2012
Kansas County-Level Land Values and Cash Rents for Non-Irrigated Cropland and Pasture

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The value of Kansas cropland and pasture land has been changing rapidly over the past few years. As a result, many people are interested in current estimates of the value of an average parcel of ground for their individual locations. Currently, the Kansas Agricultural Statistics Service (KAS) reports only state average values for irrigated, non-irrigated, and pasture land. These values are based upon an annual survey of agricultural producers and landowners asking for their estimate of the value of cropland and pasture land they own or operate. Historically, the survey was conducted such that values could be reported at the crop reporting district (CRD) level, of which there are nine in the state. While many people want values at a more disaggregated level than the CRD (e.g., county-level), this historical information did allow regional values and trends to be identified. Unfortunately, the CRD-level estimates reported by KAS were discontinued in 2009 and thus, no official government reported data exist of regional values.

In an effort to maintain information at the CRD-level, Dhuyvetter and Taylor have used historical relationships between the CRD and state averages to generate an estimate of CRD values from the currently reported KAS state-level estimate (see MF-1100 available at: http://www.agmanager.info/farmmgt/fmg/land). There are several potential problems with this method (referred to as KAS/KSU) of estimating land values. First, if the price relationship between CRD's has changed in recent years, relative to the past, the estimates will no longer accurately reflect current market conditions. Second, the source data for these estimates is a survey of people's opinions, which may not be highly attuned to the current land market. For example, the KAS data have typically lagged behind estimates based on market data, suggesting that changes in land values are moving faster than people not actively engaged in the land markets realize.

The current growth in land values and the many business and personal decisions affected by these values warrants more extensive analysis to obtain estimates that are less aggregated than either the state or CRD-level values available. To this end, sales transaction data were obtained

from the Kansas Property Valuation Department (PVD).[1] These data reflect agricultural land sales in Kansas from 2010 through 2012. To obtain estimates that reflect land sold for agricultural purposes in an "arm's length" transaction, some observations were removed from the original dataset.[2] The sales data used in the analysis were limited to bare land (undeveloped) parcels of at least 40 acres in size. These filtered data were used in a regression analysis, referred to as PVD/KSU, to estimate county-specific values for non-irrigated cropland and pasture. The land value model used characteristics of the parcels sold to determine impacts on price. Characteristics such as parcel size, soil quality rating, percent of pasture and cropland within a parcel, and when a parcel was sold were all used to estimate county-level land values.

The county-level estimates and the average for each of the CRD's are shown in table 1, where the CRD average is a simple average of the counties that fall within the region. Table 2 provides a comparison between the CRD values using the KAS/KSU data and the estimates using PVD transactions data (PVD/KSU). In all but one case (East Central region), the survey-based estimates are lower than the market-based estimates. For non-irrigated cropland, the analysis using PVD transactions data estimates a state-level average value of $2,312/acre, 36.0% higher than the 2012 KAS reported value of $1,700/acre. Across the nine CRD regions, the differences range from a 0.3% decrease from the KAS values in the East Central CRD to a 63.2% increase in the Northwest CRD. Pasture values are similarly understated by the survey method, with the transactions data estimate of $1,497/acre for the state average. This estimate is 57.9% higher than the KAS reported value for pasture in 2012. Regional differences range from an increase of 20.2% in the Southeast to an increase of 133.3% over the KAS pasture value estimate for the Northwest CRD.

[1] The authors would like to thank Leah Tsoodle and Mike Dahlman for their assistance with data collection.
[2] "Arm's length" refers to land sold through typical market channels and does not include intra-family transactions, court-ordered sales, or other transactions that may keep the sale from being considered a market-based transaction.

