



Determining Pasture Rents in the Flint Hills of Kansas

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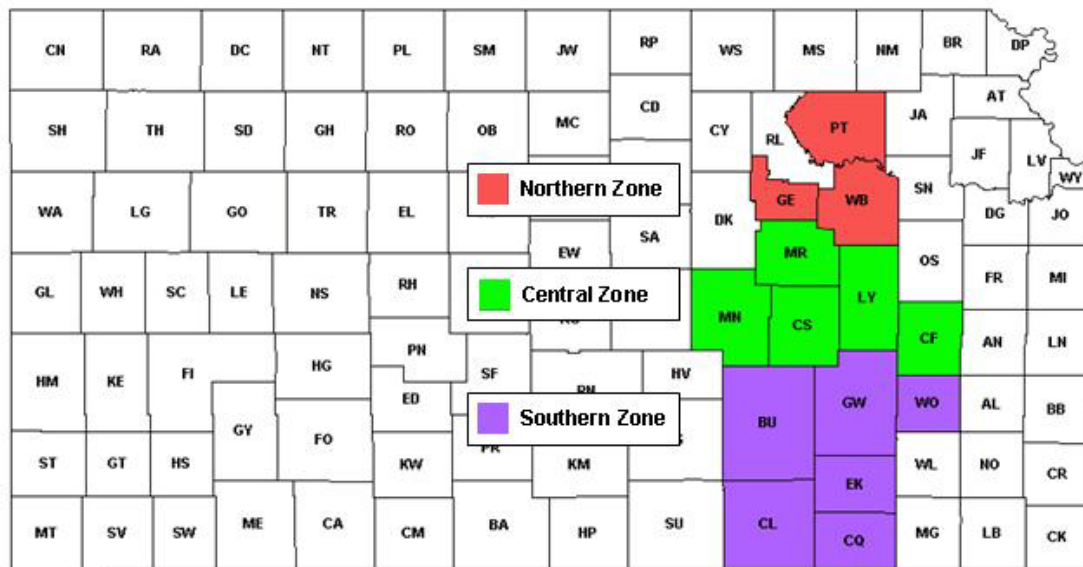
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Determining Pasture Rents in the Flint Hills of Kansas and Beyond

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Livestock grazing is a major use of agricultural land in Kansas, second only to crop production. Thus, it stands to reason that people with interests in pasture (e.g., current landowners, livestock producers, potential investors, land managers) will seek information regarding rental rates for pasture in Kansas. The annual *Bluestem Pasture Release* published by the Kansas Department of Agriculture Statistics Division (Kansas Ag Statistics, or KAS for short) in cooperation with the United States Department of Agriculture’s (USDA) National Agricultural Statistics Service (NASS) has been an important resource for many cattle producers and landowners in the state of Kansas as they negotiate pasture rents. The *Bluestem Pasture Release* represents a survey of pasture rents for different livestock classes (e.g., feeder cattle of different weights, cow/calf pairs) and different grazing intensities (e.g., early intensive and season long) in the 14-county area of the Flint Hills region as depicted in figure 1.¹ While the survey only covers this 14-county area, which varies considerably from other regions of the state, the information contained in the report can be useful statewide for helping to determine pasture rental rates by using the surveyed rates and then making adjustments based on local stocking rates and pasture quality (Dumler; Dumler and Dhuyvetter). In other words, the information contained in this report has been useful not only to those located in the Flint Hills region of Kansas, but also to guide pasture rental rates across the state and even beyond.

Figure 1. Kansas Bluestem Pasture – 14 County Area



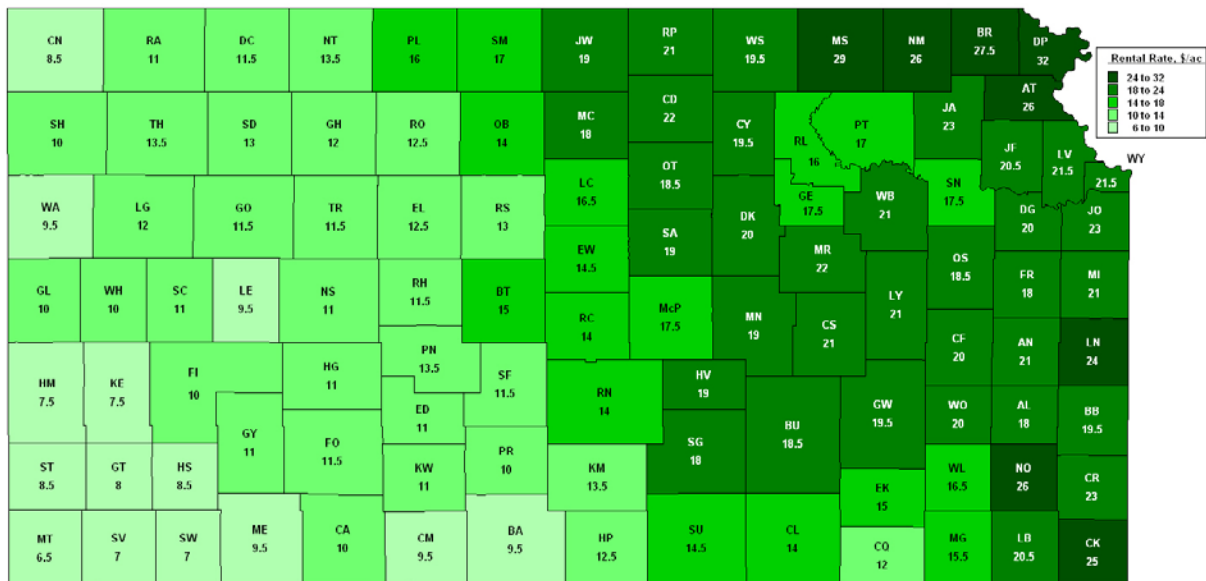
Historically, the *Bluestem Pasture Release* was published in late April of each year and included average rental rates for the upcoming year. For example, the 2009 report was released

¹ Specific details of the report and additional information can be found in historical reports available on the KAS website (http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Economics_and_Misc/Bluestem/index.asp).

April 24, 2009 and contained surveyed rental rates for the 2009 grazing season. However, due to budget reductions at KAS, the annual survey to collect data for this report was not conducted in 2010 and without additional funding this survey likely will be permanently discontinued, at least as historically done by KAS. Thus, producers and landowners will need to look to alternative sources of information as they negotiate pasture lease rates in the future.

One alternative source of information is the average pasture rents reported by Kansas Agricultural Statistics in their *Agricultural Land Values & Cash Rents* report. From 1972 through 2008, KAS reported average crop and pasture land cash rental rates for each of the nine Crop Reporting Districts in Kansas.² Beginning in 2009 KAS began surveying and reporting cash rents for crop and pasture land at the county level. For example, figure 2 shows the average cash rent for pasture in 2010 for each county in Kansas (for a more detailed discussion of county-level land values and rents see Dhuyvetter and Kastens). However, there are several shortcomings of this information. First, it is reported after the leases are already in place (e.g., the 2010 values were reported in September 2010). Second, the only value reported is the average rent per acre for each county, which masks the tremendous variability that often exists and precludes one from examining how rent for stockers varies from cows or how early intensive grazing program vary from season long programs. The *Bluestem Pasture Release* did report ranges, but more importantly, it reported average rent per head for the grazing season (per cow-calf pair in the case of cows), which is a better measure of rent than dollars per acre. This is because stocking rates (head per acre) will vary considerably based on pasture quality, rainfall, etc., but the total cost per head will often be similar across land of varying quality. Thus, by definition, the rent per acre will also vary considerably as pasture quality varies (i.e., a relatively constant \$/head value divided by a variable head/acre value leads to a variable \$/acre rate).

Figure 2. Kansas 2010 Pasture Rents*



* Cash rent values as reported by USDA NASS and Kansas Agricultural Statistics (KAS).

² There were several years that district-level data were not reported due to budget reductions (e.g., 1986-1989 and 1994-1995), however, statewide averages were still reported in those years.

