Risk Management: Considerations from an Economist's Perspective

Florida Cattle Feeding School
Gainesville, FL
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Broad Risk Points

- Risk is two-sided
  - Price:
    - KS feedlots who hedged near placement did not have "record September" closeouts
      - Would have avoided record losses in Jan. 2009 closeouts…
  - Health:
    - On-farm adverse ADG is bad
      - PEDv impact on pork supplies has been good for cattle producers
- Generally, absorbing some risk is "necessary"

Approach to Today's Discussion

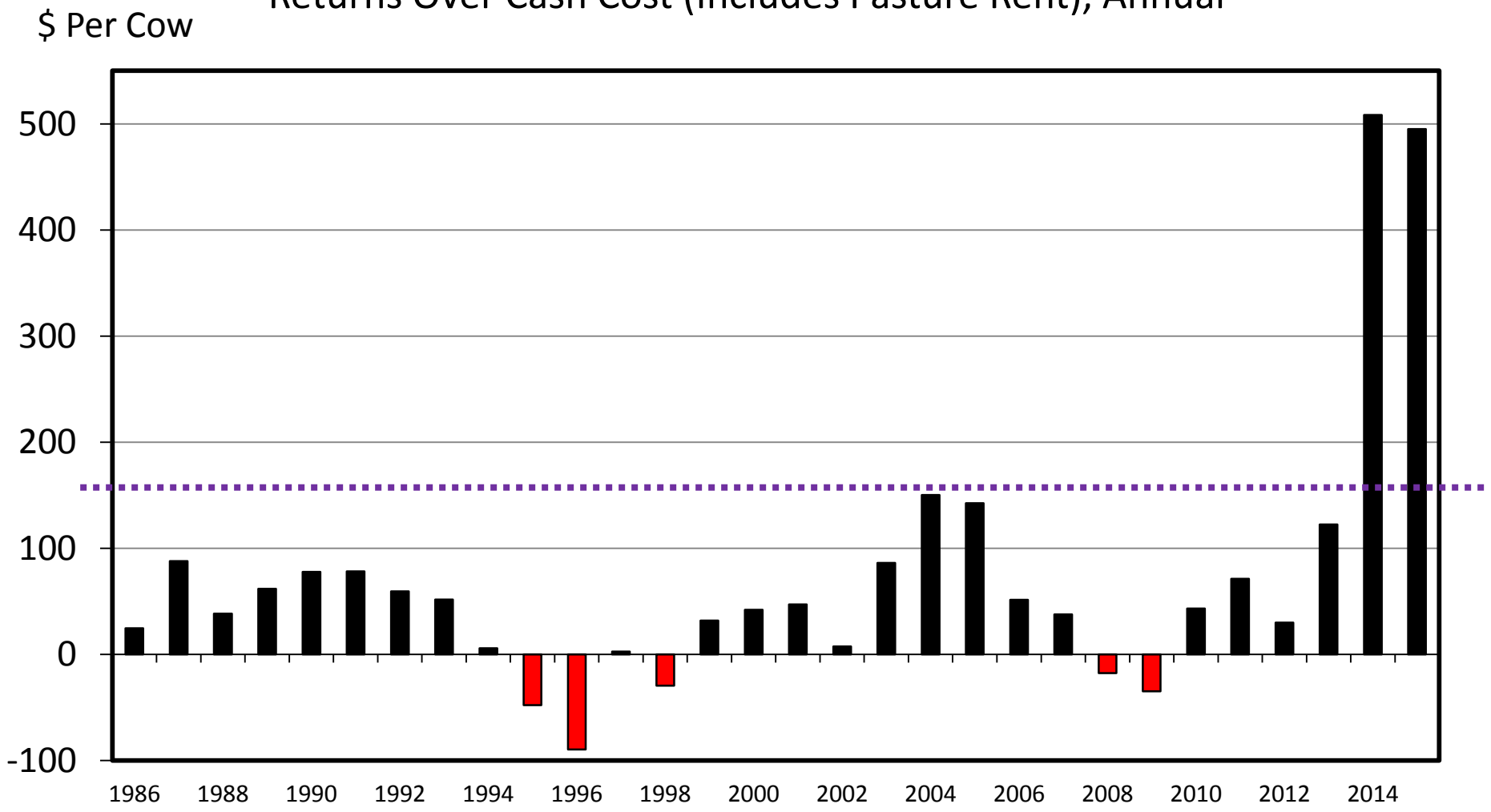
- Briefly overview current market outlook
  - Focus on stocker & feedlot margins
- "Traditional Price Risk" Considerations
  - Highlight example resources/tools
- Note broader risk considerations
- **Collective goal:**
  - **broaden our thinking & set stage for Q&A…**

Overarching Beef Industry Economic Outlook

- Supplies
  - Continued pull down, both in # of head & beef lbs
    - Mixed herd expansion signals; GT thinks we are underway…
- Demand
  - Confusing yet positive: Q3.2014 continued trend
    - Far less certain (and understood) than supply situation…
- Combined:
  - "Historic" price levels, excitement, & uncertainty…
    - **Sets stage for today's "risk management" discussion**

ESTIMATED AVERAGE COW CALF RETURNS

Returns Over Cash Cost (Includes Pasture Rent), Annual



Data Source: USDA-AMS, Compiled and Analysis by LMIC

Livestock Marketing Information Center

C-P-66

10/28/14

Economic Outlook Overview: Stockers

- Attractive Values of Gain (VOG) vs. COG
  - For those in many stocker/backgrounding areas …
  - Notably higher VOGs than feedlot COG projections (+/- $85/cwt)

- Ocala, FL 12/2/14 situation:
  - Buy 550 lb steer on 12/05/14 ($221.75)
  - Sell 750 lb steer on 3/13/15 ($216.98) {2.02 ADG}
    - VOG: $203.84/cwt
    - ***IF COG $100/cwt*** THEN Expected Profit = +/- $207/hd

http://www.beefbasis.com/VOG.aspx

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Current Basis Projections Understate Prices by $40 (550lb) & $15 (750lb)? Drops Exp. VOG by $54 to $150/cwt (cuts Exp. Profit in half…)

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Economic Outlook Overview: Feedlots

