



## Holton Livestock Exchange, Inc. Special LMA-VACC Sale Analysis



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### Background/general information

- **Collected data from ten LMA-VACC sales (F99/S00, F00/S01, F01/S02, F02/S03, F03/S04)**
- **Collected data from regular auction sale the same week of each LMA-VACC sale (exception Jan '04)**
- **Data collection procedures were consistent between LMA-VACC and regular auction each year, however, they varied slightly over time**

## Background/general information – Sale dates

	<u>Regular Sale</u>	<u>Special Sale</u>
Fall99	11/02/99	11/04/99
Spr00	2/01/00	2/03/00
Fall00	10/24/00	10/26/00
Spr01	1/09/01	1/11/01
Fall01	10/16/01	10/18/01
Spr02	1/08/02	1/10/02
Fall02	10/15/02	10/17/02
Spr03	1/07/03	1/09/03
Fall03	10/21/03	10/23/03
Spr04	1/13/04*	1/08/04

\* Changed date due to low volume related to BSE announcement

## Background/general information

- Information collected on each lot . . .

Order in sale	Quality*
Number in lot	Condition
Price	Frame size*
Weight	Health*
Sex	Muscle*
Breed/color*	Uniformity
Level*	Horns

\* Variables that varied over time (definition and availability)

## Comparing the raw data Fall 2003 . . .

### Fall 2003 Data -- SUMMARY STATISTICS

Variable	Mean			Minimum		Maximum	
	Regular Auction	Special Calf Sale	Difference	Regular Auction	Special Calf Sale	Regular Auction	Special Calf Sale
Number in sale*	197	203	6				
Price	\$94.89	\$98.07	\$3.17	\$63.50	\$70.00	\$126.00	\$120.00
Futures price**	\$104.50	\$102.13	(\$2.37)	\$104.50	\$102.13	\$104.50	\$102.13
Weight	549.2	551.7	2.4	305.0	300.0	980.0	870.0
Number in lot	2.78	6.40	3.62	1.00	1.00	17.00	78.00
Condition	2.68	2.66	-0.02	1.50	2.00	4.00	3.50
Frame	3.39	3.54	0.16	2.50	2.00	5.00	5.00
Uniform	1.20	1.32	0.12	1.00	1.00	3.00	3.00
Muscle	2.21	2.46	0.25	1.00	1.00	3.00	4.00
Horns, %	4.6%	0.0%	-4.6%				
Bad health, %	2.0%	3.9%	1.9%				
Steer, %	51.8%	54.7%	2.9%				
Heifer, %	48.2%	45.3%	-2.9%				
Black, %	50.3%	35.5%	-14.8%				
Red/RWF, %	4.6%	2.0%	-2.6%				
Continental, %	23.9%	49.3%	25.4%				
Mixed, %	15.7%	7.9%	-7.9%				
Other, %	5.6%	5.4%	-0.2%				

\* Five observations have been eliminated from the analysis (3 from regular sale and 2 from special calf sale).

\*\* Feeder cattle futures price is for the day preceding the regular sale and the day of the special calf sale.

Data sorted by sale date

## Comparing the raw data Spring 2004 . . .

### Spring 2004 Data -- SUMMARY STATISTICS

Variable	Mean			Minimum		Maximum	
	Regular Auction	Special Calf Sale	Difference	Regular Auction	Special Calf Sale	Regular Auction	Special Calf Sale
Number in sale	106	51	-55				
Price	\$91.05	\$93.42	\$2.37	\$66.00	\$79.00	\$122.00	\$119.75
Futures price*	\$86.59	\$84.72	(\$1.87)	\$86.59	\$84.72	\$86.59	\$84.72
Weight	614.9	599.7	-15.2	275.0	345.0	1035.0	944.0
Number in lot	4.92	5.14	0.22	1.00	1.00	25.00	17.00
Condition	2.89	2.80	-0.09	2.00	2.00	4.00	3.50
Frame	3.36	3.76	0.41	1.00	3.00	5.00	5.00
Uniform	1.19	1.33	0.14	1.00	1.00	2.00	3.00
Muscle	2.30	2.76	0.46	1.00	2.00	3.00	4.00
Horns, %	13.2%	0.0%	-13.2%				
Health, %	7.5%	13.7%	6.2%				
Steer, %	48.1%	58.8%	10.7%				
Heifer, %	51.9%	41.2%	-10.7%				
Black, %	58.5%	56.9%	-1.6%				
Hereford, %	0.9%	5.9%	4.9%				
Continental, %	23.6%	11.8%	-11.8%				
Mixed, %	16.0%	23.5%	7.5%				
Other, %	0.9%	2.0%	1.0%				

\* Feeder cattle futures price for the Regular Auction is the average of the close from the preceding day and the close the day of the sale. Futures price for the Special Calf Sale is the closing price from the day of the sale.