The Land Use Value Project of the Agricultural Economics Department at Kansas State University in cooperation with KAS conducts a survey of landowners and producers regarding pasture leases on a four-year rotation.³ This survey reports information on average, minimum, and maximum per acre rental rates at the Crop Reporting District (CRD) level as well as information pertaining to fence type, maintenance costs, and party responsible for costs (Schlegel and Tsoodle). The two obvious shortcomings of this survey for establishing rental rates are that the data are only updated every fourth year and the averages represent an aggregate value for a relatively large geographical area. Furthermore, as was the case with the county-level values, the rates reported are dollars per acre, which are not particularly useful unless stocking rate information is also known. Finally, a number of County Extension Agents conduct surveys in their counties and thus they would have very localized data that could be very useful. However, this survey is not done consistently across all counties in Kansas and may not be conducted each year. Thus, for many people seeking information on rental rates this is likely not a viable source of information.⁴

Another method of determining rental rates is to use the historical data from the *Bluestem Pasture Release* to develop models that can be used for projecting future values. This approach allows us to capitalize on the detailed information (i.e., rents quoted per head for both season-long and short-season stocker cattle as well as rents for both spring- and fall-calving cow-calf pairs) available in the historical *Bluestem Pasture Release* reports while also accounting for changing market conditions. This paper is intended to help cattle producers and landowners as they negotiate pasture rents by providing historical data from the *Bluestem Pasture Release* and equations that can be used to forecast future rental rates. Specifically, this paper provides historical data (1978-2009) and equations for forecasting pasture rents in the Flint Hills region of Kansas for two weight categories (<500 lbs and 500-699 lbs) of steers and heifers (full- and short-season grazing periods) and cow/calf pairs (full season, spring-, and fall-calving). Full-season rents reflect approximately a six-month grazing period from mid April through mid October (approximately 180 days). Short-season rents reflect the time period from mid April through mid to late July (90-100 days). Forecasted rents are based on the historical relationship between cash rents and time, feeder cattle prices, and corn prices.

Pasture Rents Over Time

Average rental rates, from 1978-2009, for full-season grazing for stocker cattle (500-699 lbs), short-season grazing season for stocker cattle (500-699 lbs), and full-season grazing for cow-calf pairs (spring calving), respectively, are shown in figures 3a, 3b, and 3c show.⁵ In addition to the historical average rents, each figure shows a trend line depicting the linear relationship between rents and time. As expected, all three figures show an upward sloping trend, indicating that rents tend to increase over time. Even though rents do tend to increase over time, it should be pointed out that there have been several year-to-year decreases in rents over this time period. It also can be seen that

³ There are four surveys conducted: irrigated leases, non-irrigated leases, pasture leases, and input costs. Thus, each survey is conducted every fourth year.

⁴ Readers are encouraged to check with the local County Extension Office though because when these data are available, they are often some of the best information pertaining to rental rates for a particular county.

⁵ KAS did not conduct surveys in several years during this time period (1987, 1988, and 2005) due to budgetary constraints. Data for these years were “filled in” by extrapolating rents based on previous and following years. Similarly, short-season rents were not reported prior to 1993; thus, rents for 1978-1992 were estimated based on full season rents during this time period along with relationship between full- and short-season rents from 1993-2009.

rents decreased quite significantly from 1985 to 1986 and then began increasing from that time forward again. It is not certain if this was entirely due to the farm crisis occurring at that time or if it was also potentially due to a change in the survey. Regardless, this “one-time” shock is accounted for in the models discussed below.

