Commodity trading is not suitable for all investors. There is an inherent risk of loss associated with trading commodity futures and options on futures contracts, even when used for hedging purposes. Only risk capital should be used when investing in the markets. Past performance is not indicative of future results.
Agenda

Commodity Market Volatility

Case study: The Impact of Commodity Prices on Financial Results & Supply Chain Metrics

Best Practices of Commodity Risk Management in the Supply Chain
COMMODITY MARKET VOLATILITY
Today’s Purchasing Environment is heavily influenced by outside factors:

- Energy Markets
- Weather
- Terrorism
- Food Contamination
- Global Commodity Cycles
- Growing Asian Demand
- Government Ag Policy
- Speculative Fund Money
- Bio Fuels
- Internal Risk Communication
- Price Forecasting Error
- Competitive Issues
- $USD Energy Markets
What is Volatility?

![Distribution Curve]

- 68% of data
- 95% of data
- 99.7% of data
Volatility by Asset Class

Currencies
- CAD
- EUR
- JPY
- MXN

Interest Rates
- GBP 3m
- JPY 3m
- Euro 3m
- USD 3m
- BRL 3m

Equity Indices
- S&P 500
- FTSE 100
- Bovespa
- Nikkei 225

Commodities
- Corn
- Coffee
- Crude Oil
- Pork Bellies
- Nat Gas
- Beef 50’s
Commodity Market Volatility

Why are commodities more volatile than other asset classes?
Commodity Market Volatility

Why are commodities more volatile than other asset classes?

✓ Mother Nature
✓ Institutional and Speculative Investors
✓ Government Policy
✓ Liquidity
✓ Economics 101 as it pertains to inelastic demand
IMPACT OF COMMODITY PRICE VOLATILITY ON OPERATING RESULTS:

KEURIG GREEN MOUNTAIN INC.
### Consolidated Statements of Operations (Dollars in thousands)*

<table>
<thead>
<tr>
<th></th>
<th>September 26th 2015</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Sales</strong></td>
<td>$4,520,031</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Cost of Sales</strong></td>
<td>2,912,507</td>
<td>64%</td>
</tr>
<tr>
<td><strong>Gross Profit</strong></td>
<td>1,606,524</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Selling &amp; Operating</strong></td>
<td>539,259</td>
<td>12%</td>
</tr>
<tr>
<td><strong>General &amp; Administrative Expenses</strong></td>
<td>287,591</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Restructuring Expenses</strong></td>
<td>15,250</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Operating Income</strong></td>
<td>$765,424</td>
<td>17%</td>
</tr>
</tbody>
</table>

*Source: Keurig Green Mountain Inc. Form 10-K file 11/19/2015*
Keurig Green Mountain Inc.

<table>
<thead>
<tr>
<th>GRM Cost of Sales Assumptions *</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Sales</td>
<td>$2,912,507</td>
<td>100%</td>
</tr>
<tr>
<td>Coffee Costs</td>
<td>873,752</td>
<td>30%</td>
</tr>
<tr>
<td>Non-Coffee Costs</td>
<td>2,038,755</td>
<td>70%</td>
</tr>
</tbody>
</table>

* GRM Estimation for Illustration Purposes
Understanding Your Risks

Historical coffee prices best fit to a lognormal distribution
Risk Analytics – Stochastic Modeling

Simulated Impact of Coffee Prices on Operating Income

Operating Income in Billinois

Values x 10^-5

Minimum $-351,291.10
Maximum $1,286,815.94
Mean $765,415.99
Std Dev $197,693.49
Values 10000

$765,424
Simulated Results

- A one SD increase in coffee prices reduces operating income to $580 Million
- A two SD increase in coffee prices reduces operating income to $408 Million

Simulated Impact of Coffee Prices on Operating Income

- Minimum: $-524,219.15
- Maximum: $1,278,200.64
- Mean: $765,401.03
- Std Dev: $197,787.88
- Values: 10000

$765,424
Simulated Results

What is the probability unfavorable movements in coffee prices will reduce operating income by $100 Million?