- 2014 to-date has been MUCH better than 2013
- Fed-cattle break-even prices have risen rapidly…
- Structural change concerns persist
  - Excess capacity (Calf Crop, Heifer Retention, Plant Closures), MCOOL…

Historical and Projected Kansas Feedlot Net Re
(as of 11/7/14')

(http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingRetur

Dec LC:
12/2: $168
10/1: $165
9/1: $155
8/1: $156

Sept 14': +$321/steer

(9th straight mo > $125/steer; best $/steer on record since 2003)

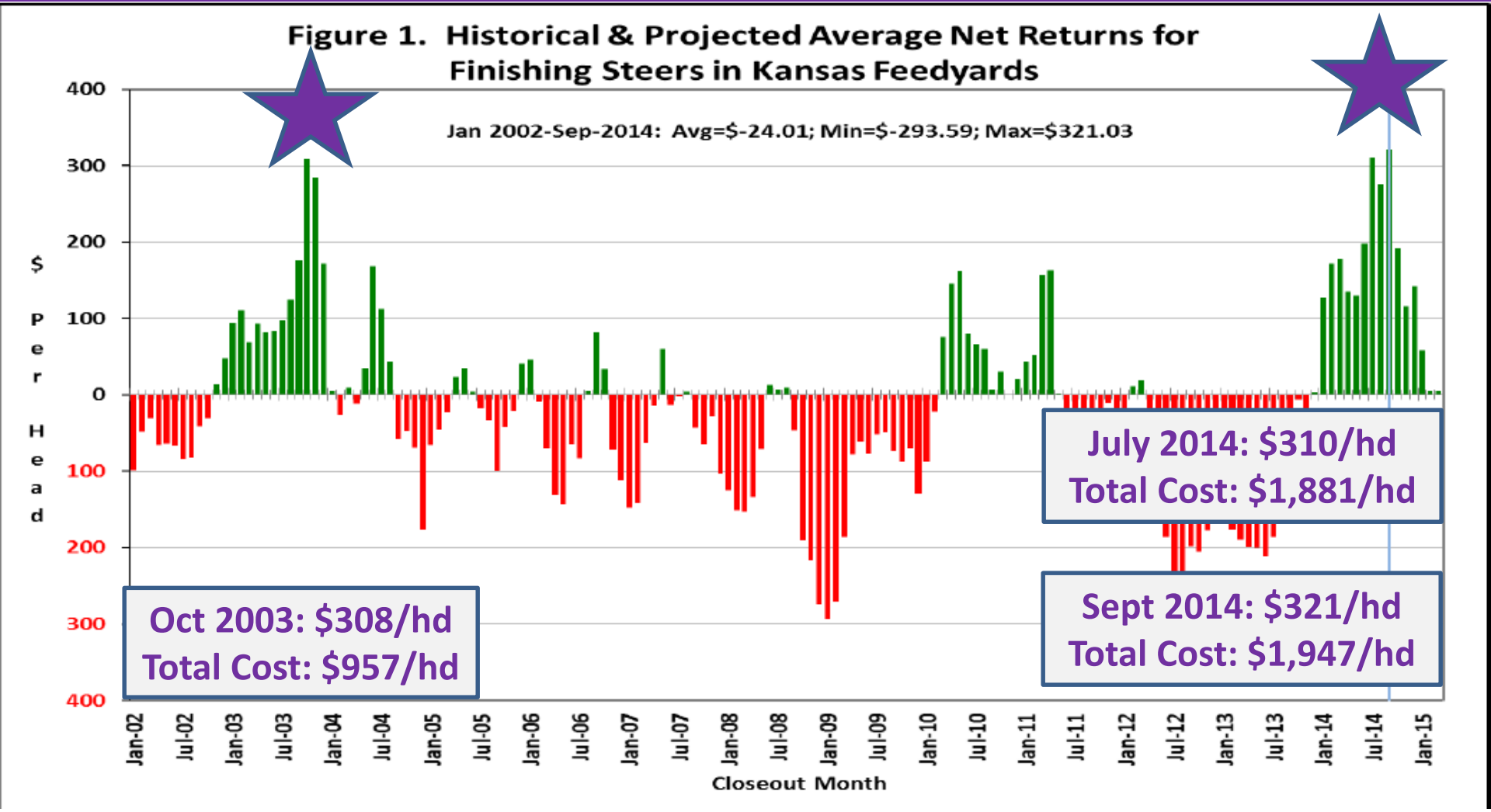
Table 1. Projected Values for Finishing Steers in Kansas Feedyards*

Closeout Mo-Yr	Net Return	FCOG**	Fed Price	Feeder Price	Breakeven FCOG**	Breakeven Fed Price	Breakeven Feeder Price
Oct-14	192.04	89.06	164.68	188.73	123.11	151.10	211.32
Nov-14	115.62	86.89	168.13	205.00	107.54	159.84	218.83
Dec-14	142.15	86.13	168.41	208.77	109.00	158.59	225.95
Jan-15	57.90	84.59	168.19	217.37	94.40	164.06	224.50
Feb-15	5.13	83.92	168.12	225.91	84.76	167.76	226.54
Mar-15	5.47	83.74	169.85	228.98	84.66	169.45	229.68

Representative Barometer for Trends in Profitability

Historical and Projected Kansas Feedlot Net Returns (as of 11/7/14')

(http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingReturns/default.asp)