Figure 3a. Full-Season Stocker Cattle

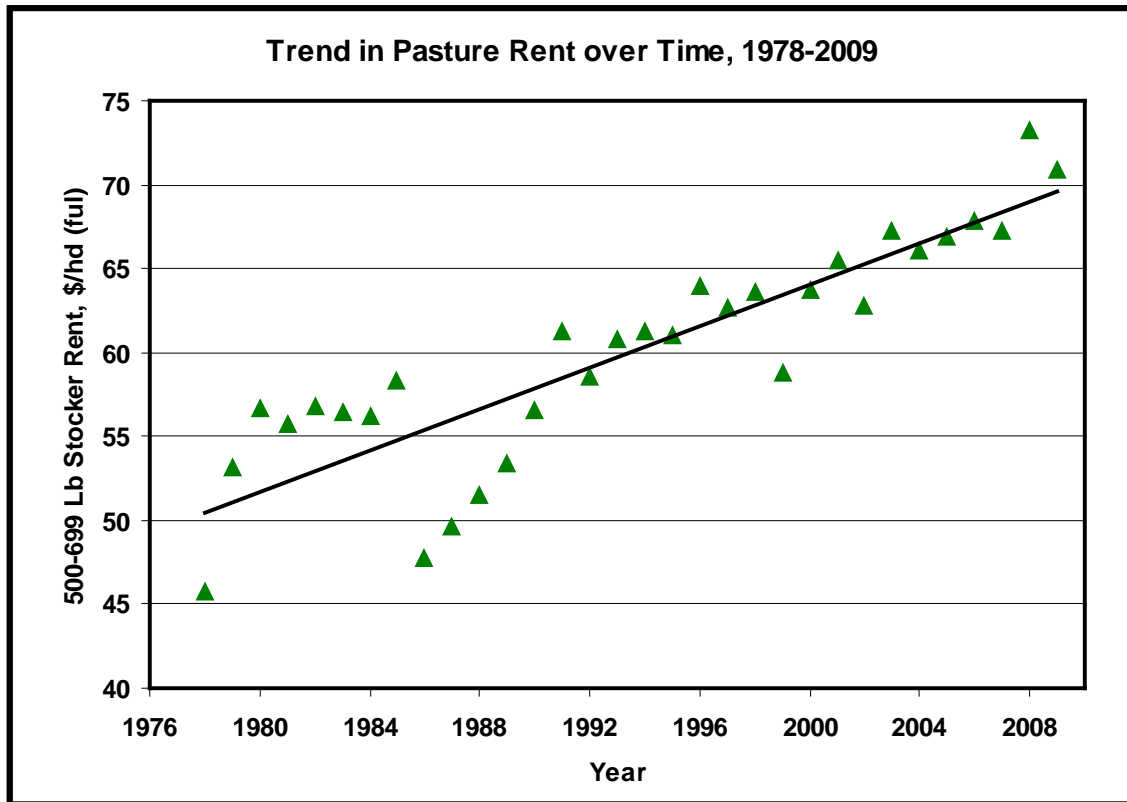


Figure 3b. Short-Season Stocker Cattle

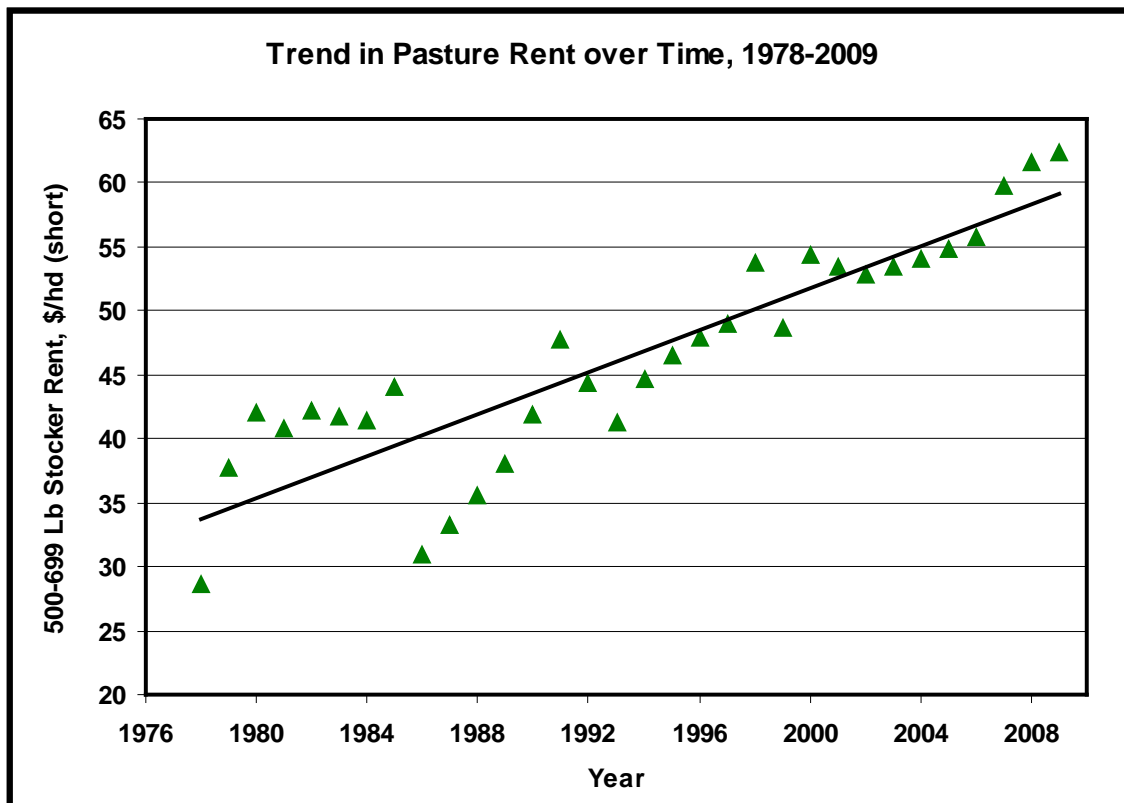
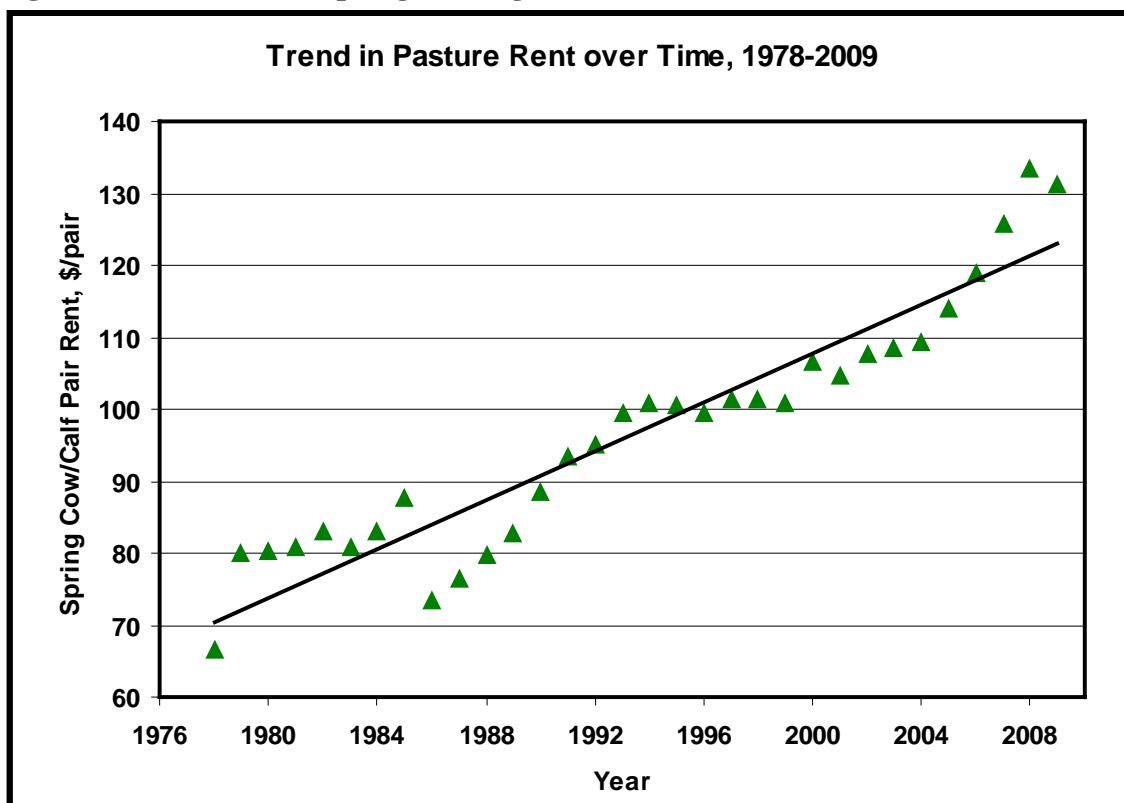


Figure 3c. Full-Season Spring Calving Cow-calf Pair



Pasture Rents versus Feeder Cattle Price

Average rental rates from 1978 to 2009 for full-season stocker cattle (500-699 lbs), short-season stocker cattle (500-699 lbs), and cow-calf pairs (spring calving) are plotted against feeder cattle futures prices (\$/cwt) in figures 4a, 4b, and 4c, respectively, where pasture rent is on the y-axis (vertical) and feeder cattle futures price is on the x-axis (horizontal). Feeder cattle prices are considered as they represent what calves may be worth when they come off grass. The feeder cattle futures price is the average of the April and October contracts during the month of March. An average of the April and October contracts is used as this reflects an estimate of what the average price of feeder cattle will be over the summer grazing period. The March time horizon is used as this reflects a time period when lease rates for the upcoming year might be negotiated. In addition to the historical average rents, each figure depicts the linear relationship between rents and feeder cattle prices. Although the relationship is not as strong as the time trends shown in the earlier figures, there is a positive relationship between feeder cattle prices and pasture rental rates. That is, as cattle prices increase, pasture rents tend to increase as well.