Simulated Impact of Coffee Prices on Operating Income

Minimum: -$524,219.15
Maximum: $1,278,200.64
Mean: $765,401.03
Std Dev: $197,787.88
Values: 10000

$765,424
Commodity Risk Management

Best Practices in Supply Chain Management
Executive Summary

Background:
In 2008 GRM and Beeson and Associates, Inc. identified seven critical attributes of best practices in risk management. This was developed through actual working and implementation experiences with such companies as Pillsbury, Kellogg’s, KFC, General Mills, and Brach’s Candy. In addition, the two companies utilized their industry relationships to benchmark other agricultural companies as to see what worked well over time across the respective organizations. Buying into the best practices requires alignment across key organizational functions hence establishing a holistic and institutionalized process. The process is meant to stand the test of time even in the face of continually changing personnel.

Qualifications:
Through this program GRM has worked with a number of retail food and QSR companies to successfully implement these best practices. Specifically GRM/Beeson have worked with Wendy’s, M+M Mars- globally, Schwann’s, Ferrara Candy, and Land ‘O Lakes. These organizations have fully embraced this process and continually receive high marks from Sr. Management and both internal and external auditors.

Scope of this presentation
The following slides illustrate and explain the progression of key processes to identify and implement a best-in-class Commodity Risk Management program. Some examples from past projects are used to illustrate the concepts.
Best Practices

- **Effective Hedging**
  - approved strategies
  - approved tools
  - new tools
  - tools match risk profile

- **Decision Making**
  - accurate positions
  - quantified impacts
  - quantified risk
  - “what–if” scenarios

- **Consistency**
  - BU alignment
  - knowledgeable
  - role understood
  - well trained

- **Create Internal Synergy**
  - $ risk tolerance
  - product pricing horizons
  - purchasing expectations
  - communication
  - margin centric risk management
  - supports the customer

- **Business Adaptation**
  - flexible strategies
  - adjust to business environment
  - maintain competitive costs
  - match risk profile
  - BU alignment

- **Internal Protocol**
  - written document
  - broad adherence
  - 8 critical factors
  - BU alignment

- **Process Rigor**
  - market conditions
  - seasonal tendency
  - statistical analysis
  - market risk/reward
  - business risk/reward
A complete program contains 7 factors

Benchmarking current risk management processes against industry “best practices” highlights area of strengths and concerns

Areas reviewed

- Business unit alignment: 25%
- Policy and controls: 20%
- Reporting: 15%
- Personnel: 15%
- Strategy analysis rigor: 10%
- Hedge tools and utilization: 10%
- Strategy flexibility: 5%
Key Concepts and Terms

• Analysis is focused on commodities

• **Volatility:** Statistical measure of market variation

• **Risk Tolerance:** The total commodity cost variation acceptable to the business

• **Neutral Cover:** Fixed forward coverage = pricing horizon

• **Risk:** Volume covered different from neutral $\times$ market volatility

• **Reporting Template:** Captures risk by period
Process Discovers Hidden Risk

**Internal Risk**
- Poor sales, demand, and position reporting systems
- Nonexistent or inconsistent understanding of financial risk
- Risk not quantified
- Product pricing strategies not understood throughout
- Disconnect between margin/product pricing and commodity strategies
- Heavy commodity price forecasting and personal bias focus
- Lack of experience/trained personnel
- Lack of ongoing disciplined RM process

**External Risk**
- Expanded market volatility
- Outside market influences leading to unpredictable market behavior
- Economy leading to poor financial performance
- Uncompetitive cost structures
Measuring Risk

• Risk is a function of volatility and time

• Volatility VaR-type measurement +/- 2 std deviations is applied based on the appropriate implied volatility of the ATM option.