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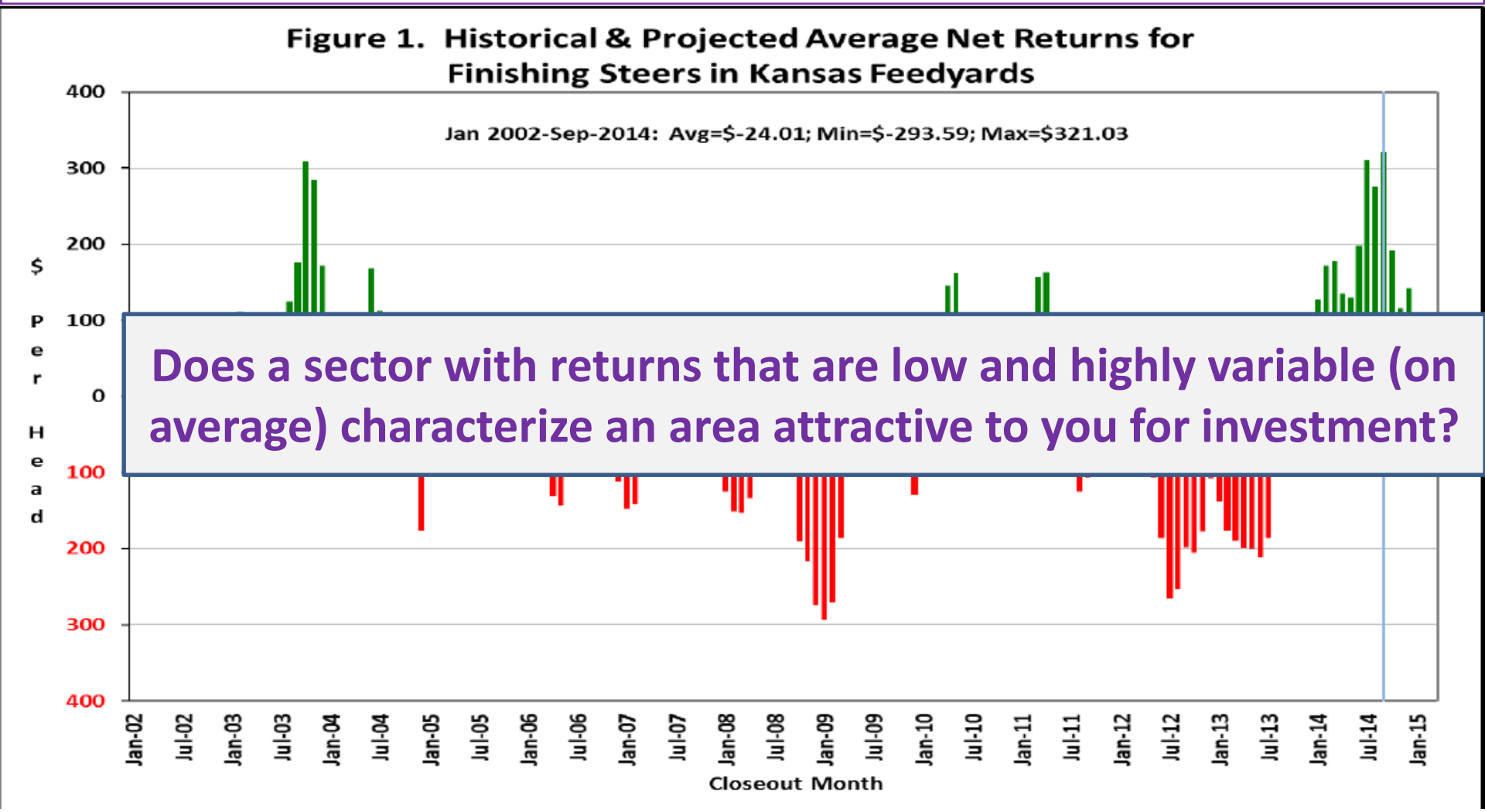

Does a sector with returns that are low and highly variable (on average) characterize an area attractive to you for investment?

Quarterly Forecasts (LMIC: 11/11/14)

Year Quarter	Comm'l Slaughter	% Chg. from Year Ago	Average Dressed Weight	% Chg. from Year Ago	Comm'l Beef Production	% Chg. from Year Ago
2014						
I	7,375	-5.2	795.7	0.3	5,868	-5.0
II	7,836	-5.9	789.0	0.9	6,183	-5.1
III	7,630	-8.3	809.6	1.9	6,178	-6.5
IV	7,517	-6.5	820.1	2.6	6,165	-4.0
Year	30,358	-6.5	803.5	1.4	24,394	-5.2
2015						
I	7,135	-3.3	812.6	2.1	5,798	-1.2
II	7,602	-3.0	799.5	1.3	6,078	-1.7
III	7,445	-2.4	814.8	0.6	6,066	-1.8
IV	7,414	-1.4	823.4	0.4	6,105	-1.0
Year	29,596	-2.5	812.5	1.1	24,047	-1.4
2016						
I	7,145	0.1	817.5	0.6	5,841	0.7
II	7,325	-3.6	804.9	0.7	5,896	-3.0
III	7,573	1.7	822.3	0.9	6,227	2.7
IV	7,333	-1.1	828.9	0.7	6,078	-0.4
Year	29,376	-0.7	818.4	0.7	24,042	0.0

Quarterly Forecasts (LMIC: 11/11/14)

Year Quarter	Live Sltr. Steer Price 5-Mkt Avg	% Chg. from Year Ago	Feeder Steer Price Southern Plains 7-800#	5-600#
2014				
I	146.34	16.6	171.77	209.30
II	147.82	18.3	193.16	227.67
III	158.49	29.6	225.93	263.14
IV	164-166	26.2	236-239	270-274
Year	154-155	22.7	206-208	242-244
2015				
I	164-167	13.1	232-236	274-280
II	164-168	12.3	234-240	278-285
III	161-166	3.2	230-237	271-280
IV	163-169	0.6	226-234	264-273
Year	163-167	6.8	231-236	272-279
2016				
I	164-171	1.2	225-234	272-283
II	164-172	1.2	228-238	275-288
III	160-169	0.6	226-237	268-282
IV	160-170	-0.6	220-232	262-277
Year	163-169	0.6	226-234	271-281

Risk Considerations: Quantitative Examples

Stockers Output Price Hedging Considerations (as of 11/21/14)

- Ocala, FL 11/21/14 situation:
  - Buy 550 lb steer on 12/05/14
  - Sell 750 lb steer on 3/13/15

- Considering price protection on March sale
  - Or for feedyard, consider protection for buy in Mar

  - **USE: *FeederCattleRiskMgmtTool.xlsx***

http://www.agmanager.info/Tools/default.asp#LIVESTOCK

Stockers Output Price Hedging Considerations (as of 11/21/14)

- Case of 200 hd @ 750 lbs =
  - Compare alternatives:

    a) 200 hd on LRP, b) 3 FC Futures Contracts (+/- 67 hd per contract), c) 3 FC Options Contracts or d) Cash