Figure 4a. Full-Season Stocker Cattle

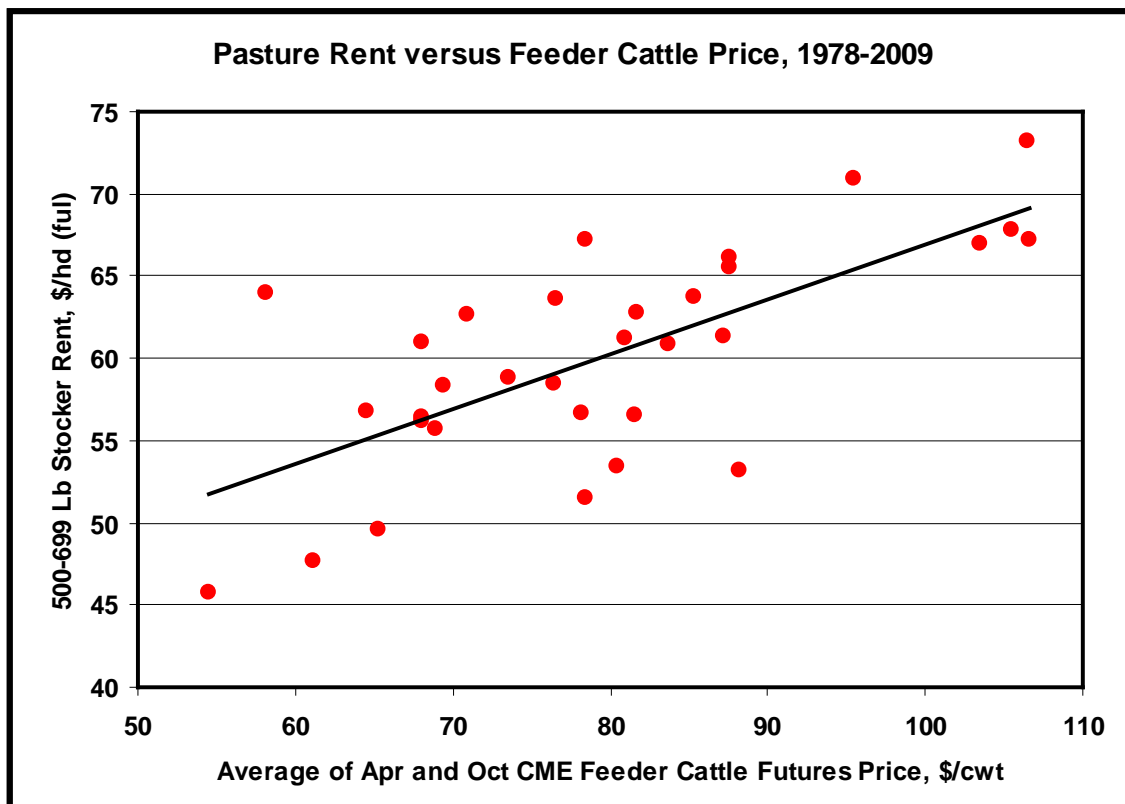


Figure 4b. Short-Season Stocker Cattle

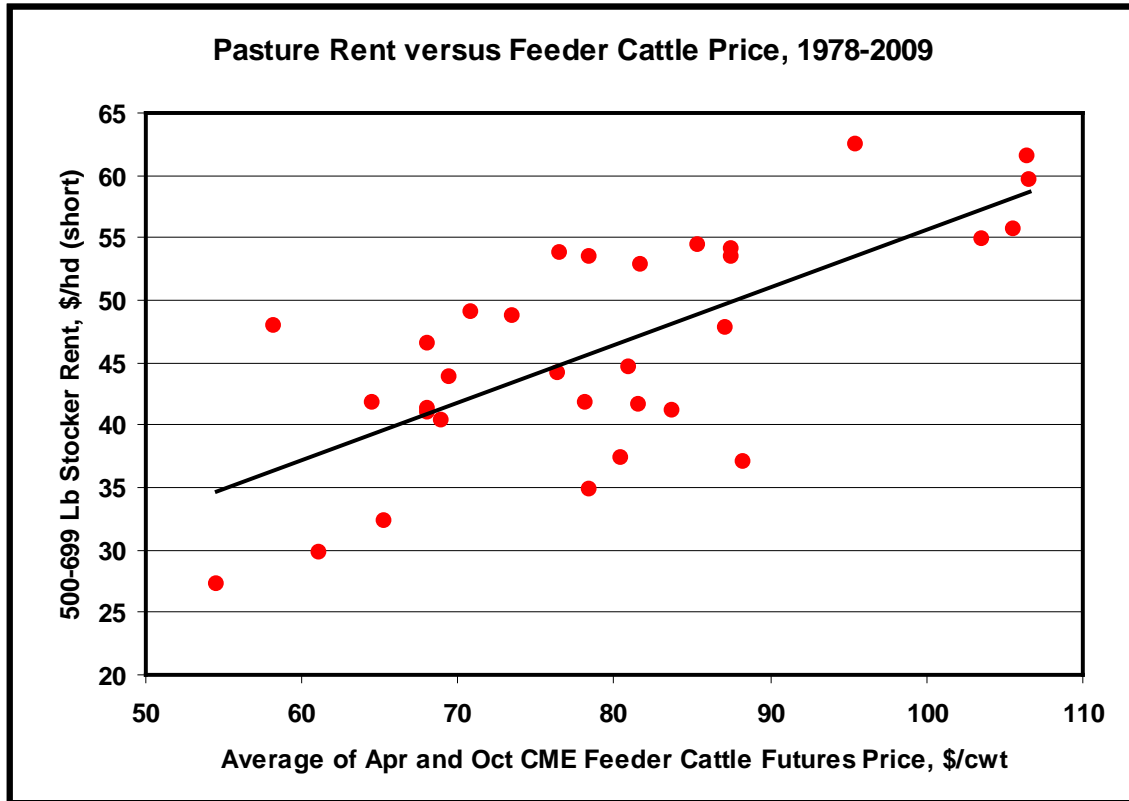
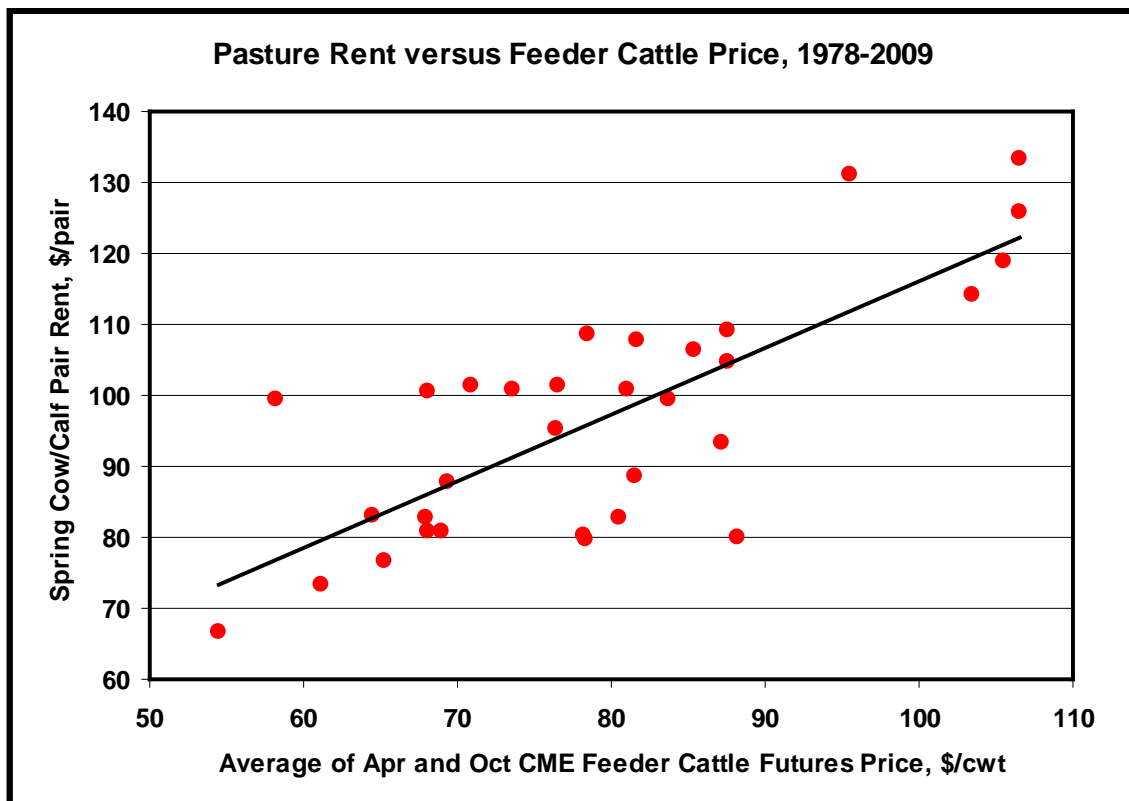


Figure 4c. Full-Season Spring Calving Cow-calf Pair



Pasture Rents versus Corn Price

Figures 5a, 5b, and 5c show average rental rates versus corn futures prices from 1978-2009 for full-season stocker cattle (500-699 lbs), short-season stocker cattle (500-699 lbs), and cow-calf pairs (spring calving), respectively. Pasture rent is plotted on the y-axes (vertical) and the corn futures price (\$/bu) is on the x-axes (horizontal). Corn price is considered as a proxy for feed costs, which is a substitute for pasture (i.e., cattle could be fed grains rather than grazed and vice versa). The corn futures price is the average of the May and December contracts during the month of March. An average of the May and December contracts is used as this reflects an estimate of what the average price of corn will be over the summer grazing period. The March time horizon is used as this reflects a time period when lease rates for the upcoming year might be negotiated. In addition to the historical average rents, each figure depicts the linear relationship between rents and corn prices. Although the statistical relationship between corn prices and pasture rents is not as strong as either time (year) or feeder cattle prices, there does appear to be a positive relationship between corn prices and pasture rental rates. It is anticipated that if the volatility of corn prices experienced the last couple of years continues into the future, the strength of the relationship between pasture rental rates and corn price will increase. In other words, to the extent that there has been a structural change in the corn market (i.e., the significant increase in the use of corn for ethanol), and hence the relative roles of corn and forage weight gain in the cattle industry, the historical relationship between pasture rental rates and corn price may not hold in the future.