Data sorted by sale date

## Comparing the raw data Spring 2004 . . .

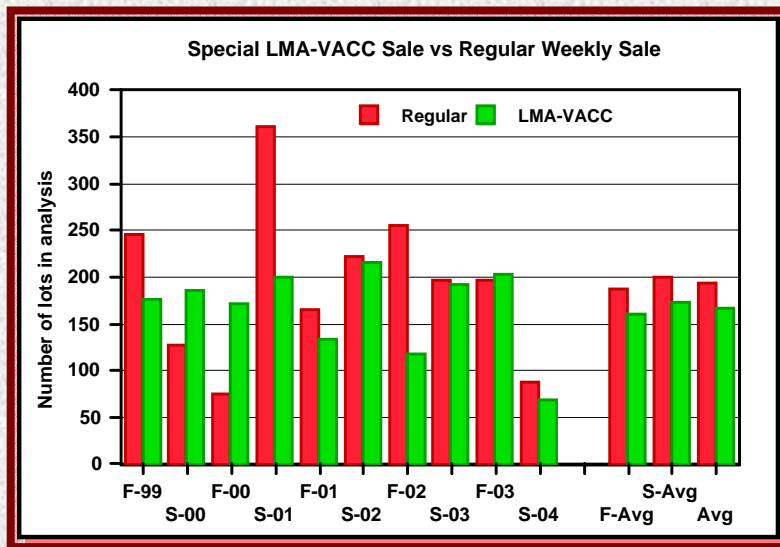
Spring 2004 Data -- SUMMARY STATISTICS

Variable	Mean			Minimum		Maximum	
	Regular Auction	Special Calf Sale	Difference	Regular Auction	Special Calf Sale	Regular Auction	Special Calf Sale
Number in sale	88	69	-19				
Price	\$91.19	\$92.63	\$1.44	\$66.00	\$75.50	\$122.00	\$119.75
Futures price*	\$86.59	\$85.21	(\$1.38)	\$86.59	\$84.72	\$86.59	\$86.59
Weight	616.2	601.9	-14.4	319.0	275.0	1035.0	990.0
Number in lot	5.20	4.71	-0.49	1.00	1.00	25.00	17.00
Condition	2.77	2.99	0.22	2.00	2.00	4.00	4.00
Frame	3.66	3.28	-0.38	2.00	1.00	5.00	5.00
Uniform	1.22	1.26	0.04	1.00	1.00	2.00	3.00
Muscle	2.41	2.51	0.10	1.00	1.00	3.00	4.00
Horns, %	15.9%	0.0%	-15.9%				
Health, %	9.1%	10.1%	1.1%				
Steer, %	47.7%	56.5%	8.8%				
Heifer, %	52.3%	43.5%	-8.8%				
Black, %	53.4%	63.8%	10.4%				
Hereford, %	1.1%	4.3%	3.2%				
Continental, %	25.0%	13.0%	-12.0%				
Mixed, %	19.3%	17.4%	-1.9%				
Other, %	1.1%	1.4%	0.3%				