  - MAR FC: $234.45 & Exp. Basis: -$1.00
  - LRP Coverage Price: $232 & Premium: $6.282
  - MAR Put @ $232: $5.20 premium

http://www.agmanager.info/Tools/default.asp#LIVESTOCK

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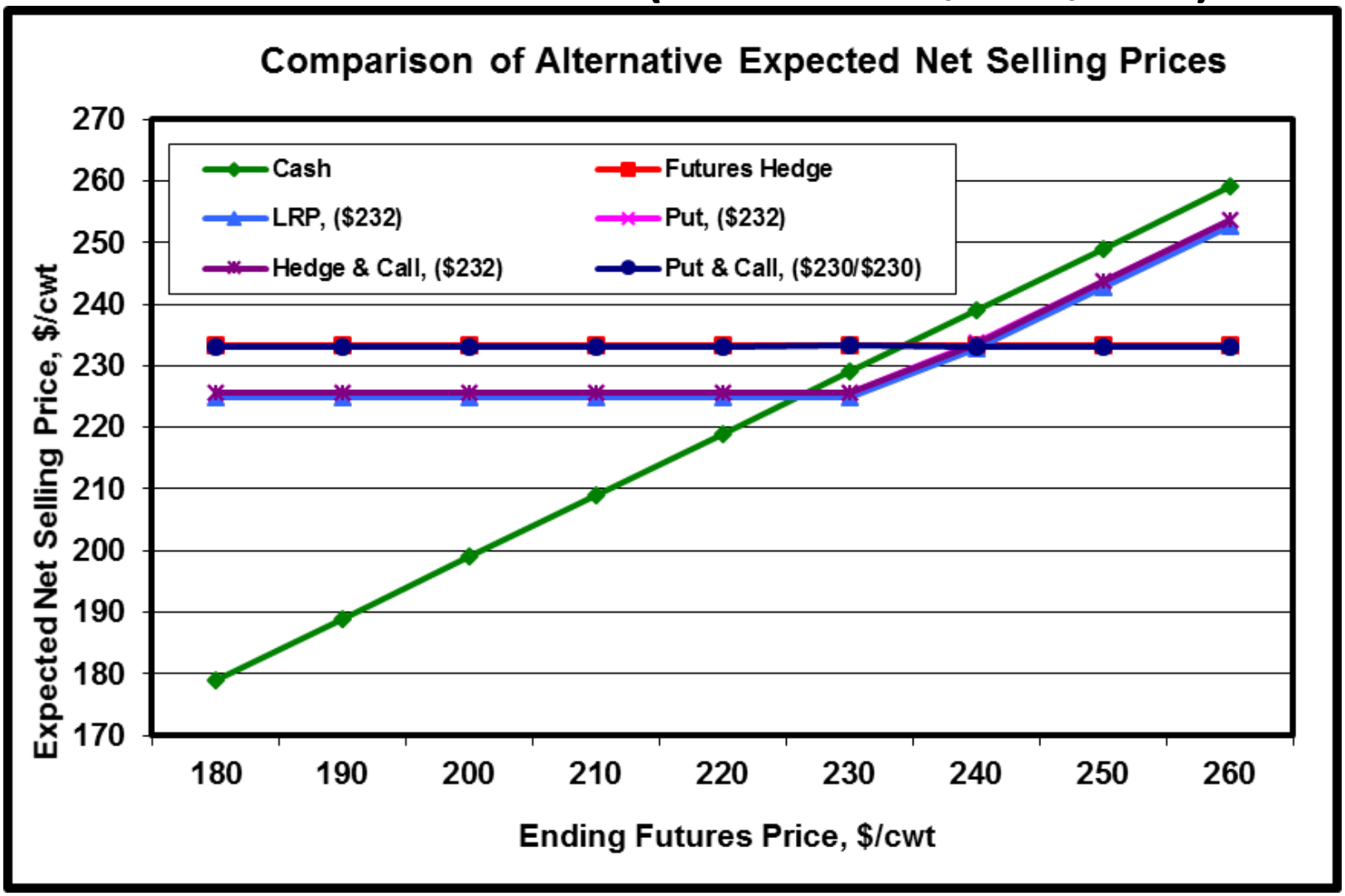

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LRP Parameters

Item	LRP–Feeder Cattle	LRP-Fed Cattle
Type of cattle	Heifers, Steers, Brahman, or Dairy	Heifers or Steers
Weight Classification	Less than 600 Lbs. 600 - 900 Lbs.	10 – 14 Cwt. Yield Grade 1- 3
Coverage Levels	70-100%	70-100%
Coverage Price	Varies Daily	Varies Daily
Endorsement Length	13 weeks to 52 weeks (4 week intervals)	13 weeks to 52 weeks
Subsidy	13 Percent	13 Percent
Ending Value Based On….	CME Feeder Cattle Price Index	AMS 5-area weekly average direct slaughter cattle report
Max. Cattle Covered Per Submission	1,000 Head	2,000 Head
Max. Cattle Covered Per Crop Year	2,000 Head	4,000 Head

Fed Cattle Price Risks

- Lawrence & Bortz
  (http://www.iowabeefcenter.org/Docs_econ/Management_Cattle_Price_Risk_Futures.pdf)
  - IA fed cattle price risk mngt: 1987-2006 assessment

The strategies evaluated were:

Cash:	Sell all cattle at the cash price on the first day of the month
Futures:	Hedge all cattle with futures contracts when cattle enter feedlot
50 Futures:	Hedge 50 % of cattle with a futures contract and sell 50 % on cash market
1 OTM Put:	Buy a put option one strike price out-of-the-money when cattle enter feedlot
ATM Put:	Buy a put option with the strike price at the money when cattle enter feedlot
1 ITM Put:	Buy a put option one strike price in-the-money when cattle enter feedlot

Fed Cattle Price Risks

- Lawrence & Bortz
  - IA fed cattle price risk mngt: 1987-2006 assessment

Table 1. Summary of Returns to Alternative Cattle Feeding Risk Management Strategies, 1987-2006