Figure 5a. Full-Season Stocker Cattle

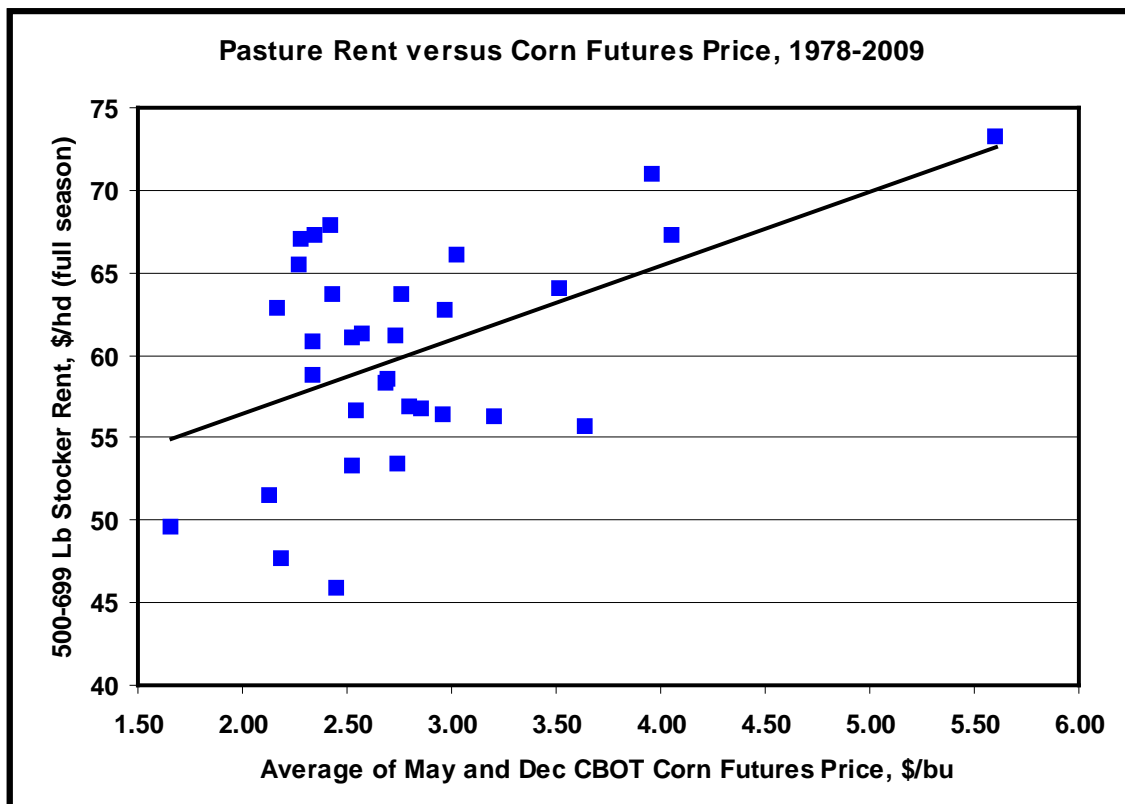


Figure 5b. Short Season Stocker Cattle

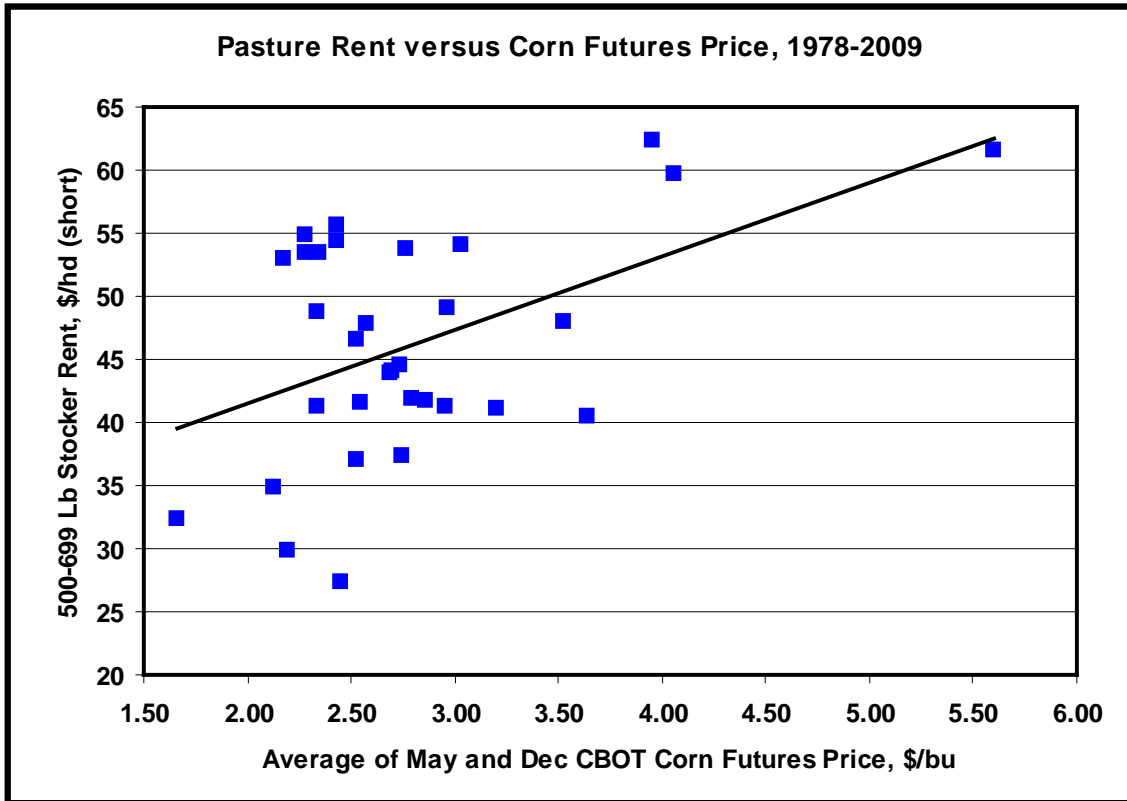
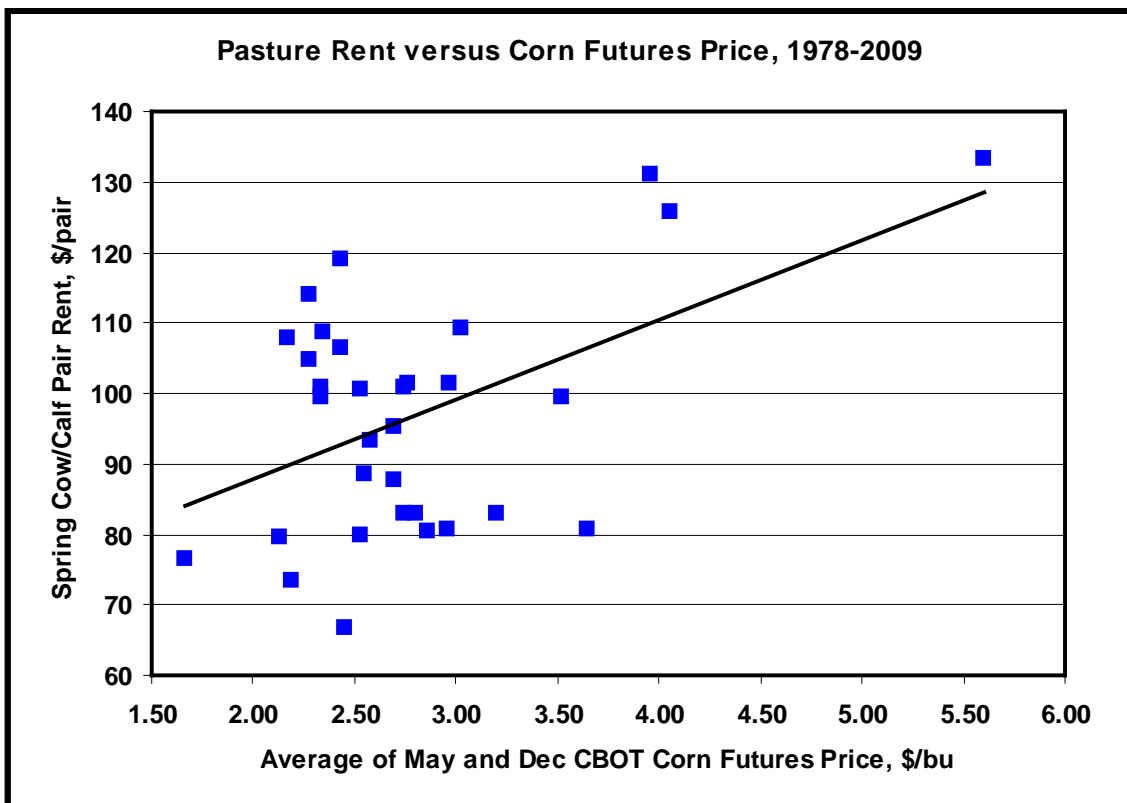


Figure 5c. Full Season Spring Calving Cow-calf Pair



Forecasting Pasture Rents

Based on the previous figures it appears that pasture rental rates can be considered as a function of time, feeder cattle prices, and corn prices, but also allowing for a shift starting in 1986. Although the figures' trend lines depicted relationships involving only one variable at a time, it is important to account for all three of these factors simultaneously. That is, when thinking about how rents might change over time, it also is important to account for feeder cattle and corn prices. Accordingly, the following equation was statistically estimated using multiple regression:

$$[1] \quad \text{Cash rent}_t = A_0 + A_1(\text{Year}_t) + A_2(\text{FCFP}_t) + A_3(\text{CNFP}_t) + A_4(\text{Pre1986}_t),$$

where Cash rent_t is the survey-reported cash rent (\$/head or \$/pair) in year t , FCFP_t refers to the feeder cattle futures price (\$/cwt) in year t (average of April and October contracts during the month of March), CNFP_t refers to the corn futures price (\$/bu) in year t (average of May and December contracts during the month of March), Pre1986_t is a binary variable equal to 1 for years prior to 1986 and equal to 0 otherwise, and A_0 through A_4 are parameters to be estimated. Given the trend lines depicted in the previous figures, it is expected that the values for A_1 , A_2 , and A_3 will be positive. As mentioned previously, the binary variable is included to account for the one-time decrease in rents that occurred from 1985 to 1986 (see figures 3a-3c) and thus the A_4 coefficient is also expected to be positive.⁶

