

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search http://ageconsearch.umn.edu aesearch@umn.edu

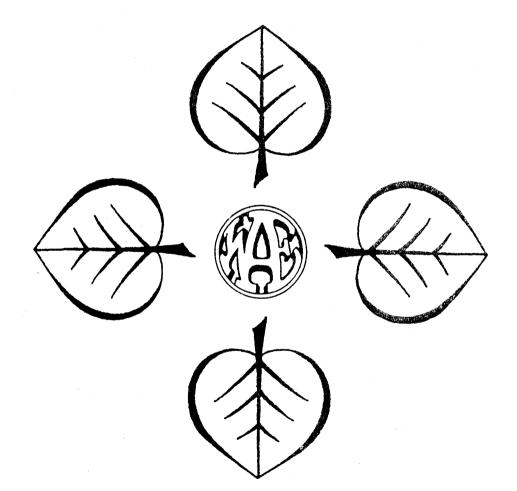
Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.



Papers of the 1992 Annual Meeting

Western Agricultural Economics Association



Colorado Springs, Colorado July 12-15, 1992 Nonparametric statistics are used to analyze the volatility, persistence, and comovement of agricultural land prices in 48 states for the period 1910-1989. Our main focus is on possible changes in the cyclical behavior of land prices after agricultural policies were introduced in 1933.

Nonparametric statistics are used to analyze the volatility, persistence, and comovement of agricultural land prices in 48 states for the period 1910-1989. Our main focus is on possible changes in the cyclical behavior of land prices after agricultural policies were introduced in 1933. Two important characteristics that are compared across time periods are the volatility and persistence of short-run movements in real land prices. We analyze whether short-run fluctuations have become less extreme and whether the tendency of shocks to have permanent or transitory effects has changed after agricultural policies were introduced. Correlation of short-term price movements across states is also investigated to determine if macroeconomic or sectoral shocks dominate or if individual land price series move in different ways. The methods used in this study were recently applied by Romer to 38 annual production series to investigate business cycles in the US.

Policy Issues

Two important policy issues can be illuminated by examining lengthy land price series behavior. First, since land is the fixed resource used in agricultural production, land prices are determined by the discounted stream of future earnings. Effective agricultural policies should reduce farm income variability and, hence, dampen fluctuations in anticipated land price. If agricultural policies have been effective, we would expect land price fluctuations in each state to become more stable after their introduction. Second, the relative importance of macroeconomic and sector-specific shocks is not well understood. If macroeconomic factors dominate land price movement, price in each state should respond similarly to shocks. If, however, land prices in some states tend to respond to shocks differently than land prices in other states, this would indicate state-specific and possibly sector-specific factors are most important.

Data Detrending and Differencing

Annual land price data are available from USDA for the years 1910-1989. In the analysis that follows, data are divided into the pre-agricultural policy period 1910-1933 and the agricultural policy period 1947-1989. These periods are delineated as period one and period two, respectively. The war years were dropped from analysis because of war time price controls. Land prices are deflated by the Consumer Price Index available from the Bureau of Labor Statistics. Following Cochrane, Campbell and Mankiw, and Romer, we use the log differences of price data in our analysis. This insures data stationarity but does not a priori force trend-reverting behavior on the data as would detrending (Campbell and Mankiw). Price data used in analysis can be interpreted as growth rates.

Nonparametric Statistics

Three summary statistics are used to analyze the transformed land price data. Standard deviation is used to measure price volatility. Shock persistence -- the tendency of a time series not to be trend-reverting after an innovation in price -- is measured using Cochrane's recently proposed nonparametric estimator (Cochrane; Campbell and Mankiw). In the long-run land price fluctuations should be transitory; after a shock, price should be trend-reverting. Cochrane's estimator is based on

the weighted average of the first several sample autocorrelations.

(1)
$$\hat{\nabla}^{k} = 1 + 2 \sum_{j=0}^{k} \left(1 - \frac{j}{(k+1)}\right) \hat{\rho}_{j}$$

where $\hat{\rho}_j$ is the j th sample autocorrelation. Campbell and Mankiw show that a simple transformation of Cochrane's $\hat{\nu}^{\perp}$ allows interpretation of the transformed statistic as $A^k(1)$ in the following equation:

(2)
$$\Delta y_t = \beta + A^{\underline{t}}(L)e_t$$

If $A^{k}(1) = 0$, then an innovation in the land price growth rate is completely dissipated in later periods. If $A^{k}(1) = 1$, then growth in land prices is a random walk. And if $A^{k}(1) > 1$, then the trend growth rate in land prices is permanently changed. Campbell and Mankiw's transformation is given by:

(3)
$$\hat{\mathbb{A}}^{k} = \sqrt{\frac{\hat{\mathbb{V}}^{k}}{\left(1 - \hat{\rho}_{1}^{2}\right)}}$$

where $\hat{\rho}_1^2$ is the square of the first sample autocorrelation of the series. Campbell and Mankiw give the standard error of $\hat{v} \stackrel{!}{}$ as:

(4)
$$SE[\hat{V}^{k}] = \frac{\hat{V}^{k}}{\sqrt{\frac{3}{4}\frac{T}{(k+1)}}}$$

The standard error for \hat{A}^{k} can be computed from (3) and (4) using the delta method.