All returns are $/cwt.	Average	Minimum	Maximum	Standard Deviation	Positive Returns (%)	Beats Cash Sales (%)
Cash Price	2.76	-9.76	33.77	8.31	64%	NA
Futures	-0.24	-7.83	13.90	3.65	50%	39%
50% Futures	1.27	-5.84	23.83	5.32	62%	39%
1 OTM put	0.98	-10.51	32.07	7.87	55%	14%
ATM put	0.62	-11.23	31.55	7.79	53%	18%
1 ITM put	1.24	-12.01	30.88	7.89	56%	25%

Feedlot Margin Risks

- Schulz, 2013 (http://www.extension.iastate.edu/agdm/livestock/html/b2-54.html)

Table 2.2. Percent of Trading Days During Feeding Period that Breakeven +/-$X could be Hedged for Yearlings, 1993-2012

BE +	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
-$4	70%	69%	81%	90%	89%	78%	74%	72%	74%	70%	79%	79%	77%
-$3	67%	66%	75%	86%	88%	69%	65%	60%	65%	61%	71%	72%	70%
-$2	64%	59%	69%	80%	85%	63%	55%	49%	54%	52%	63%	66%	63%
-$1	58%	54%	63%	75%	78%	55%	45%	39%	46%	43%	55%	59%	56%
$0	53%	48%	58%	70%	69%	48%	36%	28%	39%	34%	48%	52%	49%
$1	49%	41%	51%	63%	58%	41%	25%	22%	30%	24%	39%	42%	41%
$2	37%	29%	40%	53%	46%	32%	19%	16%	16%	14%	25%	28%	30%
$3	32%	24%	29%	45%	39%	26%	12%	8%	10%	11%	19%	23%	23%
$4	21%	15%	23%	31%	32%	19%	7%	6%	5%	8%	13%	14%	16%

Feedlot Margin Risks

- Belasco, 2008 (http://ageconsearch.umn.edu/bitstream/46563/2/Belasco.pdf)
  - Relative importance of production risk and price risk in feeding profits
  - KS & NE feedlot data from 11,397 pens between 1995 & 2004
  - Hypothetical KS pen placed March 13, 2008

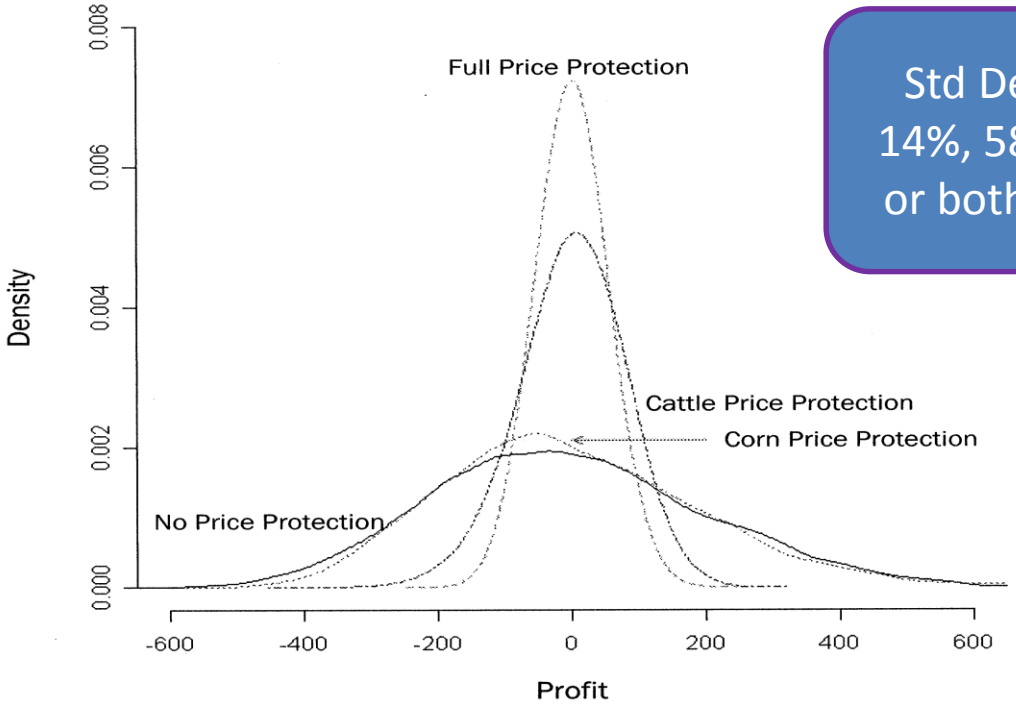
Table 1. Mean Ex Ante Conditional Profits ($ per head) from Shocks to Production Risk Factors, Under Full Price Coverage

Scenario	Mean	Scenario	Mean
Baseline–No Price Risk	–3.61	Low *DMFC* (5.26 lbs. feed/lbs. gain)	19.19
High *MORT* (3.41%)	–34.36	High *DMFC* (7.43 lbs. feed/lbs. gain)	–92.22
Low *ADG* (2.56 lbs./day)	–40.22		
High *ADG* (4.14 lbs./day)	14.64		

Shocks reflect 5th & 95th percentile values of MORT, ADG, & DMFC

Feedlot Margin Risks

- Belasco, 2008 (http://ageconsearch.umn.edu/bitstream/46563/2/Belasco.pdf)



Std Dev of Exp. Profits Fall by 14%, 58%, & 87% if corn, cattle, or both are forward contracted

Scenario	Mean	Std. Dev.	5%	25%	75%	95%
Full Price Protection	–3.61	37.70	–66.66	28.62	21.81	57.65
Cattle Price Protection	–3.56	125.29	–233.07	–69.45	83.20	164.64
Corn Price Protection	–3.89	257.95	–371.07	–187.76	147.58	463.74
No Price Protection	–3.84	299.79	–457.27	–206.66	179.06	516.73

Figure 1. Distribution of ex ante conditional profits under four types of risk coverage

Feedlot Margin Risks

- Herrington, 2013 (http://krex.k-state.edu/dspace/bitstream/handle/2097/15997/MatthewHerrington2013.pdf?sequence=1)
  - Simulated 1,000 returns for each week (n=585) between 1/2/2002 and 3/15/2013; to assess how feedlot risks have changed over time
    - Probability of profits > $100 have been declining
    - Probability of losses > $100 have been growing rapidly