The data used to estimate equation [1] for the different classes of cattle are reported in Tables A1-A4 in the Appendix. Tables A1-A3 report the historical pasture rents per head (stocker cattle) and per pair (cow/calf) and guaranteed acres and a calculated rent per acre for full-season stocker cattle, short-season stocker cattle, and cow-calf pairs, respectively. In the case of stockers, rents are reported for two weight classes: 1) steers and heifers weighing less than 500 pounds and 2) steers and heifers weighing 500-699 pounds. In the case of cow/calf pairs, rents are reported separately for spring- and fall-calving herds. Table A4 reports the March monthly average feeder cattle futures prices (April and October contracts and their average) by year and the March monthly average corn futures prices (May and December contracts and their average). The 2010 prices are also reported in this table, but they were not used in model estimation as there were not rental values reported in that year. However, these values can be “plugged in” to the appropriate equations to get an model-estimated price for 2010.

Table 1 reports the results of estimating equation [1] for the different classes of cattle (two different weights of stocker cattle with full- and short-season grazing season and spring- and fall-calving cow/calf pairs). As expected, the coefficients on *Year*, *FCFP*, and *CNP* are all positive. Likewise, the binary variable included to account for the mid 1980's shock in rental rates (*Pre1986*) is positive in all cases, indicating that rents prior to 1986 were higher than subsequent years *all else equal*. Put another way, the coefficients on this variable, which range across models from 3.08 to 8.57, reflect how much higher rents would be today had we not seen the “correction” from 1985 to 1986. With several exceptions, most parameter estimates were statistically significantly different from 0, and the models explained much of the variation in pasture rental rates (i.e., R-square values ranged from 0.86 to 0.97). The variable that was the least important significantly was feeder cattle futures prices. For most classes of livestock, this value was generally not statistically significant

⁶ Squared terms for both feeder cattle and corn futures prices were also analyzed to determine if price impacts were nonlinear, however, in almost all cases they were not statistically significant and thus have been excluded from the final models reported.

indicating that feeder cattle prices are not particularly important in explaining pasture rents after accounting for time trends, corn prices, and structural shifts in the mid 1980's.

Table 1. Regression Results for Pastoral Rental Rate Model (Equation [1])

Variable*	Stocker Cattle (\$/head)				Cow/calf (\$/pair)	
	Full Season		Short Season		Spring	Fall
	< 500 lbs	500-699 lbs	< 500 lbs	500-699 lbs	calves	calves
Intercept (A0)	-1671.31 (0.000)	-1393.79 (0.000)	-1291.01 (0.000)	-2109.21 (0.000)	-3244.15 (0.000)	-2667.74 (0.000)
Year (A1)	0.8644 (0.000)	0.7254 (0.000)	0.6664 (0.000)	1.0766 (0.000)	1.6631 (0.000)	1.3827 (0.000)
FCFP (A2)	0.0173 (0.746)	0.0351 (0.454)	0.0270 (0.394)	0.0476 (0.391)	0.1682 (0.008)	0.0669 (0.469)
CNFP (A3)	0.0320 (0.969)	1.3288 (0.077)	1.9937 (0.000)	1.1435 (0.191)	3.7812 (0.000)	3.3066 (0.028)
Pre1986 (A4)	5.2879 (0.014)	5.0116 (0.008)	3.7060 (0.004)	8.5753 (0.000)	6.2522 (0.010)	3.0851 (0.381)
R-square**	0.8649	0.8763	0.9386	0.9071	0.9691	0.8992

* Values in parenthesis below the estimated coefficients are p-values associated with hypothesis test that coefficient is significantly different from zero. A value of 0.10 would imply we are 90% confident that value is significantly different from zero (0.05 implies 95% confidence, and so on).

* R-square represents the proportion of variability in the dependent variable (pasture cash rent) that is explained by variation in the independent variables (i.e., year, feeder cattle price, and corn price).

By replacing A_0 through A_4 with the corresponding coefficient values from Table 1 in Equation [1] and then plugging in appropriate values for *Year*, *FCFP*, *CNP*, and *Pre1986*⁷ an estimate of cash rental rate can be calculated. For example, assume it is currently the fall of 2010 and you wish to forecast pasture rental rates for cow-calf pairs (spring calves) in 2011. Furthermore, you would like to examine how this forecast compares with what the model would have predicted in 2010 as this allows you to look at year-to-year changes in addition to the absolute value. This will require forecasting prices for both 2010 and 2011 based on information available at the time when making your forecast:

⁷ Because of the way *Pre1986* was defined, i.e., equal to 1 for years prior to 1986 and equal to 0 for years after 1985, this variable can be ignored in forecasting prices for current years because the coefficient in Table 1 would simply be multiplied by 0.

	<u>2010⁸</u>	<u>2011⁹</u>
Apr feeder cattle futures price	\$106.38	\$113.50
Oct feeder cattle futures price	\$108.26	\$115.50
Average feeder cattle futures price	\$107.32	\$114.50
May corn futures price	\$3.69	\$5.96
Dec corn futures price	\$3.98	\$5.40
Average corn futures price	\$3.83	\$5.68

Plugging the 2010 values into Equation [1] with the corresponding coefficients for cow-calf pairs (spring calves) gives:

$$\$131.24/\text{pair} = -3244.15 + 1.6631(2010) + 0.1682(\$107.32) + 3.7812(\$3.83) + 6.2522(0).$$

Plugging the higher feeder cattle and corn prices projected for 2011 into Equation [1] gives the following:

$$\$141.09/\text{pair} = -3244.15 + 1.6631(2011) + 0.1682(\$114.50) + 3.7812(\$5.68) + 6.2522(0).$$

Thus, given the higher feeder cattle and corn prices (as well as the natural increasing trend over time), we might expect pasture rents to increase approximately \$10/pair in 2011 compared to 2010.

Similarly, if you wanted an estimate of 2011 rental rates for full-season 500-699 pound stockers, plugging in the appropriate coefficients from Table 1 gives:

$$\$76.54/\text{head} = -1393.79 + 0.7254(2011) + 0.0351(\$114.50) + 1.3288(\$5.68) + 5.0116(0).$$

The coefficients in Table 1 used for projecting rental rates, have been incorporated into an Excel spreadsheet (*KSU-Graze.xls*) and a web dashboard (online calculator – *PastureRent.swf*) that allow users to plug in the required values (i.e., year of interest, feeder cattle and corn futures prices) and the resulting rental rates are calculated. These tools are available at www.AgManager.info website (direct link is www.agmanager.info/farmmgmt/land/lease/default.asp#Decision-Making Tools).

Absolute Values versus Percent Changes

The 2011 predicted values of \$141.09 (spring calving cow/calf pairs) and \$76.54 (full-season stocker weighing 500-699 lbs) reflect average rental rates for the Bluestem Region. However, there always is considerable variability around averages. For example, although the average cow/calf rental rate was \$131.10 per pair in 2009, this value might easily have ranged +/- \$30 across different pasture rent situations, which depend on numerous factors (e.g., size of pasture, location, water availability, fence condition, etc.). Thus, a prediction for 2011 of \$141.09 might not mean much to somebody currently paying \$110 or \$160 per pair due to situation-specific factors. In cases such as

⁸ Prices for 2010 reflect averages for the respective contracts during the month of March as reported in Table A4.

⁹ Prices for 2011 reflect the closing futures prices on 10/27/10 as a projection of what these futures prices will be in March. On 10/27/10 there was not a quote for the October 2011 feeder cattle futures contract and thus the \$115.50 is actually for the September 2011 contract.

these, it is more appropriate to calculate a percent change in model-predicted rents from one year to the next and then apply that value to the current rent. Table 2 reports the model-estimated rents for the last five years (2006-2010) for each of the different livestock classes.