Finally, factor analysis is used to describe the covariance relationships among the growth in land prices in various states in terms of unobservable, random quantities called factors. Factor analysis decomposes the movement of each series in a group into parts that are due to distinguishable, but unobservable, common factors and a disturbance that is associated with only with that particular series. Johnson and Wichern present the theoretical foundations and computational details of factor analysis.

Volatility

Standard deviations of land price growth are presented in table 1. The third column is the ratio of period 2 standard deviation to period 1 standard deviation. Numbers larger than one indicate an increase in volatility. Completely effective agricultural policies should reduce land price volatility. It is conceivable, however, that macroeconomic conditions have destabilized agriculture land prices even though policy has had a dampening effect. A pattern is immediately apparent in table 1. Standard deviations have increased in important agricultural states, particularly those in the mid-west and great plains, and have decreased in less important agricultural states. Important exceptions in this pattern are California and Texas, both major agricultural states where volatility has decreased. The hypothesis that standard deviations have not changed between the two periods can be rejected only for states marked with a * at the 15% significance level.

Persistence

Nonparametric persistence estimates, \hat{A}^{k} , are given in table 2 for periods one and two. The third column is the asymptotic t-ratio for the test that persistence has not changed between the first

and second periods. In the first period, before agricultural policies were introduced, innovations in land price growth appear to dissipate quickly; \hat{A}^{k} is less than one for nearly all states. After agricultural policies were introduced, innovations in land price growth appear to permanently shift trend growth. Persistence estimates in important agricultural states increased to about two after agricultural policies were introduced. In states where agriculture is less important, persistence estimates do not increase as much, and in some states, persistence estimates actually decline in the second period. The hypothesis that persistence has not changed between the two periods can be rejected for states marked with a * at the 15% significance level.

These results have a two important implications. First, increased persistence measures in the post-policy period suggest that permanent shocks have become more important. Alternatively, the ability to recover from external shocks has diminished in states where persistence has significantly risen. One possibility is that farm programs have made shocks more persistent by reducing down-side profit risks while maintaining upward revenue flexibility. When economic conditions worsen, farm programs protect farmers from economic loss, but as conditions improve, farmers benefit (Rausser, Chalfant, Love, and Stamoulis). Second, persistence estimates greater that one in the post-policy period indicate that the price series are not stationary, characterizing a series that will continue to grow from its previously forecast value following a shock (Campbell and Mankiw).

Factor Analysis

Factor analysis results from SAS's initial factor method are presented in table 3 for land price growth and for the ratio of government transfer payments to total state agricultural cash receipts. The second data set measures agricultural program importance in a state, and is included for factor loading comparisons. Government payment and agricultural cash receipt data are from <u>Agricultural Statistics</u>. Both analyses are for the post-policy period, 1947-1989. If factor loadings in the two data sets result in similar state groupings, the proposition that agricultural programs help explain shock persistence in the second period gains support. Factor loadings indicate that a single common factor accounts for a significant part of the total variation in land price growth. The interest rate is a likely candidate for this unobservable common factor. The second factor groups states into two categories. Those with negative factor loadings, important agricultural states, and those with positive factor loadings, less important agricultural states. This state grouping is consistent with both the volatility and persistence groupings. Factor loadings for the share of state farm cash receipts from government programs result in a similar state grouping. Less important agricultural states have a negative loading on factor two while important agricultural states have a positive factor two loading.

Conclusions

Results indicate that volatility in land price growth increased after farm policies were introduced. In addition, shocks have had a more persistent influence on agricultural land price growth since farm policies were introduced. Evidence indicates that farm programs may have played an important role, however, other interpretations are possible. This analysis focuses attention on the possibility that agricultural programs may have had a destabilizing effect on the sector. References