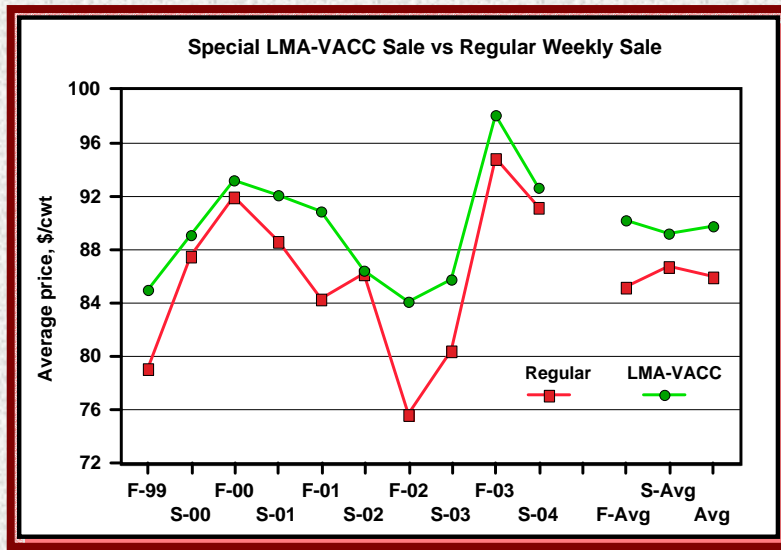
\* Feeder cattle futures price for the Regular Auction is the average of the close from the preceding day and the close the day of the sale. Futures price for the Special Calf Sale is the closing price from the day of the sale.

Data sorted by LMA tag – analysis based on these data

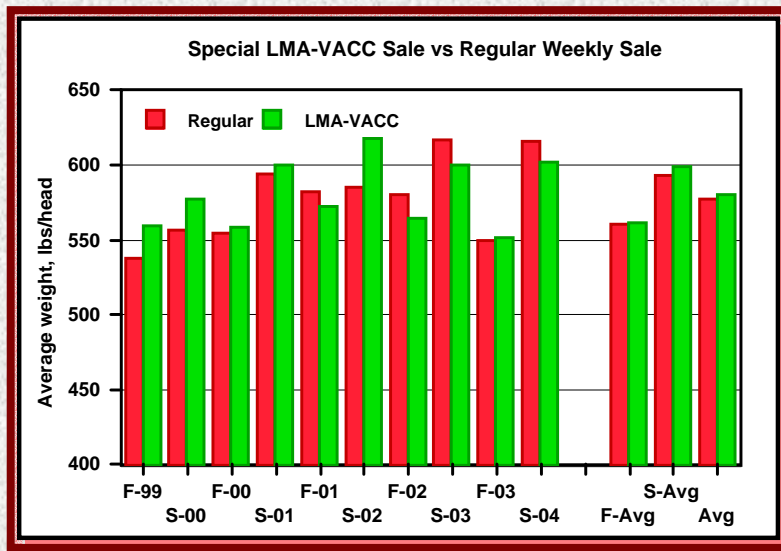
## Comparing the raw data – sale lots analyzed . . .



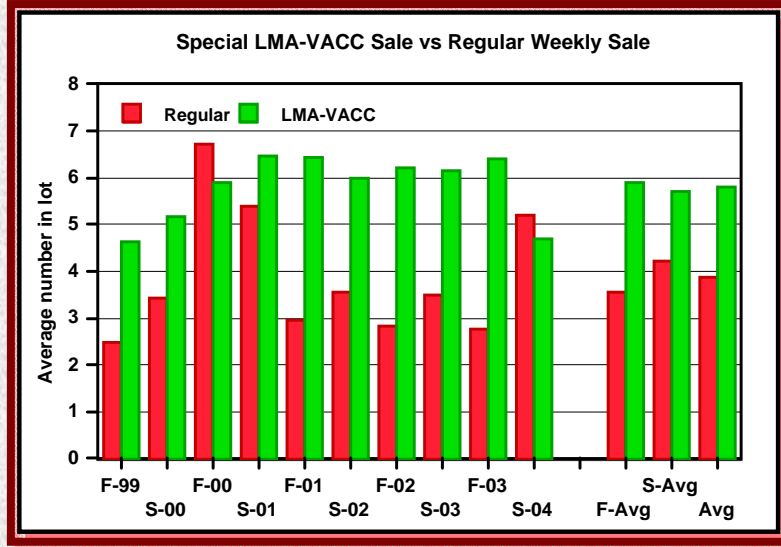
### Comparing the raw data – average prices . . .