Table 1. Estimated Agricultural Land Values for 2012 using PVD Transactions Data

CRD	County	Non-Irrigated, $/ac	Pasture, $/ac
Northwest	Cheyenne	1,517	985
	Decatur	1,803	1,171
	Graham	1,158	752
	Norton	1,874	1,217
	Rawlins	1,811	1,175
	Sheridan	2,167	1,409
	Sherman	1,484	964
	Thomas	2,284	1,484
	Average:	**1,762**	**1,145**
West Central	Gove	1,534	997
	Greeley	1,530	992
	Lane	1,534	996
	Logan	1,462	950
	Ness	1,374	891
	Scott	2,247	1,458
	Trego	1,308	849
	Wallace	1,230	799
	Wichita	1,851	1,201
	Average:	**1,563**	**1,015**
Southwest	Clark	1,751	1,134
	Finney	1,257	816
	Ford	1,707	1,108
	Grant	1,057	687
	Gray	1,371	890
	Hamilton	927	602
	Haskell	1,175	763
	Hodgeman	1,013	657
	Kearny	911	591
	Meade	1,212	787
	Morton	895	581
	Seward	1,519	985
	Stanton	754	489
	Stevens	895	579
	Average:	**1,175**	**762**
North Central	Clay	3,578	2,322
	Cloud	3,248	2,111
	Jewell	2,558	1,663
	Mitchell	2,231	1,448
	Osborne	1,892	1,228
	Ottawa	2,414	1,567
	Phillips	1,296	841
	Republic	3,683	2,392
	Rooks	1,382	895
	Smith	1,937	1,256
	Washington	3,193	2,074
	Average:	**2,492**	**1,618**
Central	Barton	2,084	1,353
	Dickinson	2,813	1,828
	Ellis	2,204	1,432
	Ellsworth	1,194	775
	Lincoln	1,763	1,144
	Marian	2,528	1,642
	McPherson	2,617	1,697
	Rice	2,198	1,428
	Rush	1,220	791
	Russell	1,828	1,186
	Saline	3,379	2,193
	Average:	**2,166**	**1,406**
South Central	Barber	2,626	1,707
	Comanche	1,897	1,230
	Edwards	1,884	1,223
	Harper	2,282	1,483
	Harvey	2,826	1,836
	Kingman	2,122	1,378
	Kiowa	1,806	1,172
	Pawnee	1,816	1,180
	Pratt	1,600	1,038
	Reno	2,131	1,385
	Sedgwick	3,688	2,390
	Stafford	1,747	1,136
	Sumner	1,883	1,221
	Average:	**2,178**	**1,414**
Northeast	Atchison	4,427	2,871
	Brown	5,546	3,601
	Doniphan	4,929	3,198
	Jackson	3,089	2,005
	Jefferson	3,567	2,312
	Leavenworth	4,512	2,923
	Marshall	3,956	2,571
	Nemaha	3,994	2,595
	Pottawatomie	2,909	1,889
	Riley	4,432	2,879
	Wyandotte*	--	--
	Average:	**4,136**	**2,684**
East Central	Anderson	2,417	1,566
	Chase	1,695	1,100
	Coffey	2,438	1,581
	Douglas	5,284	3,430
	Franklin	3,385	2,196
	Geary	1,951	1,265
	Johnson*	--	--
	Linn	2,658	1,725
	Lyon	2,327	1,511
	Miami	6,298	4,089
	Morris	2,335	1,514
	Osage	2,620	1,700
	Shawnee	3,768	2,444
	Wabaunsee	2,800	1,818
	Average:	**3,075**	**1,995**
Southeast	Allen	2,158	1,398
	Bourbon	2,569	1,667
	Butler	3,140	2,039
	Chautauqua	2,252	1,462
	Cherokee	2,383	1,548
	Cowley	2,068	1,343
	Crawford	1,896	1,231
	Elk	2,140	1,388
	Greenwood	2,434	1,581
	Labette	2,444	1,589
	Mongtomery	2,174	1,412
	Neosho	2,333	1,514
	Wilson	2,090	1,356
	Woodson	2,512	1,631
	Average:	**2,328**	**1,511**

* Land value for these counties were not estimated due to insufficient data available meeting the selection criteria of parcel sizes above 40 acres and bare ground.