- Campbell, J.Y. and G. Mankiw, "Are Output Fluctuations Transitory?" <u>Quarterly Journal of</u> <u>Economics</u>, 102(1987):857-880.
- Cochrane, J.H. "How Big is the Random Walk in GNP?" Journal of Political Economy, 95(1988):893-920.
- Johnson, R.A. and D.W. Wichern, <u>Applied Multivariate Statistical Analysis</u>. 2nd edition, Prentice-Hall, Englewood Cliffs, NJ, 1988.
- Rausser, G.C., J.A. Chalfant, H.A. Love, and K. Stamoulis, "Macroeconomic Linkages, Taxes, and Subsidies in the U.S. Agricultural Sector," <u>American Journal of Agricultural Economics</u>, 68(1986):399-412.
- Romer, C.D. "The Cyclical Behavior of Individual Production Series, 1889-1984," <u>Quarterly Journal of Economics</u>, 105(1991):1-31.
- U.S.D.A. U.S. Agricultural Land Prices, 1910-1989. Economic Research Service, U.S.D.A., Washington, D.C. 1989.
- U.S.D.A. Agricultural Statistics, U.S.D.A., Washington, D.C., various issues.
- U.S. Bureau of Labor Statistics, Department of Commerce, Washington, D.C., various issues.

Table 1 Standard Deviation of Growth in Land Prices							
Region	State	Period 1	Period 2	Ratio(2/1)			
New England	Connecticut	0.069	0.038	0.563*			
	Maine	0.058	0.049	0.840			
	Massachusetts	0.062	0.039	0.635*			
	New Hampshire	0.074	0.048	0.650*			
	Rhode Island	0.078	0.057	0.734			
	Vermont	0.065	0.048	0.729			
Mid-Atlantic	Delaware	0.051	0.059	0.975			
	Maryland	0.055	0.050	1.089			
	New Jersey	0.074	0.058	0.776			
	New York	0.057	0.044	0.780			
	Pennsylvania	0.051	0.058	0.959			
North Central	Illinois	0.054	0.090	1.414			
	Indiana	0.056	0.037	1.556*			
	Iowa	0.086	0.105	1.242			
	Michigan	0.050	0.052	1.028			
	Minnesota	0.067	0.094	1.411			
	Missouri	0.058	0.077	1.324			
	Ohio	0.051	0.078	1.513*			
	Wisconsin	0.054	0.053	1.168			
Plains	Kansas	0.064	0.071	1.112			
	Nebraska	0.059	0.091	1.524*			
	North Dakota	0.050	0.078	1.356			
	Oklahoma	0.064	0.068	1.058			
	South Dakota	0.059	0.072	1.040			
	Texas	0.058	0.061	0.889			
Southeast	Alabama	0.068	0.059	0.861			
	Arkansas	0.059	0.071	1.038			
	Florida	0.109	0.078	0.720			
	Georgia	0.084	0.060	0.713			
	Kentucky	0.048	0.055	1.159			
	Louisiana	0.064	0.081	1.256			
	Mississippi	0.094	0.072	0.762			
	North Carolina	0.077	0.051	0.663*			
	South Carolina	0.112	0.055	0.497*			
	Tennessee	0.054	0.051	0.943			
	Virginia	0.059	0.050	0.863			
	West Virginia	0.048	0.065	1.363			
Northwest	Colorado	0.073	0.053	0.870			
	Idaho	0.058	0.059	1.013			
	Montana	0.058	0.064	1.116			
	Oregon	0.076	0.057	0.747			
	Washington	0.063	0.058	0.916			
_	Wyoming	0.105	0.067	0.640*			
Southwest	Arizona	0.101	0.072	0.715			
	California	0.083	0.065	0.793			
	Nevada	0.073	0.080	1.020			
	New Mexico	0.089	0.070	0.780			
	Utah	0.055	0.067	1.219			