• The sum of all positions +/- of a fully hedged profit margin X volatility is the P+L “risk” exposure of the business

• The sum of all open futures and option positions X volatility is the cash flow “risk” exposure of the business
Neutral Cover Length is Identified

- If raw material cost is known when prices are set… No risk
- Keep purchases and sales in balance
- When purchases extend to cover sales, the position is “neutral”

- The length of commodity coverage that balances the business’ ability to deliver its financial objectives with its competitive position in the industry
- Incremental coverage long or short of even creates risk
Neutral Cover Length–Key Questions

• Time to implement price change?
• Consumer elasticity?
• Who leads?
• Customer willingness?
• Competitive cover?
• Cost savings?
• Cost of holding cover?
• Supply assurance?
Cumulative Risk of No Coverage (2 std dev)

coverage longer or shorter than neutral adds risk !!!
How long does it take to make a finished product price change in response to changing commodity costs?

<table>
<thead>
<tr>
<th>Periods</th>
<th>1 Period or Less</th>
<th>2 Periods</th>
<th>3 Periods</th>
<th>4 Periods</th>
<th>5 Periods</th>
<th>6 Periods</th>
<th>7 Periods</th>
<th>More Than 7 Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Percent</td>
<td>0%</td>
<td>0%</td>
<td>29%</td>
<td>19%</td>
<td>10%</td>
<td>38%</td>
<td>0%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Follow-up revealed a 4 month window to actually affect a change.
### Acceptable Risk Tolerance - survey responses

**How large of a commodity cost surprise can be absorbed by the business within a fiscal year without major earnings impact?**

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Number of Responses</th>
<th>Response Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 200,000 AUD</td>
<td>2</td>
<td>8.3%</td>
</tr>
<tr>
<td>&gt;200,000 AUD to 500,000 AUD</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>&gt;500,000 AUD to 1,000,000 AUD</td>
<td>7</td>
<td>29.1%</td>
</tr>
<tr>
<td>&gt;1,000,000 AUD to 1,600,000 AUD</td>
<td>4</td>
<td>16.6%</td>
</tr>
<tr>
<td>&gt;1,600,000 AUD to 3,600,000 AUD</td>
<td>5</td>
<td>20.8%</td>
</tr>
<tr>
<td>&gt;3,600,000 AUD</td>
<td>3</td>
<td>12.5%</td>
</tr>
<tr>
<td>No Responses</td>
<td>3</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>

Initial responses indicated wide divergence

Follow-up identified a unified definition of risk at $3mill
Cumulative Risk of No Coverage (2 std dev)

Coverage longer or shorter than neutral add risk !!!

Current practice was 6-month rolling positions. The two additional periods added $4-5 million of unmanageable risk.
Purchasing role is not understood

The Company’s most important goal of the Commercial Department and its commodity risk management process should be to:

<table>
<thead>
<tr>
<th>Goal</th>
<th>Sr Team</th>
<th>Finance</th>
<th>Marketing</th>
<th>Commercial</th>
<th>Sales</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate significant savings versus the market</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Protect margins on all forward priced products</td>
<td>1</td>
<td>1</td>
<td></td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Protect costs versus plan</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Capture savings versus year ago if possible</td>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Buy in the lower percentile of a historical pre-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Sr. Management comments:

- Would like to see Purchasing to play around the edges, doesn’t believe they can beat the overall market.

- Purchasing needs to be focused to beat the market.

- Purchasing goal should be to provide a level of certainty.

- Primary goal of the Purchasing team is to beat the market by 3% over a period.

- Goal, keep the factory running. Add value wherever they can
## Risk Management Scorecard - Example

### I. Business Unit Alignment

<table>
<thead>
<tr>
<th>Score</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>25%</td>
</tr>
<tr>
<td>2.0</td>
<td>40%</td>
</tr>
<tr>
<td>3.0</td>
<td>25%</td>
</tr>
<tr>
<td>2.0</td>
<td>10%</td>
</tr>
</tbody>
</table>

- Unified and quantified definition of risk
- Sr. Mgmt involved in extended position decisions
- Formal commodity and business strategy review process
- Mgmt consistently draws on commercial expertise
# Risk Management Scorecard - Example