Table 2. Comparison of CRD Average KAS/K-State Land Values and PVD Transactions Data Estimates for 2012

	Northwest	West Central	Southwest	North Central	Central	South Central	Northeast	East Central	Southeast	State
Non-Irrigated Value										
KAS/KSU	1,080	1,054	1,031	1,666	1,821	1,747	2,848	3,085	2,028	1,700
PVD/KSU	1,762	1,563	1,175	2,492	2,166	2,178	4,136	3,075	2,328	2,312
Difference, $/ac	682	509	144	826	345	431	1,288	-10	300	612
Difference, %	63.2	48.3	13.9	49.6	19.0	24.6	45.2	-0.3	14.8	36.0
Pasture Value										
KAS/KSU	491	531	432	788	907	876	1,434	1,580	1,257	950
PVD/KSU	1,145	1,015	762	1,618	1,406	1,414	2,684	1,995	1,511	1,500
Difference, $/ac	654	484	330	830	499	538	1,250	415	254	550
Difference, %	133.1	91.1	76.4	105.3	55.0	61.4	87.2	26.3	20.2	57.9

Note: Source of KAS/KSU CRD-level values is MF-1100 available at: http://www.agmanager.info/farmmgt/fmg/land

2012 Kansas County-Level Cash Rental Rates for Non-Irrigated Cropland

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In the wake of rapid changes in Kansas agricultural land values, many people are also wondering how rental rates for cropland have been affected. Historically, the ratio of cash rent to land value (i.e., rent-to-value ratio) has been in the range of 5 to 6 percent. This ratio indicates the annual return (before real estate taxes) that landowners can expect on their capital investment from renting the land out excluding capital gains. If that relationship still holds, then a state-level estimate for non-irrigated cropland of $2,516/acre would imply cash rental rates ranging from approximately $126 to $151/acre. This range leaves a large amount of negotiating room for landowners and tenants, which prompts us to apply another method of estimating rental rates. Furthermore, if part of the land value increase in recent years has been due to "non-ag" reasons, then the historical rent-to-value ratio may not be appropriate to use in the current environment.

Rather than targeting a particular rate of return on non-irrigated cropland, which may or may not reflect the productivity of the land or current crop prices, cash rents were estimated employing a method of calculating revenue from a crop share arrangement. The decision aid used to guide these calculations is the *KSU-Lease.xls* Excel spreadsheet available at the AgManager.info website (http://www.agmanager.info/farmmgt/land/lease). The basic premise of the approach in *KSU-Lease* is that a lease is considered to be equitable if the income from the lease is split proportionally to how the inputs (costs) are contributed.[3]

This spreadsheet requires input of production cost data for a given crop mix and expected commodity prices. The crop enterprise mix for each county was determined using planted acreage estimates for each county from the 2002 and 2007 USDA Census of Agriculture[4]. The crop mix was limited to wheat, corn, soybeans, and grain sorghum, where wheat was either summer-fallow or continuous. Yields for these crops were calculated using an 8-year historic average for each county. Information on costs of production and long-run commodity prices were taken from the 2012 updates of the Farm Management guides

[3] For a further discussion of principles behind how leases are determined see publications NCFMEC-01 and NCFMEC-02 also available at AgManager.info
[4] 2012 Census data is not yet available at time of publication.

(http://www.agmanager.info/farmmgt/fmg/nonirrigated). The expected commodity prices, crop acreage mix, historic yields, and landowner's crop share percentage averaged to the regional level are presented in table 3. From the *KSU-Lease* spreadsheet, an estimate of the expected revenue to the landowner from an equitable crop share arrangement was obtained. The estimated crop share percentages used in the analysis range from 28.9% in the South Central region of the state to 41.9% in the Northeast region. The difference in crop share splits across the regions reflects the relative productivity, costs, and revenue potential of the farmland.

The estimated crop share split was applied to historical county-level yields as reported by KAS and the long-run commodity price forecasts shown in table 3 to determine an estimate of crop share revenue at the county level. Finally, the crop share revenue was discounted by a 20 percent risk premium to arrive at a cash rent estimate. The 20 percent discount reflects the lower risk faced by a landowner when they enter into a cash rent contract. Crop share revenues, while higher, are also more variable or risky than fixed cash rents. This is especially true in recent years with large fluctuations in commodity prices. In more stable years, the risk percentage may be lower. It should be noted that risk premiums were routinely close to zero, and negative in some cases, in the early in the late 1990's and early 2000's and thus this 20 percent risk premium is quite high by historical standards.

The county-level estimates of non-irrigated cropland cash rental rates are given in table 4. The first column of rental rates contains the survey-based values reported by USDA-KAS for 2012 (KAS). They are obtained in a similar fashion to the land values, via survey. A comparison of the rental rates from USDA-KAS and those estimated using the *KSU-Lease.xls* crop share approach adjusted for risk (KSU) reveals the USDA-KAS estimates are significantly lower, as was the case with the land value data.