Revinn New England String Connacticut Lathof 1 Period 2 teratio teration New England Connacticut 1.567 1.755 0.17 Michins 1.159 1.401 0.34 Microfilancotts 1.611 1.339 -0.29 How Encogenite 1.153 2.631 0.77 Priced Island 1.763 1.075 -0.51 Wermand 0.835 2.300 1.06 Mid-Atlantic Dointware 1.252 1.633 0.16 Mid-Atlantic Dointware 1.252 1.363 -0.15 Merry York 1.632 1.363 -0.15 Penneylywaits 1.235 1.426 0.19 North Central Hilmotis 0.501 1.913 1.07 Indition 0.693 2.042 1.108 Idvar 1.163 2.037 0.75 Microphysits 1.232 1.93 1.07 Indition 0.699 1.752 0.95 <t< th=""><th>Table 2 Persistence</th><th>Mecsures</th><th></th><th></th><th></th></t<>	Table 2 Persistence	Mecsures			
Mathem 1.139 1.401 0.34 Margandure 1.631 1.339 -0.29 Mary Hampehire 1.631 1.339 -0.29 Mirst Hampehire 1.635 2.630 1.07 Theols Inland 0.295 2.380 1.06 Mid-Adantic Delmortro 1.205 1.743 0.40 Marylenid 0.292 1.633 1.156 -0.41 Merrylenid 1.225 1.362 0.43 0.41 Merrylenid 1.225 1.426 0.19 North Central Illinoit 0.501 1.911 1.07 Indiana 0.603 1.977 1.113 1.07 Indiana 0.603 1.797 1.113 1.07 Interrouri 0.609 1.797 1.113 1.07 Minesotin 0.614 2.320 1.333 Miresotin 0.614 2.320 1.333 Morth Central Miresotin 0.703 1.09 1.333	Region	State		Period 2	<u>t-ratio</u>
Matrix Recupsilies 1.601 1.339 -0.29 Marr Recupsilies 1.135 2.031 0.77 Ethods Ethind 1.703 1.075 -0.51 Vermoni 0.855 2.380 1.08 Mid-Atlantic Delarvare 1.209 1.749 0.40 Maryland 0.529 1.633 0.86 Mory Jessey 1.633 1.163 -0.41 Mey Verth 1.525 1.363 -0.15 Penneylvenio 1.225 1.363 -0.15 North Central Illinois 0.629 1.752 0.367 Michigan 0.593 2.042 1.10° 1.25° Michigan 0.629 1.752 0.36° 1.33° Michigan 0.629 1.757 1.11° Michigan 0.614 2.320 1.35° Michigan 0.614 2.320 1.35° Michigan 0.614 2.320 1.35° Michigan 0.614 2.320	New England	Connecticut	1.547	1.755	
Nerv Hempelire 1.132 2.031 0.77 Rheds Island 1.763 1.075 -0.51 Vermont 0.255 2.380 1.06 Mid-Adantic Delavaro 1.209 1.743 0.40 Maryland 0.929 1.653 0.255 Nort Jeercey 1.643 1.152 -0.15 Pennaylvenia 1.255 1.426 0.19 North Central Illicols 0.601 1.913 1.10° Indiana 0.503 2.042 1.10° 1.83° Idron 1.183 2.037 0.76 1.83° Minexotn 1.252 1.358 1.06 1.18° Illicouri 0.603 1.916 1.25° 1.35° Vinconsin 0.514 2.320 1.35° Minexotn 1.352 2.109 1.33° Vinconsin 0.702 1.09 1.33° Noth Dalota 0.910 2.050 1.23° South Dalota 0.910		Maine	1.129	1.401	
Phode Island 1.703 1.075 -0.51 Warmone 0.855 2.320 1.06 Mid-Atlantic Delayers 1.303 1.743 0.40 Maryland 0.229 1.653 0.286 Mory Jerzey 1.643 1.152 -0.41 North Central Pennsylvania 1.225 1.426 0.19 North Central Illinois 0.591 1.913 1.07 Indiana 0.603 2.042 1.107 Indiana North Central Illinois 0.591 1.913 1.252 Midenzota 1.252 2.159 1.363 Midenzota 0.209 1.752 0.95 Midenzota 0.614 2.320 1.363 Miceoata 0.614 2.320 1.363 Plains Kanana 0.614 2.320 1.363 Morth Daloa 0.916 2.055 1.07 Olitchome 0.720 1.950 1.233 South Daloa		Messachusetts	1.681	1.339	-0.29
Warmont 0.853 2.300 1.03 Mid-Atlantic Delawaro 1.209 1.743 0.46 Marytend 0.929 1.653 0.86 Mary Terzey 1.615 -0.41 Mew York 1.322 1.363 -0.15 Penneglvenic 1.235 1.426 0.19 North Centrel Illicols 0.501 1.918 1.07 Indican 0.503 2.042 1.108 1.257 Minescom 1.125 2.139 1.368 Minescom 0.609 1.752 0.95 Minescom 0.609 1.797 1.118 Minescom 0.614 2.320 1.368 Minescom 0.614 2.320 1.338 Micristan 0.639 1.547 1.318 Plains Kanaca 0.703 2.109 1.337 Morth Dalcoa 0.916 2.053 1.07 Otho 0.053 1.07 1.144 0.659		New Hampshire	1.135	2.051	0.77
Mid-Atlantic Delatores 1.303 1.743 0.40 MaryInad 0.529 1.653 0.25 New York 1.523 1.163 -0.41 New York 1.255 1.426 0.19 North Central Illicols 0.503 2.042 1.10° North Central Illicols 0.503 2.042 1.10° North Central Illicols 0.503 2.042 1.10° North Central Milecols 0.503 2.042 1.10° North Central Milecols 0.503 1.913 1.35° Milecols 0.609 1.752 0.95 0.16 0.009 1.797 1.11° Milecols 0.609 1.797 1.11° 0.33° 0.13° <th></th> <th>Rhode Island</th> <th>1.703</th> <th>1.075</th> <th>-0.51</th>		Rhode Island	1.703	1.075	-0.51
Maryland 0.929 1.663 0.96 Mary Jerzey 1.613 1.168 -0.41 New York 1.323 1.363 -0.15 Pennsylvalia 1.225 1.426 0.19 North Central Hilmois 0.591 1.913 1.07 Indiana 0.593 2.042 1.108 1.255 Mideligan 0.693 2.042 1.363 Midnesota 1.252 2.159 1.363 Minnesota 1.252 2.159 1.363 Minnesota 0.694 1.913 1.77 Minnesota 0.209 1.797 1.113 Wisconsh 0.614 2.320 1.335 Plains Kanacs 0.703 2.109 1.335 North Dalota 0.910 2.053 1.07 Olifotoan 0.910 2.053 1.07 Olifotoan 0.923 1.634 0.89 Adorate 0.910 2.055 1.23* S		Vernont	0.855	2.380	1.08
