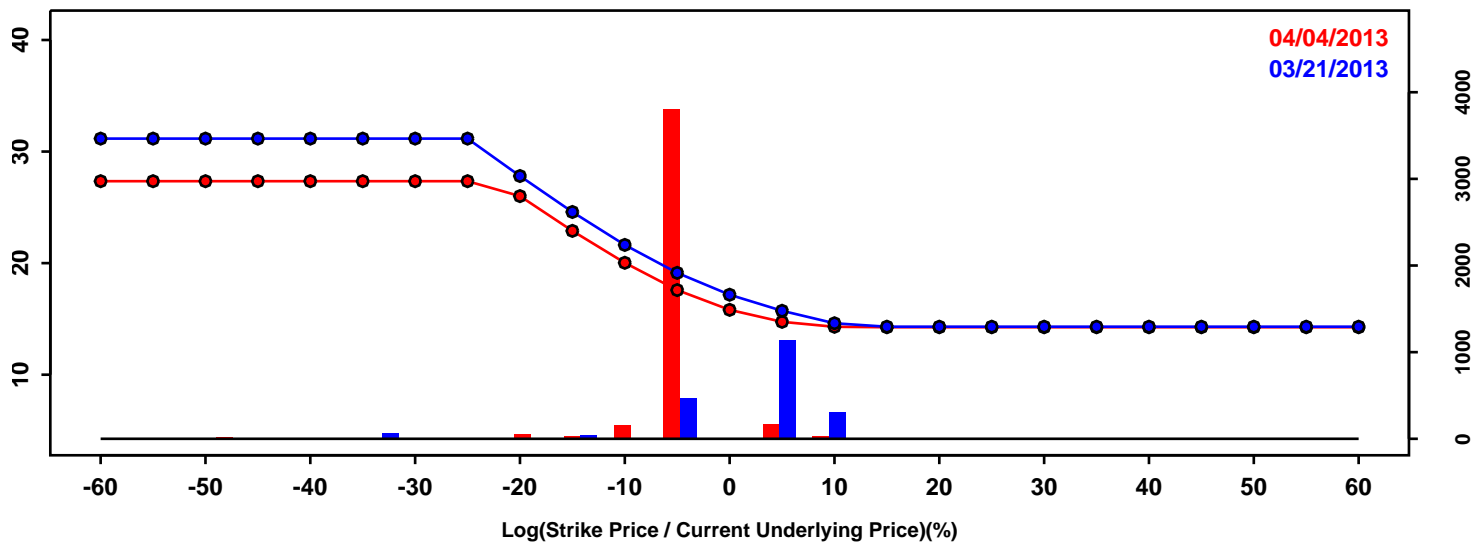
### Statistics of the Log Return Distributions

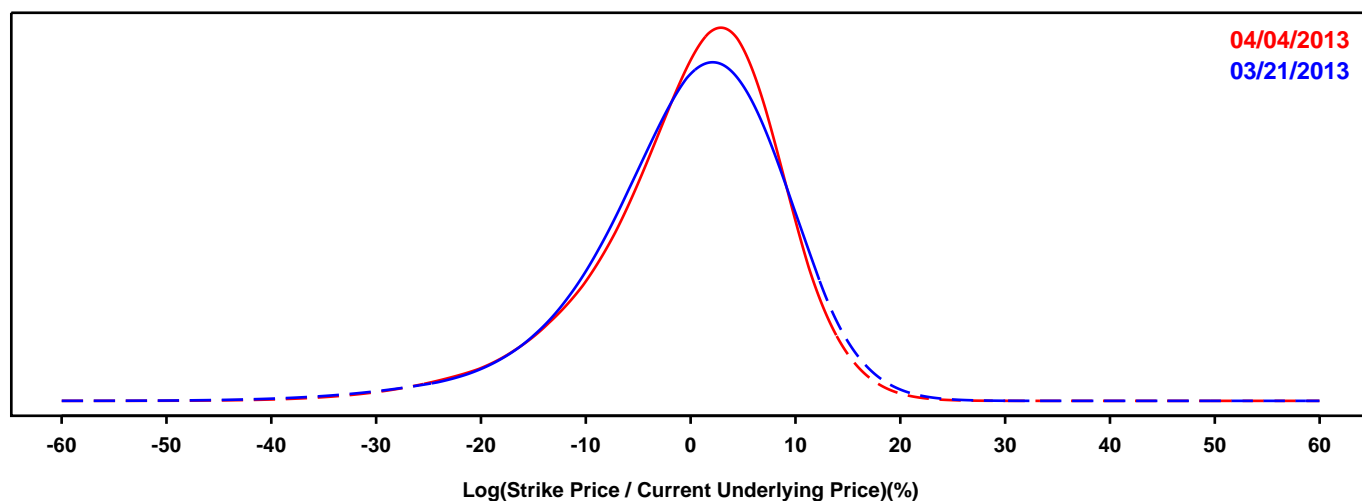| | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -11.19% | -10.12% | 1.07% |
| **50th Pct** | 0.62% | 0.43% | -0.19% |
| **90th Pct** | 9.62% | 8.81% | -0.81% |
| **Mean** | -0.32% | -0.29% | 0.03% |
| **Std Dev** | 8.79% | 7.98% | -0.81% |
| **Skew** | -0.92% | -0.79% | 0.14% |
| **Kurtosis** | 2.19 | 1.92 | -0.26 |