### Comparing the raw data – average weights . . .



## Comparing the raw data – average lot sizes . . .



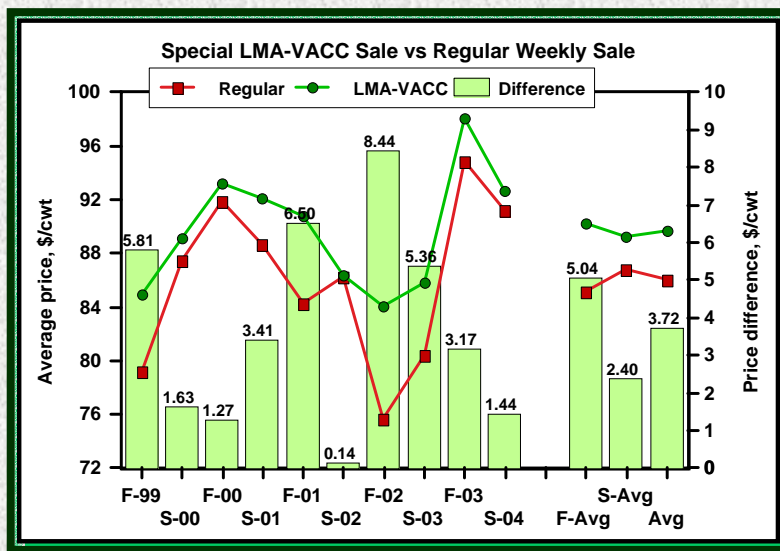
## Comparing the raw data . . .

Sale	F-99	S-00	F-00	S-01	F-01	S-02	F-02	S-03	F-03	S-04	F-Avg	S-Avg	Avg
<b>Percent steers</b>													
Regular	52.4%	52.3%	46.7%	53.6%	58.2%	59.9%	56.9%	58.9%	51.8%	47.7%	53.2%	54.5%	53.8%
LMA-VACC	58.2%	48.9%	53.8%	58.5%	52.6%	55.1%	53.8%	54.7%	54.7%	56.5%	54.6%	54.7%	54.7%
Difference	-5.8%	3.4%	-7.1%	-4.9%	5.6%	4.8%	3.0%	4.2%	-2.9%	-8.8%	-1.4%	-0.3%	-0.8%
<b>Percent Black/BWF</b>													
Regular	49.6%	46.1%	46.7%	47.5%	55.8%	57.2%	49.4%	52.3%	50.3%	53.4%	50.3%	51.3%	50.8%
LMA-VACC	50.8%	51.1%	28.1%	48.0%	21.8%	58.3%	25.6%	72.4%	35.5%	63.8%	32.4%	58.7%	45.5%
Difference	-1.3%	-5.0%	18.6%	-0.5%	34.0%	-1.1%	23.8%	-20.1%	14.8%	-10.4%	18.0%	-7.4%	5.3%
<b>Percent Continental</b>													
Regular	17.5%	20.3%	1.3%	29.0%	13.3%	24.3%	19.6%	20.8%	23.9%	25.0%	15.1%	23.9%	19.5%
LMA-VACC	23.2%	5.9%	16.4%	8.5%	60.2%	26.9%	57.3%	18.8%	49.3%	13.0%	41.2%	14.6%	27.9%
Difference	-5.7%	14.4%	-15.0%	20.5%	-46.8%	-2.5%	-37.7%	2.1%	-25.4%	12.0%	-26.1%	9.3%	-8.4%
<b>Percent Red/RWF</b>													
Regular	3.7%	6.3%	13.3%	8.0%	7.3%	7.2%	5.5%	7.1%	4.6%	1.1%	6.9%	5.9%	6.4%
LMA-VACC	7.3%	22.6%	5.3%	18.5%	9.0%	1.9%	0.9%	2.6%	2.0%	4.3%	4.9%	10.0%	7.4%
Difference	-3.7%	-16.3%	8.1%	-10.5%	-1.7%	5.4%	4.6%	4.5%	2.6%	-3.2%	2.0%	-4.0%	-1.0%
<b>Percent Mixed</b>													
Regular	28.9%	27.3%	37.3%	9.4%	7.3%	5.9%	14.5%	12.7%	15.7%	19.3%	20.7%	14.9%	17.8%
LMA-VACC	18.1%	20.4%	43.9%	19.0%	8.3%	7.9%	13.7%	3.1%	7.9%	17.4%	18.4%	13.6%	16.0%
Difference	10.8%	6.9%	-6.5%	-9.6%	-1.0%	-2.0%	0.8%	9.6%	7.9%	1.9%	2.4%	1.4%	1.9%