Now Serrey 1.643 1.165 -0.41 North Central May York: 1.523 1.383 -0.15 Pennoylvania 1.255 1.426 0.19 North Central Illinois 0.503 2.042 1.10° Indiana 0.503 2.042 1.10° 1.07° Indiana 0.503 2.042 1.10° 1.25° Minuscotn 1.252 2.159 1.36° Minuscotn 0.609 1.752 0.95 Oldo 0.614 2.320 1.35° Minuscotn 0.614 2.320 1.35° Plains Kanzas 0.703 2.109 1.33° Noth Daltota 0.910 2.058 1.07 Okichoma 0.720 1.950 1.23° South Daltota 0.910 2.058 1.07 Texas 0.637 1.634 0.99 Arlenancs 0.957 1.634 0.99 Arlenancs 0.957 1.634	Mid-Atlantic		1.309		
Norri Jenesy 1.643 1.153 -0.41 Nerv York 1.526 1.363 -0.15 Pennsylvania 1.255 1.426 0.19 Illinoia 0.591 1.918 1.07 Indiana 0.603 2.042 1.10 ⁹ Iova 1.132 2.037 0.76 Minnecotn 1.252 2.159 1.36 ⁹ Minnecotn 1.252 2.159 1.36 ⁹ Minnecotn 0.594 1.916 1.25 ⁹ Minnecotn 0.509 1.732 0.95 Ohio 0.609 1.797 1.11 ⁹ Wilcoantin 0.614 2.320 1.33 ⁹ Nethrasha 0.639 1.547 1.31 ⁹ North Dalota 0.910 2.058 1.07 Olithoma 0.702 1.950 1.23 ⁹ South Dalota 0.974 1.447 0.67 Terns 0.637 1.634 0.99 Arlematrs 0.525 1.786		Maryland	0.929	1.663	0.86
Penncylvania 1.255 1.426 0.19 North Central Hilinois 0.691 1.918 1.07 Indiana 0.503 2.042 1.10° Iova 1.102 2.037 0.76 Minesotn 1.252 2.159 1.36° Minesotn 1.252 2.159 1.36° Minesotn 0.694 1.916 1.25° Ohio 0.609 1.797 1.11° Visconatin 0.614 2.320 1.33° Plains Kanses 0.703 2.109 1.33° North Deltota 0.910 2.058 1.07 Olthomn 0.720 1.950 1.23° North Deltota 0.910 2.058 1.07 South Daltota 0.910 2.058 1.07 Chichomn 0.720 1.950 1.23° Southeast Alsbann 0.233 1.634 0.99 Arisenses 0.957 1.061 1.11° K			1.643	1.168	-0.41
North Central Hilinois Indiana 0.591 1.918 1.07 Indiana 0.503 2.042 1.10° Iova 1.103 2.037 0.75 Nehligan 0.66% 1.918 1.25° Minnazota 1.252 2.159 1.36° Minnazota 1.252 2.159 1.36° Minnazota 0.609 1.752 0.95 Chito 0.609 1.752 0.95 Chito 0.609 1.33° Nitroout 0.614 2.320 1.36° Plains Kanaza 0.703 2.109 1.33° North Daltota 0.910 2.058 1.07° Viaconsin 0.703 2.109 1.33° North Daltota 0.910 2.058 1.07° North Daltota 0.910 2.058 1.07° 1.01° South Daltota 0.704 1.447 0.69 Adebama 0.223 1.634 0.99 Aritanzes 0.557 1.854 0.		New York	1.528	1.368	
North Central Illinois 0.691 1.918 1.07 Indiana 0.903 2.042 1.10° Iowa 1.103 2.037 0.76 Michigan 0.694 1.916 1.25° Minesoth 1.252 2.159 1.36° Minesoth 1.252 2.159 1.36° Miscouri 0.029 1.752 0.95 Ohio 0.000 1.797 1.11° Wiscouri 0.639 1.547 1.31° Worth Dalota 0.916 2.058 1.07 Ohichoma 0.703 1.950 1.23° North Dalota 0.916 2.058 1.07 Ohichoma 0.720 1.950 1.23° South Dalota 0.074 1.447 0.67 Tenss 0.337 1.194 0.69 Southeast Alebama 0.233 1.634 0.99 Florida 1.057 2.001 0.84 Georgin 0.735 1.77		Pennsylvania	1.255	1.426	0.19
Iowa 1.103 2.037 0.75 Milehigan 0.694 1.916 1.25 ³ Minnezota 1.252 2.159 1.36 ³ Minezota 0.609 1.752 0.95 Olio 0.609 1.752 0.95 Olio 0.609 1.797 1.11 ³ Wieconsin 0.614 2.320 1.36 ⁵ Plains Kenaas 0.703 2.109 1.33 ² North Defrota 0.916 2.055 1.07 Olihoma 0.720 1.950 1.23 [*] South Defrota 0.974 1.447 0.67 Terns 0.337 1.194 0.69 Arlenars 0.557 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.735 1.786 1.11 [*] Kanuchy 0.919 1.907 0.93 Louisiana 0.735 1.777 1.50 [*] Machiasisipi 0.521 1.777 <td>North Central</td> <td></td> <td></td> <td></td> <td></td>	North Central				
Mideligan 0.694 1.916 1.25 ² Minnatoth 1.252 2.159 1.36 ³ Minesoth 0.609 1.752 0.95 Ohio 0.609 1.752 0.95 Ohio 0.609 1.752 0.95 Ohio 0.609 1.752 0.95 Ohio 0.609 1.757 1.11 ³ Wisconsh 0.514 2.320 1.35 ³ Plains Knazes 0.703 2.109 1.33 ³ Nebrash 0.639 1.547 1.31 ² North Dalsota 0.916 2.058 1.07 Oldhome 0.720 1.950 1.23 ³ South Dalsota 0.974 1.447 0.67 Texas 0.837 1.194 0.69 Aritanses 0.957 1.854 0.89 Florida 1.027 2.001 0.84 Georgin 0.732 1.799 1.22 ³ Minsissippi 0.521 1.777		Indiana			
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$					
Milcourl 0.009 1.752 0.95 Ohio 0.009 1.797 1.11° Wicconsin 0.514 2.320 1.36° Plains Kenses 0.703 2.109 1.33° North Daltona 0.639 1.547 1.31° North Daltona 0.916 2.058 1.07 Ohichome 0.720 1.950 1.23° South Dalton 0.974 1.447 0.67 Terns 0.037 1.194 0.69 Arltanses 0.957 1.854 0.89 Florida 1.077 2.001 0.84 Georgin 0.755 1.786 1.11° Manuelry 0.919 1.987 0.98 Louisinan 0.732 1.799 1.22° Mitasissippi 0.521 1.777 1.50° North Carolina 1.142 1.587 0.48 South Carolina 0.610 1.418 1.33° Vest Virginia 0.937		Michigan			