Model-estimated values in Table 2 for 2006 through 2009 can be compared against actual reported values to examine if the model projections seem reasonable. For example, the model-predicted rent for spring calving cow/calf pairs in 2009 was \$128.05 (slightly below the actual reported value of \$131.10 – Table A3). For full-season 500-699 pound stockers it was \$72.14 (slightly above the actual value of \$70.90 – Table A1). The model-predicted values for 2011 of \$141.09 and \$76.54 represent increases from 2010 predicted values of 7.5% and 4.7% for cow/calf pairs and stockers, respectively. Thus, a cow/calf producer that actually paid \$110 per pair in 2010 might expect to pay about \$118 ($\110×1.075) in 2011. Likewise, a cow/calf producer that paid \$160 per pair in 2010 might expect to pay about \$172 ($\160×1.075) in 2011. Similarly, a stocker operator that might have paid \$70 per head in 2010 might expect to pay \$73.28 ($\70×1.045) in 2011. Thus, even though actual rent for a particular situation might deviate considerably from what is reported in the *Bluestem Pasture Release*, the prediction models reported here still can be useful in helping landowners and producers negotiate future rental rates.

Table 2. Model-Predicted Pasture Rental Rates by Cattle Class*

Year	Stocker Cattle (\$/head)				Cow/calf (\$/pair)	
	Full Season		Short Season		Spring	Fall
	< 500 lbs	500-699 lbs	< 500 lbs	500-699 lbs	calves	calves
2006	\$64.67	\$68.28	\$53.42	\$58.28	\$118.97	\$120.97
% change	n/a	n/a	n/a	n/a	n/a	n/a
2007	\$65.60	\$71.21	\$57.36	\$61.27	\$126.97	\$127.81
% change	1.4%	4.3%	7.4%	5.1%	6.7%	5.7%
2008	\$66.51	\$73.98	\$61.09	\$64.11	\$134.45	\$134.28
% change	1.4%	3.9%	6.5%	4.6%	5.9%	5.1%
2009	\$67.14	\$72.14	\$58.19	\$62.78	\$128.05	\$129.51
% change	0.9%	-2.5%	-4.7%	-2.1%	-4.8%	-3.6%
2010	\$68.20	\$73.11	\$58.93	\$64.28	\$131.24	\$131.27
% change	1.6%	1.4%	1.3%	2.4%	2.5%	1.4%
2011	\$69.25	\$76.54	\$63.47	\$67.81	\$141.09	\$139.24
% change	1.5%	4.7%	7.7%	5.5%	7.5%	6.1%

* Predicted rates are calculated using Equation [1] with coefficient values reported in Table 1 and average feeder cattle and corn futures prices reported in Table A4 (years 2006-2010; for 2011 average futures prices for feeder cattle and corn were based on 10/27/2010 closes and were \$114.50/cwt (feeder cattle) and \$5.68/bu (corn)).

Summary

The *Bluestem Pasture Release* published by Kansas Agricultural Statistics has provided some of the most useful information for Kansas cattle producers and landowners as they negotiate pasture rents each year. However, due to budget reductions, the survey used to collect this valuable information was discontinued in 2010. Given that information pertaining to pasture rental rates is still needed by many people alternative sources of information or methods of determining rates need to be identified. While other pasture rent information does exist, because it typically is not as detailed as the historical *Bluestem Pasture Release* information was, we believe a viable approach to estimating rental rates that can serve as a starting point in individual negotiations between landowners and tenants are models estimated from historical data. This paper provides a brief overview of historical pasture rental rates for various livestock classes and models that can be used to predict future rental rates. Using multiple regression, prediction models were developed for the different classes of cattle where pasture rental rates are a function of year (time trend), feeder cattle prices, and corn prices. These models provide producers and landowners with an alternative method of determining pasture rents that is tied to observed rates in the past.

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Appendix – Data used in estimating regression models (Equation [1]).**Table A1. Bluestem Pasture Lease Rates and Acreage Guarantees -- Full Summer Season**

Year*	Steers and Heifers -- Under 500 lbs			Steers and Heifers -- 500 - 699 lbs		
	\$/head	acres	\$/acre	\$/head	acres	\$/acre
1978	\$39.60	3.7	\$10.70	\$45.80	4.4	\$10.41
1979	\$46.10	3.8	\$12.13	\$53.20	4.5	\$11.82
1980	\$48.30	3.8	\$12.71	\$56.70	4.6	\$12.33
1981	\$49.10	4.0	\$12.28	\$55.70	4.5	\$12.38
1982	\$51.20	3.9	\$13.13	\$56.80	4.4	\$12.91
1983	\$49.20	3.7	\$13.30	\$56.40	4.4	\$12.82
1984	\$50.30	3.8	\$13.24	\$56.20	4.4	\$12.77
1985	\$51.60	3.9	\$13.23	\$58.30	4.5	\$12.96
1986	\$42.90	3.9	\$11.00	\$47.70	4.4	\$10.84
1987	\$44.40	3.9	\$11.38	\$49.60	4.4	\$11.36
1988	\$45.90	3.9	\$11.77	\$51.50	4.3	\$11.88
1989	\$47.40	3.9	\$12.15	\$53.40	4.3	\$12.42
1990	\$51.50	3.8	\$13.55	\$56.60	4.3	\$13.16
1991	\$54.20	3.8	\$14.26	\$61.30	4.2	\$14.60
1992	\$54.70	3.9	\$14.03	\$58.50	4.2	\$13.93
1993	\$54.80	3.8	\$14.42	\$60.80	4.1	\$14.83
1994	\$57.80	3.9	\$14.82	\$61.20	4.1	\$14.93
1995	\$57.60	3.9	\$14.77	\$61.00	4.5	\$13.56
1996	\$58.40	3.7	\$15.78	\$64.00	4.2	\$15.24
1997	\$55.40	3.5	\$15.83	\$62.70	3.9	\$16.08
1998	\$59.20	3.8	\$15.58	\$63.60	3.9	\$16.31
1999	\$56.00	3.7	\$15.14	\$58.80	3.9	\$15.08
2000	\$60.40	3.6	\$16.78	\$63.70	3.9	\$16.33
2001	\$59.00	3.8	\$15.53	\$65.50	4.0	\$16.38
2002	\$62.50	3.8	\$16.45	\$62.80	4.1	\$15.32
2003	\$62.30	3.8	\$16.39	\$67.20	3.9	\$17.23
2004	\$58.50	3.8	\$15.39	\$66.10	4.1	\$16.12
2005	\$63.35	3.9	\$16.24	\$66.95	4.2	\$16.13
2006	\$68.20	4.0	\$17.05	\$67.80	4.2	\$16.14
2007	\$59.20	3.7	\$16.00	\$67.20	4.4	\$15.27
2008	\$67.60	3.6	\$18.78	\$73.20	3.8	\$19.26
2009	\$65.10	4.3	\$15.14	\$70.90	3.9	\$18.18

* Surveys were not conducted in 1987, 1988, and 2005. Values for these years were interpolated from surrounding years.