Why would rental rates collected via survey be so much lower than risk-adjusted crop share estimates? The cost of production and commodity price information used in the KSU crop share lease method reflect the most current information available about what returns to non-irrigated farming would be under prices projected for the next 3-5 years (values would be even higher if they were based on expected prices for 2013). Therefore, if a contract between a landowner and

Table 3. Prices and Acreages Used to Estimate Cash Rental Rates

Region	Price, $/bu	Crop Enterprise Mix, % of acres	8-Year Historic Average Yields*	Landowner's Crop Share
West				37.3%
Wheat	6.36	65.4	31.0	
Corn	5.17	9.4	55.2	
Soybeans	n/a	0.0	n/a	
Grain Sorghum	4.62	24.7	53.6	
North Central				34.6%
Wheat	6.05	63.2	36.7	
Corn	4.86	3.5	84.1	
Soybeans	10.48	10.7	29.6	
Grain Sorghum	4.68	22.6	80.2	
South Central				28.9%
Wheat	6.64	74.5	33.8	
Corn	5.00	2.9	71.2	
Soybeans	10.69	4.6	24.9	
Grain Sorghum	4.89	18.0	63.0	
Northeast				41.9%
Wheat	6.35	17.0	34.5	
Corn	5.03	29.3	106.1	
Soybeans	10.83	46.5	34.2	
Grain Sorghum	4.82	7.2	69.9	
Southeast				29.7%
Wheat	6.42	33.4	31.7	
Corn	4.94	17.4	97.8	
Soybeans	10.55	40.8	30.2	
Grain Sorghum	4.54	8.4	68.3	

* The yields and crop enterprise mix values presented here are averaged across the region. However, county-level values for both of these variables were used to calculate the county-level rental rates.

tenant were being negotiated today for the next 3-5 years, these rates should be very close to negotiated rates. If the lease was being negotiated for the 2013 season only, the rates likely would be higher yet. A potential problem with the USDA-KAS survey values is that they do not reveal the year in which the rental rate being reported was negotiated. If a contract has been in place for several years, with no change in the rental rate, then it is likely to be lower than a current contract reflecting higher crop prices. Another possible explanation for lower rental rates being reported on surveys is that not all contracts are negotiated solely based on returns to farming. If there are other aspects to the contract that provide value to the landowner, then perhaps the rental rate is reduced to reflect that non-pecuniary value. Finally, it is possible that the rates are simply being understated due to bias in the survey respondents.

The final piece of information that can be obtained from a comparison of non-irrigated rental rate estimates is a check of the consistency of historical rent-to-value rates across different information sources. Calculation of the rent-to-value ratio using the risk-adjusted crop share based rental rates (KSU) and the PVD/KSU land values for non-irrigated land result in a state-level estimate of 3.6%. The ratio suggests that even though land values have been increasing rapidly, returns to farming are expected to support returns of 3.6% over the next few years. The ratio is lower than the historic range of 5 to 6 percent, based on KAS data over the past 10 years. However, as compared to the historically low interest rates we are currently experiencing, a 3.6% rate of return is appealing and suggests that land markets could continue to be strong in the near future.

Table 5 reports the KAS survey values for pasture rental rates at the county level. There is not a comparable approach, as was done for non-irrigated crop rental rates (i.e., the risk-adjusted crop share approach), to estimate a "KSU" pasture rental rate. This is because stocking rate data, the parallel to crop yields, is not available at the county level. However, producers and landowners wanting another estimate of pasture rental rates for their unique situation can do so with the *KSU-Graze.xls* Excel spreadsheet or web dashboard available at the AgManager.info website (http://www.agmanager.info/farmmgt/land/lease).