Chio 0.000 1.797 1.11* Wisconsin 0.614 2.320 1.36* Plains Konses 0.703 2.109 1.33* Nebresin 0.639 1.547 1.31* North Dalota 0.918 2.058 1.07 Olichome 0.720 1.950 1.23* South Dalota 0.974 1.447 0.67 Texas 0.637 1.194 0.69 South Dalota 0.974 1.447 0.67 Texas 0.637 1.634 0.99 Arlenses 0.957 1.654 0.89 Floride 1.097 2.001 0.84 Georgin 0.732 1.799 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Teanasces 0.630 2.019 1.10 Virginia 0.673 1.755<		Minnecota			
Visconsin 0.614 2.320 1.36 [*] Plains Kanzas 0.703 2.109 1.33 [*] Nebrasin 0.609 1.547 1.31 [*] North Dalota 0.916 2.058 1.07 Olichoma 0.720 1.950 1.23 [*] South Dalota 0.974 1.447 0.67 Tomas 0.837 1.194 0.69 Southeast Alabama 0.823 1.634 0.99 Aritanses 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11* Kentuelry 0.919 1.987 0.93 Louisiana 0.732 1.779 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Teanasees 0.630 2.019 1.10 Virginia		Missouri			
Plains Kinners 0.703 2.109 1.33 [*] Nebresha 0.639 1.547 1.31 [*] North Daltota 0.918 2.058 1.07 Oldehome 0.720 1.950 1.23 [*] South Daltota 0.974 1.447 0.67 Tenzs 0.637 1.194 0.69 Southeast Alabama 0.923 1.634 0.99 Artmans 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgia 0.755 1.786 1.11 [*] Kentuchy 0.919 1.967 0.93 Louisiana 0.732 1.799 1.22 [*] Mississippi 0.521 1.777 1.50 [*] North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23 [*] Morth Carolina 0.610 1.413 1.33 [*] Vest Virginia 0.937 1.737 0.86 <t< th=""><td></td><td>Chio</td><td></td><td></td><td></td></t<>		Chio			
North Dakota 0.639 1.547 1.31* North Dakota 0.918 2.058 1.07 Oldahoma 0.720 1.950 1.23* South Dakota 0.974 1.447 0.67 Tenas 0.837 1.194 0.69 Southeast Alabama 0.323 1.634 0.99 Arkmasts 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11* Mentuckry 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Mitsissippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Teanascea 0.630 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Colorado 0.673		Wisconsin	0.614		
North Dalxota0.910 2.058 1.07 Oldchome0.7201.950 1.23^* South Dalxota0.9741.4470.67Tenas0.6371.1940.69Alabama0.6231.6340.99Arkanass0.9571.8540.89Florida1.0972.0010.84Georgia0.7551.7861.11*Kentucky0.9191.9270.93Louisiana0.7321.7991.22*Miasiasippi0.5211.7771.50*North Carolina1.1421.5870.48South Carolina0.6751.6921.23*Vest Virginia0.9371.7370.86NorthvestColoredo0.6731.7551.27*Idaho0.6942.6071.33*Montana1.0541.7950.74Oregon0.6212.1391.16*Washington0.9121.8841.02Wyoming0.6321.9321.22*SouthwestArizona1.7331.456California1.0292.0370.96NerkeArizona1.7331.456Octalifornia1.0221.2330.33NorthwestArizona1.7331.456Octalifornia1.0292.0370.96NorthwestArizona1.7331.456Octalifornia1.0292.0370.96Nevede1.0221.2330.33Northwes	Plains	Kanses			
Oldehom 0.720 1.950 1.23* South Dalkota 0.974 1.447 0.67 Temas 0.037 1.194 0.69 Southeast Alabama 0.023 1.634 0.99 Arlansas 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11* Mentuelry 0.919 1.987 0.98 Louisiana 0.732 1.799 1.22* Miasiasippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennesses 0.830 2.019 1.10 Virginia 0.937 1.737 0.86 Northwest Coloredo 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821		Nebraska			
South Daltota 0.974 1.447 0.67 Textas 0.037 1.194 0.69 SoutheastAlabama 0.023 1.634 0.99 Arltansas 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11^* Kentuclry 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22^* Mitasissippi 0.521 1.777 1.50^* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23^* Tennasce 0.830 2.019 1.10 Virginia 0.937 1.737 0.86 NorthvestColorado 0.673 1.755 1.27^* Idaho 0.694 2.607 1.33^* Montana 1.054 1.795 0.74 Cregon 0.221 2.139 1.16^* Washington 0.912 1.884 1.02 Wyoming 0.668 1.932 1.22^* SouthwestArizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevzda 1.002 1.233 0.38 Nev Mexico 0.987 1.225 0.39		North Dakota	0.918		
Tottas 0.837 1.194 0.69 Southeast Alabama 0.223 1.634 0.99 Arltansas 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11* Kentuclty 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennesses 0.830 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idcho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.21 2.139 1.16* Wyoming 0.6		Okiahoma			