## Analyzing the data . . .

- Data were analyzed separately for each sale period (i.e., fall99, spr00, fall00, spr01, ...)
- Between 5 and 10% of observations were deleted from each sale period (typically from regular sale)
- Premiums associated with Special LMA-VACC sale were estimated with regression analysis

## Why not simply look at average prices?



## Regression analysis . . .

- “Isolates” the impact of an individual trait while accounting for all other traits
- Results are additive across traits
- Has been extensively used in hedonic pricing studies (e.g., feeder cattle, cows, bulls, horses, wheat, land)

## Regression results for Spring 2004 . . .

Model: MODEL1				
Dependent Variable: PRICE				
Root MSE	6.56167	R-Square	0.5885	
Dependent Mean	96.505	Adj R-Sq	0.5691	
Coeff Var	6.79931			
Variable	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	114.59	11.8721	9.65	<.0001
Sale	2.3090	0.7490	3.08	0.0022
Lot	0.0229	0.0063	3.63	0.0003
Head	0.6351	0.1060	5.99	<.0001
Head^2	-0.0080	0.0019	-4.23	<.0001
Heifer	-6.8193	0.6876	-9.92	<.0001
Weight	-0.1909	0.0244	-7.81	<.0001
Weight^2	0.0001	0.0000	5.84	<.0001
Uniform	8.6451	5.3418	1.62	0.1064
Uniform^2	-2.5777	1.6467	-1.57	0.1183
Condition	2.0151	1.0548	1.91	0.0568
Frame	18.8040	6.6307	2.84	0.0048
Frame^2	-2.6214	0.8867	-2.96	0.0033
Muscle	1.8529	0.8588	2.16	0.0316
HealthB	-12.9452	1.9822	-6.53	<.0001
Red/RWF	-4.9583	1.9018	-2.61	0.0095
Continental	-3.3487	0.8406	-3.98	<.0001
Mixed	-1.9012	1.1120	-1.71	0.0881
Other	-13.9649	1.5568	-8.97	<.0001

\$2.31	Sale effect
\$2.37	Futures price change adj.
\$4.68	Special sale premium, \$/cwt.

\$25.81	dollars/head at mean weight
39.5	optimal lot size

## Regression results for Spring 2004 . . .

Model: MODEL1				
Dependent Variable: PRICE				
Root MSE	5.8898	R-Square	0.7472	
Dependent Mean	91.8188	Adj R-Sq	0.7142	
Coeff Var	6.4145			
Variable	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	12.38	133.87	0.09	0.9264
Sale/LMA	2.4256	2.5663	0.95	0.3462
Lot number	0.0012	0.0253	0.05	0.9621
Head	0.9689	0.3221	3.01	0.0031
Head^2	-0.0384	0.0174	-2.21	0.0291
Heifer	-6.2095	1.0266	-6.05	<.0001
Weight	-0.1687	0.0249	-6.77	<.0001
Weight^2	0.0001	0.0000	4	0.0001
Uniform	0.8540	1.2124	0.7	0.4824
Condition	1.8850	1.3432	1.4	0.1628
Frame	11.9511	4.6855	2.55	0.0118
Frame^2	-1.4601	0.6081	-2.4	0.0177
Muscle	-0.1224	1.3669	-0.09	0.9288
HealthB	-0.9802	1.8389	-0.53	0.5949
Hereford	-5.8650	3.1535	-1.86	0.065
Other	-14.0734	4.3379	-3.24	0.0015
Cont	-2.5364	1.4302	-1.77	0.0784
Mixed	-0.7639	1.3873	-0.55	0.5828
Futures	1.4423	1.5295	0.94	0.3473