Table 5-2: Summary Statistics of Mean Simulation Results from 1/2/2001 to 3/15/2013

	E[Profit] ($/hd)	E[TR] ($/hd)	E[TC] ($/hd)	E[VC] ($/hd)	E[FCC] ($/hd)	E[TFC] ($/hd)	E[DMFP] ($/lb)	E[IC] ($/hd)	E[SaleWt.]
Mean	-31.56	1141.32	1172.89	1112.89	827.17	245.93	0.0790	29.87	1281.79
SD	47.90	221.10	245.76	245.76	154.57	103.44	0.0331	5.02	13.62
COV	-1.52	0.19	0.21	0.22	0.19	0.42	0.4194	0.17	0.01
Min	-172.55	773.81	768.25	708.25	549.14	121.87	0.0394	20.06	1265.04
Max	102.08	1640.46	1713.29	1653.29	1208.39	514.16	0.1615	42.33	1298.54

Feedlot Margin Risks

- Herrington, 2013 (http://krex.k-state.edu/dspace/bitstream/handle/2097/15997/MatthewHerrington2013.pdf?sequence=1)
  - Sources of cattle feeding return risks:
    - LC price always was ranked first (e.g. has largest impact on returns)
    - Relative impacts of FC, C, & ADG changed over time

Table 5-5: Sensitivity Analysis Results: Percent of Weeks during which a Variable was Ranked as the First, Second, or Third Most Influential Variable on Expected Kansas Feedlot Profits, 1/2/2002 - 3/15/2013

Year	#1: LC Price	#2: FC Price	#2: ADG	#2: Corn Price	#3: FC Price	#3: ADG	#3: Corn Price	N
2002	100%	60%	40%	0%	38%	60%	2%	52
2003	100%	79%	21%	0%	21%	79%	0%	53
2004	100%	94%	6%	0%	6%	85%	10%	52
2005	100%	62%	38%	0%	38%	62%	0%	52
2006	100%	81%	19%	0%	19%	77%	4%	52
2007	100%	83%	13%	4%	***13%***	***48%***	***38%***	52
2008	100%	**62%**	**0%**	**38%**	38%	9%	53%	53
2009	100%	87%	4%	10%	10%	38%	52%	52
2010	100%	69%	4%	27%	29%	54%	17%	52
2011	100%	67%	0%	33%	29%	15%	56%	52
2012	100%	83%	2%	15%	15%	21%	63%	52
2013	100%	82%	0%	18%	18%	9%	73%	11

Feedlot Margin Risks

- Herrington and Tonsor, 2013 (http://pas.fass.org/content/29/4/435.full.pdf+html)
  - Used KS Focus on Feedlot data from Jan. 1990 to June 2012 to examine feedlot cattle performance
- Structural break occurred in September 2008 (3 yrs after renewable fuels stnd.)
- ADG, G:F, and BW gain have positive annual growth rates = increasing feeding efficiencies & higher BW gains

Table 5. Annual growth rate of cattle performance variables[1]

Model	AGR 1990 to 2012 (%)
Steer ADG	0.610[a]
Heifer ADG	0.653[a]
Steer G:F	0.422[a]
Heifer G:F	0.377[a]
Steer BW gain	0.537[a]
Heifer BW gain	0.570[a]

Other Considerations: Vote-Buy Disconnects & Politics of Food

- Lusk (Food Police, pg 105):
  - "You don't have to like my decision, but don't ask me to subsidize yours- and have the courage to let others arrive at a different conclusion from yours."

- Center For Food Integrity (tweeted Sep 04, 2013):
  - "Science tells us if we <u>can</u> do something. Society tells us if we <u>should</u> do it."
    - USDA, FDA, etc. approval DOES NOT EQUAL consumer & customer acceptance

➢ Increases uncertainty on long-term production practices that will be in-place & complicates aggregate demand patterns…

Other Considerations: “Global Factors”

- Adverse developments:
  - Geo-political risks
  - Global GDP forecast reductions
  - U.S. dependent on grain-fed preferences

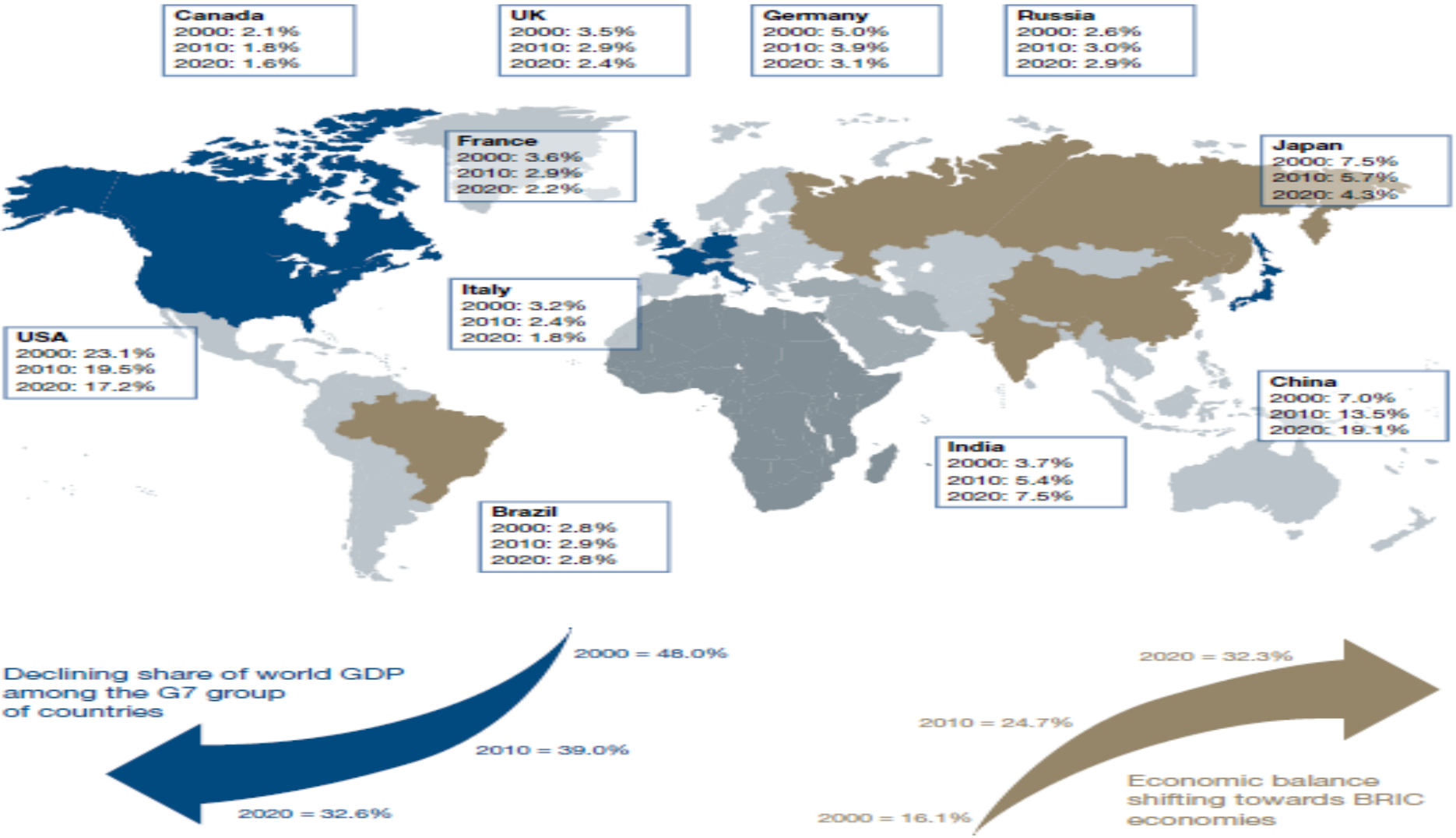
- Positive developments:
  - Global population & income growth = + meat demand
  - U.S. maintains a comp. position in grain-fed beef globally