Table 4. Estimated Cash Rental Rates for Non-Irrigated Cropland in 2012

CRD	County	KAS Rental Rate, $/ac*	KSU Rental Rate, $/ac**	Difference, %
Northwest	Cheyenne	47.50	66.00	38.9
	Decatur	49.00	88.20	80.0
	Graham	38.50	71.60	86.0
	Norton	40.50	81.50	101.2
	Rawlins	51.00	73.40	43.9
	Sheridan	47.50	78.70	65.7
	Sherman	41.00	64.80	58.0
	Thomas	52.50	70.00	33.3
	Average:	**45.94**	**74.28**	**61.7**
West Central	Gove	40.50	75.20	85.7
	Greeley	42.50	59.80	40.7
	Lane	35.00	60.60	73.1
	Logan	39.50	70.90	79.5
	Ness	27.00	63.50	135.2
	Scott	54.50	79.80	46.4
	Trego	34.00	65.30	92.1
	Wallace	42.50	64.20	51.1
	Wichita	41.50	74.50	79.5
	Average:	**39.67**	**68.20**	**71.9**
Southwest	Clark	30.50	54.10	77.4
	Finney	30.50	70.50	131.1
	Ford	32.00	72.20	125.6
	Grant	30.50	48.60	59.3
	Gray	39.50	73.00	84.8
	Hamilton	30.50	51.70	69.5
	Haskell	30.50	57.00	86.9
	Hodgeman	32.00	65.00	103.1
	Kearny	30.50	61.60	102.0
	Meade	33.00	56.60	71.5
	Morton	26.00	46.90	80.4
	Seward	30.50	56.50	85.2
	Stanton	35.00	59.30	69.4
	Stevens	27.50	53.50	94.5
	Average:	**31.32**	**59.04**	**88.5**
North Central	Clay	67.00	94.60	41.2
	Cloud	60.00	89.20	48.7
	Jewell	56.50	92.40	63.5
	Mitchell	58.50	87.30	49.2
	Osborne	50.50	76.90	52.3
	Ottawa	59.50	74.70	25.5
	Phillips	44.00	77.70	76.6
	Republic	73.50	95.50	29.9
	Rooks	38.50	66.80	73.5
	Smith	60.00	87.20	45.3
	Washington	71.00	102.30	44.1
	Average:	**58.09**	**85.87**	**47.8**
Central	Barton	40.00	60.40	51.0
	Dickinson	49.00	79.70	62.7
	Ellis	39.50	63.70	61.3
	Ellsworth	39.50	70.80	79.2
	Lincoln	49.50	75.60	52.7
	Marian	44.50	64.10	44.0
	McPherson	54.50	67.80	24.4
	Rice	57.50	69.50	20.9
	Rush	34.00	58.70	72.6
	Russell	44.00	70.70	60.7
	Saline	54.50	72.60	33.2
	Average:	**46.05**	**68.51**	**48.8**
South Central	Barber	43.00	44.50	3.5
	Comanche	32.00	39.90	24.7
	Edwards	45.00	53.00	17.8
	Harper	38.00	42.40	11.6
	Harvey	54.50	66.90	22.8
	Kingman	44.50	45.90	3.1
	Kiowa	32.00	52.00	62.5
	Pawnee	43.50	61.80	42.1
	Pratt	32.00	55.20	72.5
	Reno	51.00	56.40	10.6
	Sedgwick	52.00	56.00	7.7
	Stafford	45.50	56.50	24.2
	Sumner	44.50	50.70	13.9
	Average:	**42.88**	**52.40**	**22.2**
Northeast	Atchison	98.50	172.50	75.1
	Brown	160.00	202.90	26.8
	Doniphan	143.00	229.60	60.6
	Jackson	59.50	150.20	152.4
	Jefferson	51.00	161.80	217.3
	Leavenworth	61.50	149.20	142.6
	Marshall	87.00	143.20	64.6
	Nemaha	119.00	164.00	37.8
	Pottawatomie	60.50	147.40	143.6
	Riley	69.00	125.80	82.3
	Wyandotte	61.50	141.50	130.1
	Average:	**90.90**	**164.66**	**81.1**
East Central	Anderson	63.00	72.90	15.7
	Chase	54.00	70.80	31.1
	Coffey	57.50	71.30	24.0
	Douglas	61.00	138.10	126.4
	Franklin	55.00	114.90	108.9
	Geary	50.50	117.90	133.5
	Johnson	70.00	123.20	76.0
	Linn	50.50	69.10	36.8
	Lyon	59.50	70.20	18.0
	Miami	50.50	125.20	147.9
	Morris	56.50	94.40	67.1
	Osage	59.00	113.70	92.7
	Shawnee	63.00	142.80	126.7
	Wabaunsee	63.00	122.30	94.1
	Average:	**58.07**	**103.34**	**78.0**
Southeast	Allen	43.50	64.70	48.7
	Bourbon	47.50	64.80	36.4
	Butler	42.00	70.30	67.4
	Chautauqua	35.50	51.20	44.2
	Cherokee	58.50	69.20	18.3
	Cowley	35.50	55.40	56.1
	Crawford	59.00	71.50	21.2
	Elk	41.00	63.60	55.1
	Greenwood	47.50	72.70	53.1
	Labette	47.50	59.00	24.2
	Mongtomery	54.50	61.20	12.3
	Neosho	39.50	60.10	52.2
	Wilson	55.50	64.30	15.9
	Woodson	46.50	65.40	40.6
	Average:	**46.68**	**63.81**	**36.7**