Table A2. Bluestem Pasture Lease Rates and Acreage Guarantees -- Short Season

Year*	Steers and Heifers -- Under 500 lbs			Steers and Heifers -- 500 - 699 lbs		
	\$/head	acres	\$/acre	\$/head	acres	\$/acre
1978	\$33.86	2.5	\$13.75	\$27.27	2.5	\$10.79
1979	\$39.09	2.5	\$15.65	\$37.08	2.5	\$14.91
1980	\$40.86	2.5	\$16.36	\$41.72	2.4	\$17.05
1981	\$41.50	2.6	\$16.17	\$40.40	2.5	\$16.25
1982	\$43.19	2.5	\$17.05	\$41.86	2.5	\$16.57
1983	\$41.58	2.5	\$16.88	\$41.33	2.5	\$16.36
1984	\$42.47	2.5	\$17.00	\$41.06	2.5	\$16.25
1985	\$43.51	2.5	\$17.18	\$43.84	2.5	\$17.63
1986	\$36.52	2.5	\$14.42	\$29.79	2.5	\$11.79
1987	\$37.72	2.5	\$14.90	\$32.31	2.5	\$12.72
1988	\$38.93	2.5	\$15.37	\$34.83	2.6	\$13.64
1989	\$40.14	2.5	\$15.85	\$37.35	2.6	\$14.55
1990	\$43.43	2.5	\$17.39	\$41.59	2.6	\$16.20
1991	\$45.60	2.5	\$18.26	\$47.82	2.6	\$18.35
1992	\$46.00	2.5	\$18.17	\$44.11	2.6	\$16.92
1993	\$43.00	2.4	\$17.92	\$41.20	2.4	\$17.17
1994	\$43.90	2.2	\$19.95	\$44.60	2.4	\$18.58
1995	\$45.60	2.5	\$18.24	\$46.50	2.6	\$17.88
1996	\$47.60	2.5	\$19.04	\$47.90	2.5	\$19.16
1997	\$48.10	2.3	\$20.91	\$49.00	3.0	\$16.33
1998	\$51.50	2.6	\$19.81	\$53.80	2.9	\$18.55
1999	\$47.10	2.4	\$19.63	\$48.70	2.6	\$18.73
2000	\$50.90	2.4	\$21.21	\$54.40	2.7	\$20.15
2001	\$51.40	2.6	\$19.77	\$53.40	2.7	\$19.78
2002	\$50.50	2.9	\$17.41	\$52.90	2.8	\$18.89
2003	\$49.20	2.5	\$19.68	\$53.50	2.6	\$20.58
2004	\$52.60	2.5	\$21.04	\$54.10	2.8	\$19.32
2005	\$51.80	2.8	\$18.84	\$54.90	2.8	\$19.61
2006	\$51.00	3.0	\$17.00	\$55.70	2.8	\$19.89
2007	\$56.60	3.0	\$18.87	\$59.70	2.9	\$20.59
2008	\$61.40	2.8	\$21.93	\$61.60	2.7	\$22.81
2009	\$56.60	2.8	\$20.21	\$62.40	2.7	\$23.11

* Survey was not conducted in 2005, value for this year was interpolated from surrounding years. Short season rents were not reported prior to 1993, thus rents for 1978-1992 were estimated based on full season rents during this time period along with relationship between full- and short-season rents from 1993-2009.

Table A3. Bluestem Pasture Lease Rates and Acreage Guarantees -- Full Summer Season

Year*	Cow/calf pairs -- Spring calves			Cow/calf pairs -- Fall calves		
	\$/head	acres	\$/acre	\$/head	acres	\$/acre
1978	\$66.60	6.6	\$10.09	\$75.20	7.3	\$10.30
1979	\$79.90	6.9	\$11.58	\$87.50	7.6	\$11.51
1980	\$80.30	6.9	\$11.64	\$91.00	7.7	\$11.82
1981	\$80.80	7.0	\$11.54	\$90.20	7.8	\$11.56
1982	\$83.00	6.7	\$12.39	\$93.70	7.2	\$13.01
1983	\$80.70	6.7	\$12.04	\$91.10	7.4	\$12.31
1984	\$82.90	6.7	\$12.37	\$90.00	7.5	\$12.00
1985	\$87.80	7.2	\$12.19	\$96.00	8.0	\$12.00
1986	\$73.40	6.9	\$10.64	\$80.40	7.5	\$10.72
1987	\$76.53	7.0	\$10.99	\$83.80	7.6	\$11.07
1988	\$79.67	7.0	\$11.33	\$87.20	7.6	\$11.42
1989	\$82.80	7.1	\$11.66	\$90.60	7.7	\$11.77
1990	\$88.50	7.3	\$12.12	\$99.10	8.0	\$12.39
1991	\$93.40	7.1	\$13.15	\$104.60	7.8	\$13.41
1992	\$95.20	7.1	\$13.41	\$106.90	8.0	\$13.36
1993	\$99.50	7.1	\$14.01	\$106.90	8.1	\$13.20
1994	\$100.90	7.2	\$14.01	\$110.50	8.1	\$13.64
1995	\$100.60	7.4	\$13.59	\$112.20	8.1	\$13.85
1996	\$99.40	7.1	\$14.00	\$109.80	7.6	\$14.45
1997	\$101.40	6.9	\$14.70	\$113.40	7.6	\$14.92
1998	\$101.40	6.8	\$14.91	\$110.20	7.6	\$14.50
1999	\$100.90	7.0	\$14.41	\$108.10	7.5	\$14.41
2000	\$106.50	7.1	\$15.00	\$115.00	7.6	\$15.13
2001	\$104.70	7.2	\$14.54	\$113.60	7.8	\$14.56
2002	\$107.80	7.4	\$14.57	\$109.50	7.6	\$14.41
2003	\$108.60	7.3	\$14.88	\$115.20	7.5	\$15.36
2004	\$109.20	7.2	\$15.17	\$111.90	7.2	\$15.54
2005	\$114.05	7.6	\$15.11	\$116.25	7.6	\$15.40
2006	\$118.90	7.9	\$15.05	\$120.60	7.9	\$15.27
2007	\$125.80	8.0	\$15.73	\$125.50	8.0	\$15.69
2008	\$133.30	7.6	\$17.54	\$132.10	8.0	\$16.51
2009	\$131.10	7.4	\$17.72	\$127.60	8.3	\$15.37

* Surveys were not conducted in 1987, 1988, and 2005. Values for these years were interpolated from surrounding years.

Table A4. Feeder Cattle and Corn Futures Prices*

Year	Feeder Cattle, \$/cwt			Corn, \$/bu		
	April	October	Average	May	December	Average
1978	\$55.31	\$53.69	\$54.50	\$2.44	\$2.47	\$2.45
1979	\$91.06	\$85.41	\$88.23	\$2.47	\$2.59	\$2.53
1980	\$78.62	\$77.71	\$78.16	\$2.70	\$3.01	\$2.86
1981	\$68.59	\$69.32	\$68.96	\$3.60	\$3.69	\$3.65
1982	\$66.23	\$62.80	\$64.51	\$2.71	\$2.89	\$2.80
1983	\$70.16	\$65.91	\$68.04	\$2.96	\$2.96	\$2.96
1984	\$69.57	\$66.43	\$68.00	\$3.47	\$2.94	\$3.20
1985	\$68.77	\$70.07	\$69.42	\$2.75	\$2.63	\$2.69
1986	\$61.44	\$60.77	\$61.11	\$2.32	\$2.07	\$2.19
1987	\$66.94	\$63.62	\$65.28	\$1.60	\$1.73	\$1.66
1988	\$80.40	\$76.35	\$78.38	\$2.07	\$2.19	\$2.13
1989	\$81.27	\$79.67	\$80.47	\$2.79	\$2.70	\$2.75
1990	\$81.69	\$81.35	\$81.52	\$2.55	\$2.55	\$2.55
1991	\$88.37	\$85.96	\$87.16	\$2.54	\$2.62	\$2.58
1992	\$78.37	\$74.43	\$76.40	\$2.72	\$2.67	\$2.70
1993	\$85.38	\$82.11	\$83.75	\$2.24	\$2.43	\$2.34
1994	\$81.11	\$80.83	\$80.97	\$2.85	\$2.63	\$2.74
1995	\$67.64	\$68.41	\$68.02	\$2.46	\$2.60	\$2.53
1996	\$57.23	\$59.09	\$58.16	\$3.90	\$3.15	\$3.52
1997	\$67.91	\$73.83	\$70.87	\$3.03	\$2.90	\$2.97
1998	\$75.22	\$77.92	\$76.57	\$2.71	\$2.81	\$2.76
1999	\$72.23	\$74.83	\$73.53	\$2.24	\$2.44	\$2.34
2000	\$84.09	\$86.62	\$85.36	\$2.31	\$2.55	\$2.43
2001	\$87.02	\$88.11	\$87.56	\$2.14	\$2.41	\$2.28
2002	\$80.32	\$83.05	\$81.68	\$2.07	\$2.28	\$2.17
2003	\$76.42	\$80.40	\$78.41	\$2.33	\$2.37	\$2.35
2004	\$87.39	\$87.73	\$87.56	\$3.05	\$3.00	\$3.03
2005	\$104.00	\$103.01	\$103.51	\$2.17	\$2.39	\$2.28
2006	\$105.17	\$105.88	\$105.53	\$2.28	\$2.58	\$2.43
2007	\$106.00	\$107.17	\$106.58	\$4.07	\$4.05	\$4.06
2008	\$102.66	\$110.31	\$106.49	\$5.53	\$5.67	\$5.60
2009	\$92.69	\$98.24	\$95.47	\$3.80	\$4.11	\$3.96
2010	\$106.38	\$108.26	\$107.32	\$3.69	\$3.98	\$3.83

* Monthly average prices during the month of March of each year.