Oxford Economics, Mar. 2011

(https://s3.amazonaws.com/halopublications/128872/open20110301120000.pdf?AWSAccessKeyId=AKIAJEH775QE2PUYLYDA&Expires=1416840692&Signature=9FCzCaZeRzRlSLltJ7bichk5TCk%3d)

Figure 2: Emerging markets take a bigger slice of the world pie

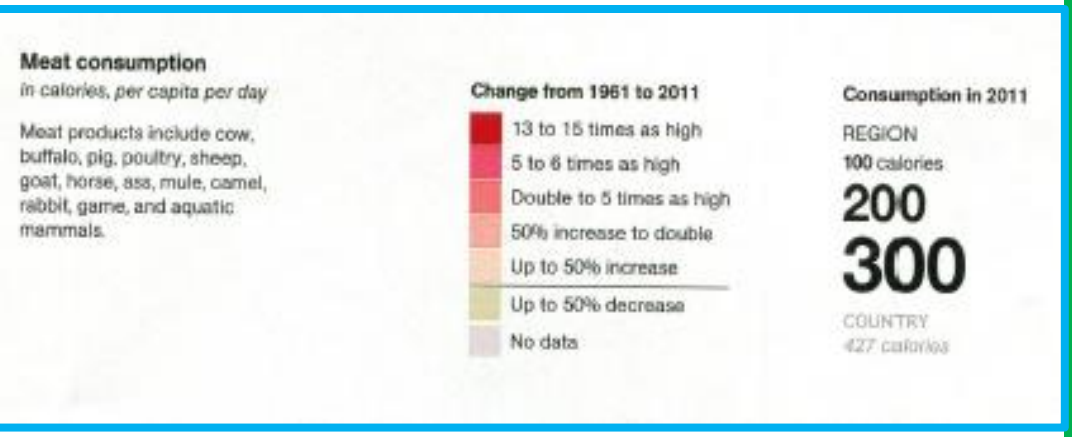
Figures represent % of world GDP.