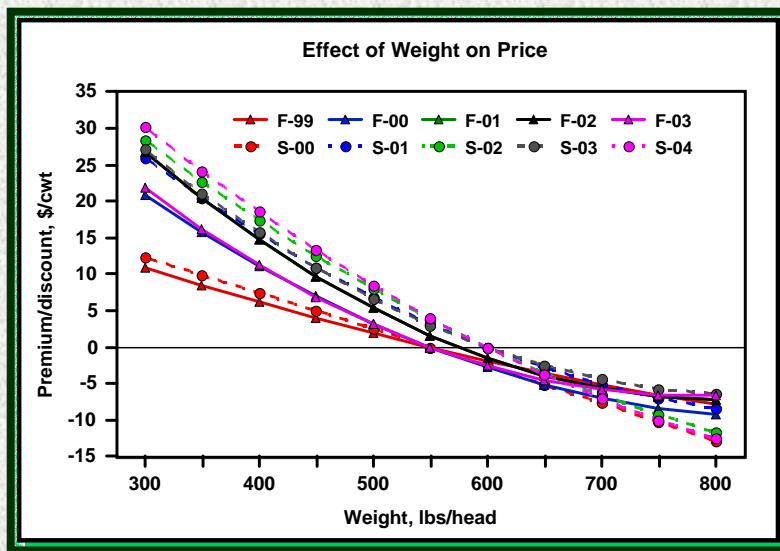
  

\$2.43	Sale effect
\$0.00	Futures price change adj
\$2.43	Special sale premium, \$/cwt.