Southeast Alabama 0.023 1.634 0.99 Arkansas 0.957 1.854 0.89 Florida 1.037 2.001 0.84 Georgin 0.755 1.786 1.11* Kentucky 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennesses 0.830 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idcho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.21 2.139 1.16* Wyoming 0.638 1.932 1.22* Southwest A		South Dakota			
Arkanass 0.957 1.854 0.89 Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11* Mentucky 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Miasiasippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.46 South Carolina 0.675 1.692 1.23* Tennasses 0.630 2.019 1.10 Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Wyoming 0.633 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.02 1.2		Texas			
Florida 1.097 2.001 0.84 Georgin 0.755 1.786 1.11* Kentuchy 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennesses 0.830 2.019 1.10 Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.621 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0	Southeast	Alabama			
Georgin 0.755 1.786 1.11* Kentucky 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennessee 0.630 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevzda <		Arkansas			
Mentuclry 0.919 1.987 0.93 Louisiana 0.732 1.799 1.22* Miasissippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennascep 0.630 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Wyoming 0.638 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevzda 1.022 1.233 0.38 New Mexico 0.987 1.225 0.39		Florida			
Louisiana 0.732 1.799 1.22* Mississippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennesses 0.830 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.755 1.27* Idaho 0.673 1.755 1.27* Idaho 0.664 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nev Mexico 0.987 1.225 0.39		Georgia			
Miasissippi 0.521 1.777 1.50* North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennesses 0.830 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nev Mexico 0.987 1.225 0.39		5			
North Carolina 1.142 1.587 0.48 South Carolina 0.675 1.692 1.23* Tennasses 0.830 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Wzshington 0.912 1.884 1.02 Wyoming 0.638 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevzda 1.602 1.233 0.38 Nev Mexico 0.987 1.225 0.39					
South Carolina 0.675 1.692 1.23* Tennesses 0.630 2.019 1.10 Virginia 0.610 1.413 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.002 1.233 0.38 New Mexico 0.987 1.225 0.39					
Tennesses 0.830 2.019 1.10 Virginia 0.610 1.418 1.33* West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.621 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.002 1.233 0.38 New Mexico 0.987 1.225 0.39					
Virginia 0.610 1.418 1.33 [*] West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27 [*] Idaho 0.694 2.607 1.33 [*] Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16 [*] Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22 [*] Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.965 Nevada 1.002 1.233 0.38 New Mexico 0.987 1.225 0.39					
West Virginia 0.937 1.737 0.86 Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39					
Northwest Colorado 0.673 1.755 1.27* Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39					
Idaho 0.694 2.607 1.33* Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16* Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39		•			
Montana 1.054 1.795 0.74 Oregon 0.821 2.139 1.16 [*] Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22 [*] Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.965 Nevada 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39	Northwest				
Oregon 0.821 2.139 1.16 [*] Washington 0.912 1.884 1.02 Wyoming 0.688 1.932 1.22 [*] Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39					
Washington 0.912 1.884 1.02 Wyoming 0.638 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevzda 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39					
Wyoming 0.638 1.932 1.22* Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.965 Nevzda 1.602 1.233 0.38 New Mexico 0.987 1.225 0.39					
Southwest Arizona 1.783 1.456 -0.23 California 1.029 2.037 0.96 Nevada 1.602 1.233 0.38 Nevy Mexico 0.987 1.225 0.39					
California1.0292.0370.96Nevada1.0021.2330.38New Mexico0.9871.2250.39					
Nevada1.0021.2330.38New Mexico0.9871.2250.39	Southwest				
New Mexico 0.987 1.225 0.39					
Utah 1.018 2.310 0.97					
		Utah	1.018	2.310	0.97