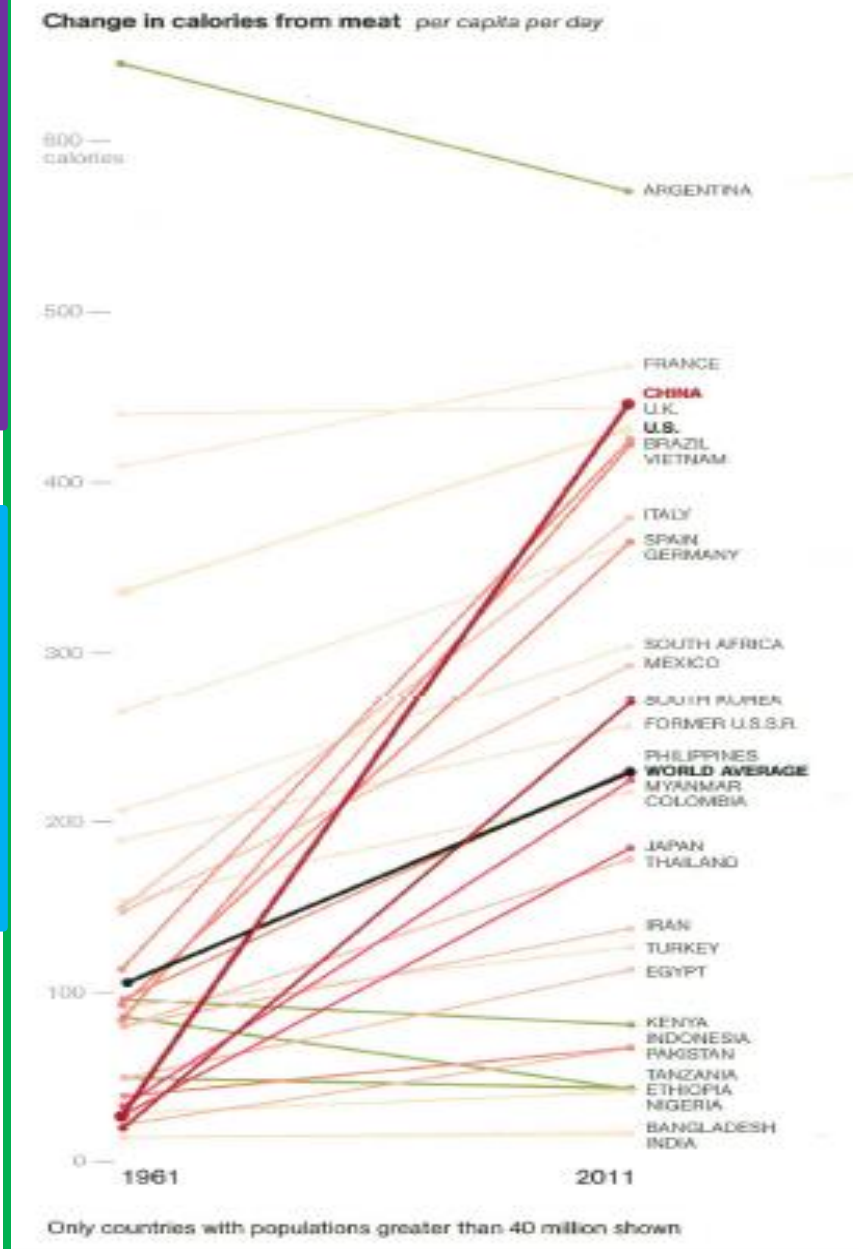


National Geographic, Nov. 2014

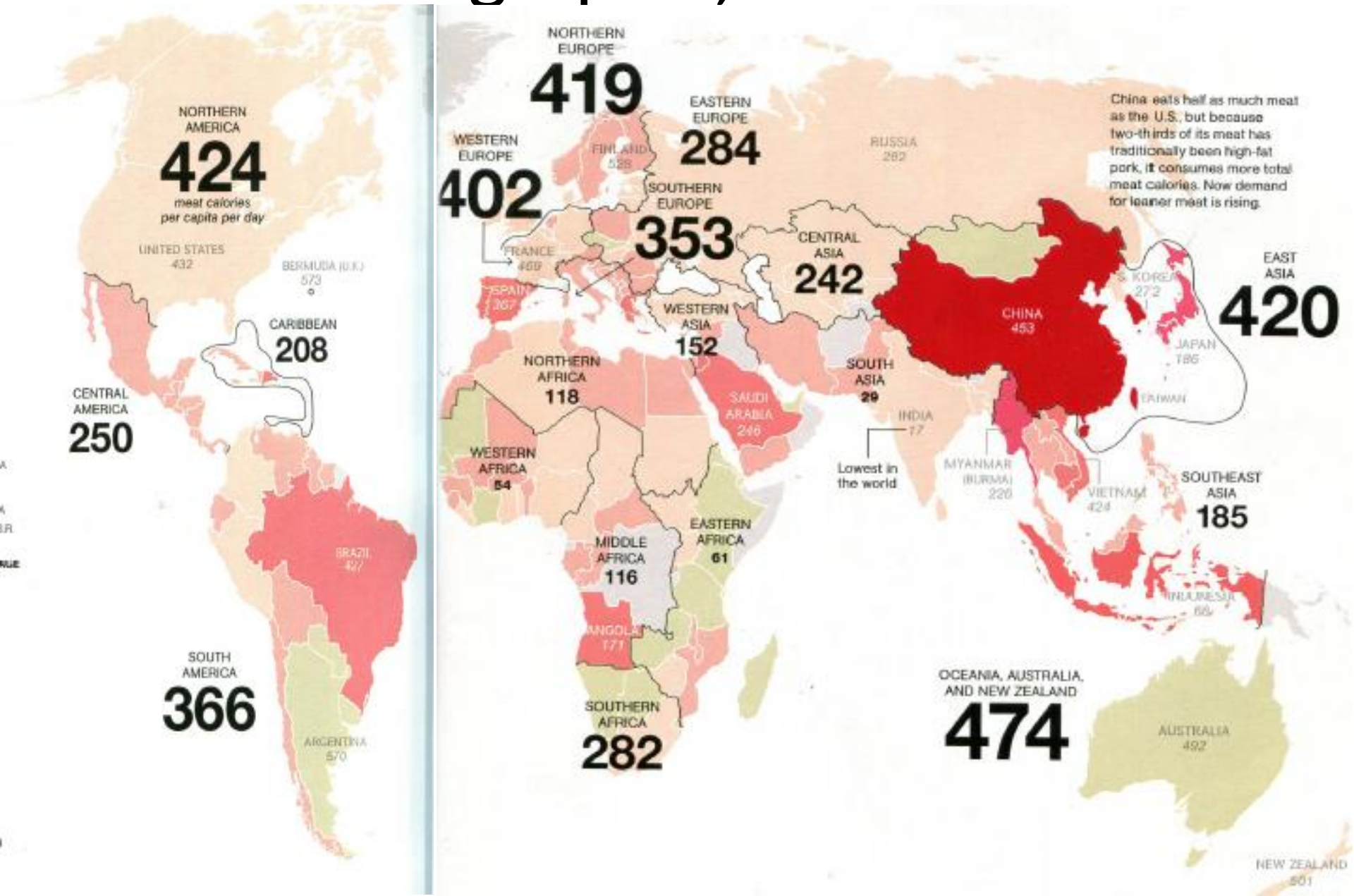
Rising Demand for Meat

Appetite for meat is growing as the developing world becomes more prosperous. But meat—especially beef—can be polarizing, on health, environmental, and ethical grounds. Chicken outpaced beef in the U.S. in 2010. Total U.S. meat consumption peaked in the mid-2000s and has declined ever since. Argentina's famous appetite for beef has fallen because of cholesterol consciousness and economic downturns. In countries where meat is a newly affordable option, animal protein is a boon, not a debate. But by 2050, when the world's population is expected to surpass nine billion, crop production will need to double to provide feed for livestock as well as direct human consumption.





National Geographic, Nov. 2014



Take-Home Summary Points

- Opportunity or Threat? “Same risks” are often viewed differently across people
- Some risks are quantifiable, many are not
- Everyone must appreciate:
  - Risks are two-sided
  - Your comparative advantage in selecting risks to accept

More information available at:

This presentation will be available in PDF format at:
http://www.agmanager.info/about/contributors/individual/tonsor.asp

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