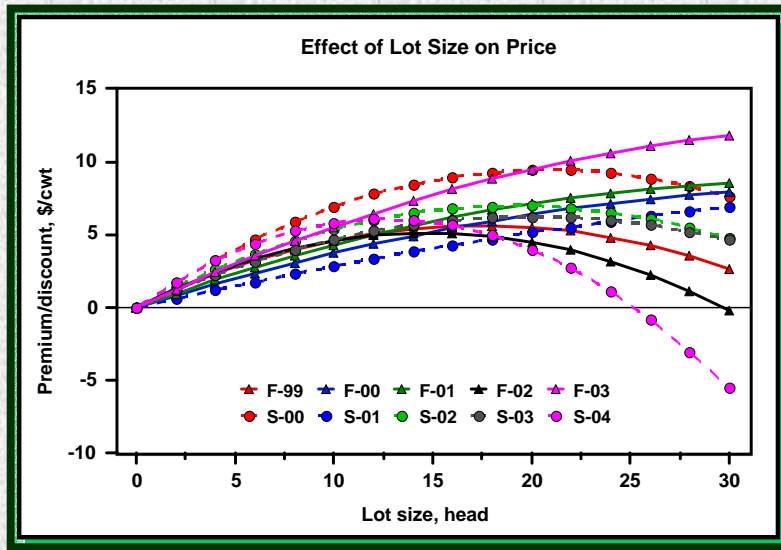
  

\$14.55	dollars/head at mean weight
12.6	optimal lot size

## Regression results – impact of weight . . .



## Regression results – impact of lot size . . .

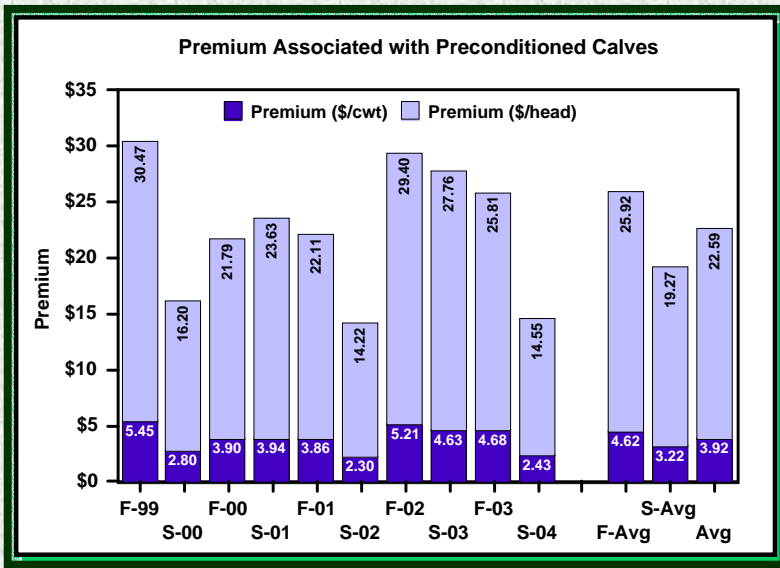


## Regression results . . .

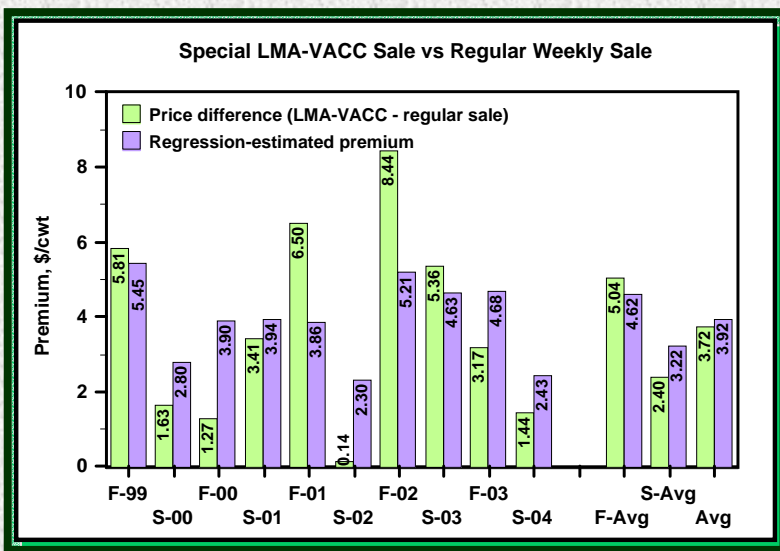
Sale	Fall99	Spr00	Fall00	Spr01	Fall01	Spr02	Fall02	Spr03	Fall03	Spr04
Heifer	(\$6.48)	(\$6.79)	(\$5.50)	(\$6.47)	(\$7.57)	(\$8.93)	(\$6.60)	(\$6.13)	(\$6.82)	(\$6.21)
Default	Blk	Blk/BWF	Blk	Blk	Blk	Blk	Blk/BWF	Blk/BWF	Blk/BWF	Blk/BWF
BWF	\$1.25	xxx	(\$0.23)	(\$1.48)	\$0.55	\$0.06	xxx	xxx	xxx	xxx
Continental	(\$1.71)	(\$5.03)	(\$5.53)	(\$1.47)	(\$3.38)	(\$3.03)	(\$1.33)	(\$2.58)	(\$3.35)	(\$2.54)
Hereford	(\$4.55)	(\$3.12)	(\$6.17)	(\$7.25)	(\$3.73)	(\$7.93)	(\$6.59)	(\$1.41)	(\$4.96)	(\$5.86)
RWF	xxx	xxx	(\$2.46)	(\$3.85)	(\$3.73)	(\$7.93)	(\$6.59)	(\$1.41)	(\$4.96)	(\$5.86)
Mix	(\$0.12)	(\$2.65)	(\$2.09)	(\$1.96)	\$0.50	(\$1.92)	(\$0.35)	(\$1.36)	(\$1.90)	(\$0.76)
Other	(\$17.92)	xxx	(\$17.55)	(\$17.17)	(\$14.86)	(\$16.74)	(\$13.11)	xxx	(\$13.96)	(\$14.07)

Variables that are not statistically different from zero at the 95% confidence level.

### Regression results – sale effect . . .



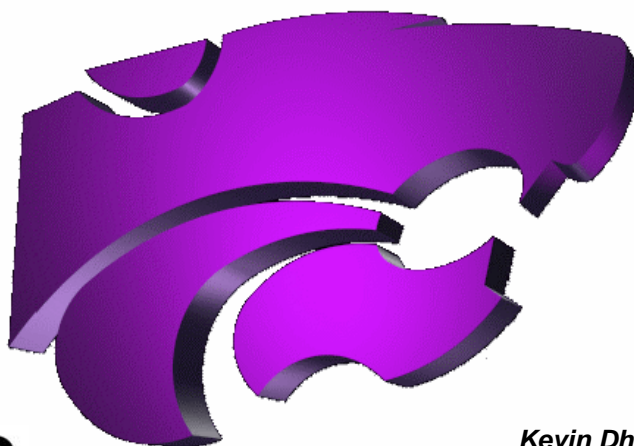
### Regression results – sale effect . . .



## Summary of results . . .

- When analyzing preconditioning premiums, cattle characteristics and marketing effects need to be accounted for (requires additional data)
- Premiums from ten Special LMA-VACC sales have been \$20-\$25 per head (\$3.50 - \$4.50 per cwt) which is consistent with previous research
  - » King -- \$3.33/cwt
  - » Avent, Ward, and Lalman -- \$1.96 - \$3.36/cwt
- Producers need to examine their costs versus expected premiums to determine the profitability of preconditioning calves

## Questions ???



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