Table 3 Factor Analysis		Land 1	Land Price		GovtPay/Revenue	
Region	State	1	2	1	_2_	
New England	Connecticut	.884	.430	.142	.889	
	Maine	.915	.380	.604	.394	
	Massachusetts	.795	.591	.190	.901	
	New Hampshire	.834	.513	.701	.262	
	Rhode Island	.882	.427	.076	.313	
	Vermont	.916	.373	.148	.910	
Mid-Atlantic	Delaware	.984	.059	.862	.144	
	Maryland	.984	.053	.923	.100	
	New Jersey	.933	.220	.886	062	
	New York	.936	.224	.946	.093	
	Pennsylvania	.984	.108	.869	.030	
North Central	Illinois	.905	364	.853	028	
	Indiana	.930	326	.950	042	
	Iowa	.875	434	.880	024	
	Michigan	.981	139	.966	031	
	Minnesota	.935	321	.915	033	
	Missouri	.974	183	.930	084	
	Ohio	.944	272	.975	039	
	Wisconsin	.979	134	.860	.012	
Plains	Kansas	.927	339	.927	088	
	Nebraska	.952	262	.639	648	
	North Dakota	.982	148	.940	105	
	Oklahoma	.982	138	.928	055	
	South Dakota	.978	161	.924	.033	
	Texas	.947	.168	.304	191	
Southeast	Alabama	.993	.081	.778	189	
	Arkansas	.982	079	.841	217	
	Florida	.964	.191	.593	018	
	Georgia	.988	.023	.902	049	
	Kentucky	.996	041	.902	.146	
	Louisiana	.973	107	.688	168	
	Mississippi	.984	081	.848	262	
	North Carolina	.991	.065	.913	081	
	South Carolina	.990	.012	.893	162	
	Tennessee	.997	.029	.892	182	
	Virginia	.982	.166	.930	054	
	West Virginia	.966	.033	.884	.122	
Northwest	Colorado	.993	025	.648	020	
	Idaho	.976	176	.944	011	
	Montana	.992	075	.886	107	
x	Oregon	.976	098	.946	.019	
	Washington	.975	077	.933	111	
	Wyoming	.989	046	.762	.288	
Southwest	Arizona	.952	.096	.749	299	
	California	.834	048	.875	267	
	Nevada	.960	.011	.752	.063	
	New Mexico	.985	.002	.843	.038	
	Utah	.957	070	.828	.030	