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WELLS FARGO

*Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.*
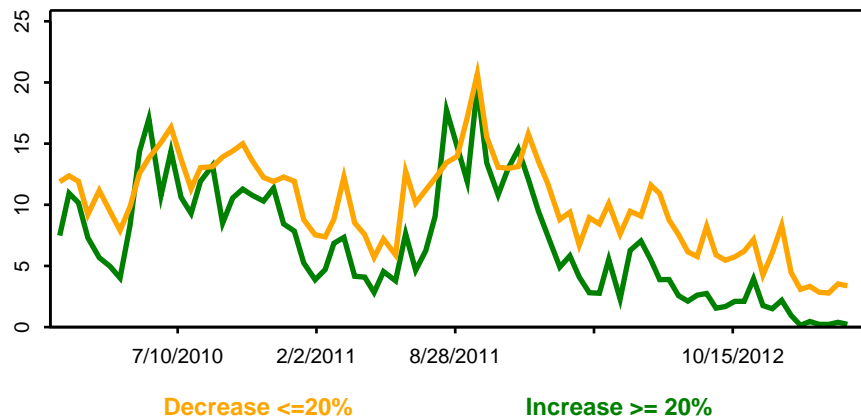
### Implied Volatilities (lines--left axis) and Volume (bars--right axis)



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Risk Neutral PDF of the Log Return Distribution



04/04/2013
03/21/2013

Log(Strike Price / Current Underlying Price)(%)

### Probability of a Large Change



Decrease <=20%          Increase >= 20%
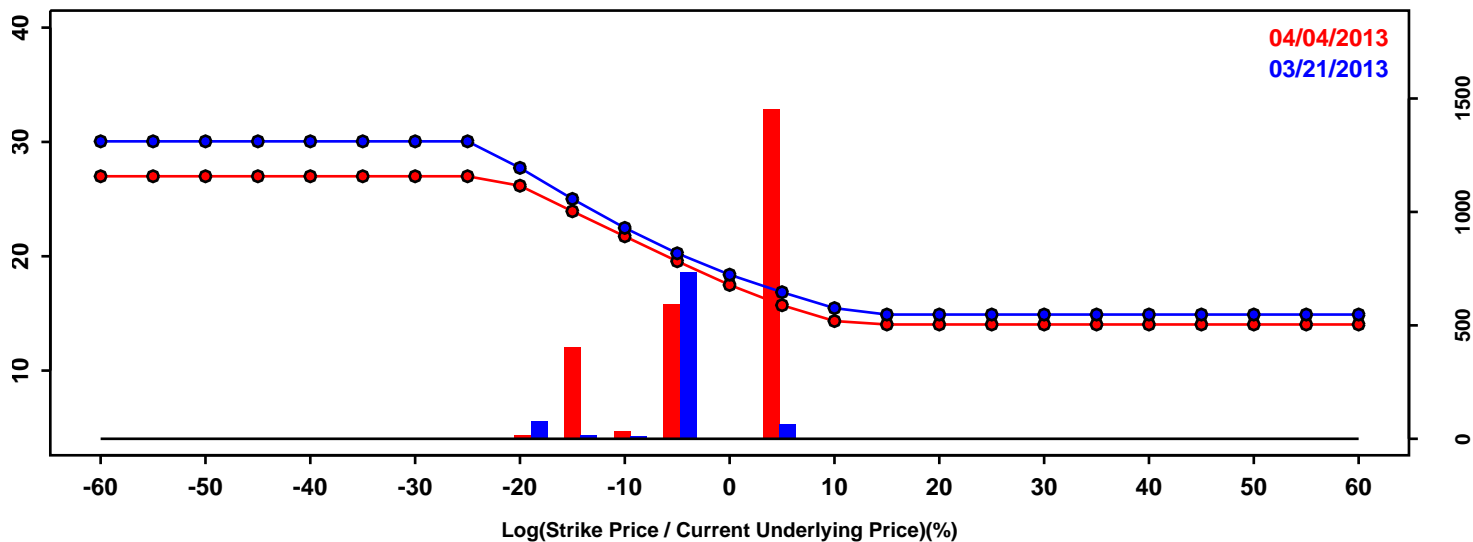
### Statistics of the Log Return Distributions

|  | 03/21/2013 | 04/04/2013 | Change |
|---|---|---|---|
| **10th Pct** | -12.25% | -12.09% | 0.15% |
| **50th Pct** | 0.71% | 0.96% | 0.25% |
| **90th Pct** | 10.38% | 9.69% | -0.69% |
|  |  |  |  |
| **Mean** | -0.33% | -0.27% | 0.06% |
| **Std Dev** | 9.40% | 8.99% | -0.41% |
| **Skew** | -0.85 | -0.89 | -0.04 |
| **Kurtosis** | 1.63 | 1.47 | -0.16 |