<table>
<thead>
<tr>
<th>II. Policy and Controls</th>
<th>Score</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls are actively practiced</td>
<td>2.0</td>
<td>50%</td>
</tr>
<tr>
<td>Existence of a policy</td>
<td>1.0</td>
<td>40%</td>
</tr>
<tr>
<td>Policy is current</td>
<td>0.0</td>
<td>5%</td>
</tr>
<tr>
<td>Policy is understood throughout the organization</td>
<td>0.0</td>
<td>5%</td>
</tr>
</tbody>
</table>

- **Score Weight**:
  - 1.4 20%
  - 2.0 50%
  - 1.0 40%
  - 0.0 5%
  - 0.0 5%
### Risk Management Scorecard - Example

<table>
<thead>
<tr>
<th>III. Reporting</th>
<th>Score</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position are clear and all inclusive (physicals, futures, options, OTC's)</td>
<td>4.0</td>
<td>50%</td>
</tr>
<tr>
<td>Reports include impacts vs. key financial metrics (Budget, Market)</td>
<td>2.0</td>
<td>30%</td>
</tr>
<tr>
<td>Reporting of forward / unhedged risk exposure</td>
<td>3.0</td>
<td>20%</td>
</tr>
</tbody>
</table>

The Risk Management Scorecard evaluates various aspects of a company's risk management practices. The table above illustrates how different components are scored and weighted. For instance, the clarity of positions and inclusiveness of financial instruments is scored 4.0 and given a 50% weight. Similarly, the inclusion of impacts versus key financial metrics receives a score of 2.0 and is weighted at 30%, and the reporting of forward and unhedged risk exposure is scored 3.0 with a 20% weight.

![Graph indicating the scoring system](#)
Case Study— Quantifying risk across a diverse portfolio of businesses

- Businesses stated they could absorb $80 million commodity risk
- Sr. Management was shocked by the magnitude
- Analysis reduced acceptable portfolio risk to $55 mill
- New policies were implemented to reduce that potential impact

<table>
<thead>
<tr>
<th>Business</th>
<th>Risk Tolerance</th>
<th>Pricing Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.0</td>
<td>6 months</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
<td>1 year</td>
</tr>
<tr>
<td>C</td>
<td>0.0</td>
<td>1 month</td>
</tr>
<tr>
<td>D</td>
<td>5.0</td>
<td>Weekly</td>
</tr>
<tr>
<td>E</td>
<td>4.0</td>
<td>Monthly</td>
</tr>
<tr>
<td><strong>Total (not all divisions shown)</strong></td>
<td><strong>80.0</strong></td>
<td></td>
</tr>
</tbody>
</table>
Keys To a Successful Risk Management Program

• Allow business management to have input into business impactful commodity decisions yet…

• Allow purchasing flexibility to independently make decisions

• Understand a “risk free” neutral strategy by matching pricing window to coverage
  • Multiple businesses may present different and individual “neutral” positions

• Quantify incremental commodity risk when decisions are made to deviate from a “neutral position”
  • $ Impact to may differ by businesses

• Have analytical processes that provide quantitative measures of commodity risk
  • System to measure performance against pre-set metrics and communicate forward risk

• Effective use of approved strategies

• Codify practices and procedures in a well-written policy
Process

Kick Off Meeting
- Review process and goals

Data Gathering
- Annual volumes and spend by business
  - Volatility analysis

Online Survey
- Discovery of general perception of risk and processes

Interviews with Key Personnel
- Sr. Mgmt.
- Finance/Treasury
- Sales
- Purchasing & RM

Follow-up BU Meetings
- Present initial findings
- Reach consensus on risks and competitive Environment
- RM Structure

Policy Creation
- 8 critical areas
  - Client specific

Final Presentation and Recommendations
- Unified Definition of Risk
- Neutral Position
- Financial Risk Tolerances
- Supporting RM Strategies
- Roles and responsibilities
- Implementation of seven key areas
YOUR FEEDBACK IS IMPORTANT

Please take a few minutes to complete this brief survey.

Survey link: www.instituteforsupplymanagement.org/JA17
or Scan the QR code on your smartphone.