* KAS rental rates available at http://www.nass.usda.gov/Statistics_by_State/Kansas/index.asp

** KSU Rental Rate is based on using *KSU-Lease* and a risk-adjusted equitable crop share approach. *KSU-Lease.xls* is available at http://www.agmanager.info/farmmgt/land/lease/default.asp

Table 5. Pasture Rental Rates Reported by Kansas Agricultural Statistics Service (KAS)

CRD	County	KAS Rental Rate, $/ac*
Northwest	Cheyenne	11.50
	Decatur	12.00
	Graham	14.50
	Norton	14.50
	Rawlins	11.50
	Sheridan	13.50
	Sherman	10.00
	Thomas	14.00
	Average:	**12.69**
West Central	Gove	12.00
	Greeley	10.50
	Lane	12.00
	Logan	10.50
	Ness	12.50
	Scott	12.50
	Trego	12.50
	Wallace	9.20
	Wichita	11.00
	Average:	**11.41**
Southwest	Clark	9.20
	Finney	8.90
	Ford	12.00
	Grant	8.90
	Gray	12.50
	Hamilton	7.60
	Haskell	8.90
	Hodgeman	12.00
	Kearny	8.00
	Meade	11.00
	Morton	5.10
	Seward	5.70
	Stanton	8.90
	Stevens	8.90
	Average:	**9.11**
North Central	Clay	19.00
	Cloud	24.00
	Jewell	21.50
	Mitchell	23.50
	Osborne	16.50
	Ottawa	21.50
	Phillips	17.00
	Republic	19.00
	Rooks	14.50
	Smith	19.00
	Washington	21.50
	Average:	**19.73**
Central	Barton	14.00
	Dickinson	19.00
	Ellis	16.00
	Ellsworth	16.00
	Lincoln	17.00
	Marian	18.50
	McPherson	19.50
	Rice	15.50
	Rush	13.00
	Russell	12.00
	Saline	19.50
	Average:	**16.36**
South Central	Barber	10.50
	Comanche	10.50
	Edwards	15.50
	Harper	14.50
	Harvey	11.50
	Kingman	16.00
	Kiowa	11.50
	Pawnee	14.50
	Pratt	11.50
	Reno	15.00
	Sedgwick	19.00
	Stafford	15.50
	Sumner	16.00
	Average:	**13.96**
Northeast	Atchison	22.00
	Brown	26.50
	Doniphan	38.50
	Jackson	23.50
	Jefferson	23.50
	Leavenworth	21.00
	Marshall	26.50
	Nemaha	29.00
	Pottawatomie	18.00
	Riley	17.50
	Wyandotte	26.50
	Average:	**24.60**
East Central	Anderson	22.50
	Chase	21.50
	Coffey	20.00
	Douglas	25.00
	Franklin	21.00
	Geary	19.00
	Johnson	23.00
	Linn	23.00
	Lyon	23.00
	Miami	19.00
	Morris	24.00
	Osage	20.00
	Shawnee	17.50
	Wabaunsee	20.00
	Average:	**21.32**
Southeast	Allen	18.50
	Bourbon	21.50
	Butler	21.00
	Chautauqua	12.00
	Cherokee	24.00
	Cowley	15.00
	Crawford	24.50
	Elk	16.50
	Greenwood	19.00
	Labette	23.00
	Mongtomery	22.00
	Neosho	26.00
	Wilson	18.00
	Woodson	20.50
	Average:	**20.11**

* KAS rental rates available at http://www.nass.usda.gov/Statistics_by_State/Kansas/index.asp