Attachment A: Detailed Regression Results

Public Lands Study, July 2015

The three tables below show the detailed regression results for each of the three economic vitality measures. Each equation included 78 observations.

Definitions of the terms used in the table are on the last page.

Table 1: Regression Results for Equation Regarding Income Growth

R-squared: 0.7809

Explanatory Variable	Coefficient	Standard Error	t-stat	p-value	95% Conf. Interval	
					Lower Bound	Upper Bound
Intercept	21.595	13.428	1.610	0.113	-5.239	48.429
Percent public lands: revenue generating and other	0.051	0.069	0.740	0.460	-0.087	0.189
Percent public lands: conservation, habitat, and passive recreation	0.282	0.080	3.500	0.001	0.121	0.442
Median income lag	-0.001	0.000	-2.920	0.005	-0.001	0.000
Employment density	0.011	0.014	0.750	0.455	-0.018	0.039
Unemployment rate lag	-0.241	0.645	-0.370	0.710	-1.530	1.048
Graduation rate lag	3.473	3.653	0.950	0.345	-3.827	10.772
Interstate highway density	-52.752	41.433	-1.270	0.208	-135.550	30.046
Forestry employment share lag	-3.900	7.862	-0.500	0.622	-19.610	11.811
Dividends to incomes share lag	-34.347	52.733	-0.650	0.517	-139.727	71.032
Percent productive arable land	4.677	3.012	1.550	0.126	-1.342	10.696
Average slope	-0.741	0.259	-2.860	0.006	-1.260	-0.223
Population per square mile lag	0.021	0.008	2.600	0.012	0.005	0.037
Expenditures per student lag	0.000	0.001	0.000	0.999	-0.002	0.002
1990-2000 dummy = 1	19.207	5.073	3.790	0.000	9.070	29.344

Source: WSU regression analysis.

Table 2. Regression Results for Equation Regarding Job Growth

R-squared: 0.6424

Explanatory Variable	Coefficient	Standard Error	t-stat	p-value	95% Conf. Interval	
					Lower Bound	Upper Bound
Intercept	4.426	6.593	0.670	0.504	-8.749	17.602
Percent public lands: revenue generating and other	0.045	0.044	1.040	0.303	-0.042	0.132
Percent public lands: conservation, habitat, and passive recreation	0.146	0.042	3.470	0.001	0.062	0.230
Median income lag	0.000	0.000	-0.430	0.667	0.000	0.000
Employment density	0.009	0.008	1.070	0.289	-0.008	0.025
Unemployment rate lag	-0.545	0.252	-2.160	0.034	-1.048	-0.042
Graduation rate lag	0.498	1.538	0.320	0.747	-2.575	3.571
Interstate highway density	24.621	19.055	1.290	0.201	-13.456	62.699
Forestry employment share lag	-7.552	5.484	-1.380	0.173	-18.511	3.407
Dividends incomes share lag	-7.647	20.872	-0.370	0.715	-49.357	34.063
Percent productive arable land	2.391	1.827	1.310	0.195	-1.261	6.043
Average slope	-0.374	0.130	-2.870	0.006	-0.635	-0.114
Population per square mile lag	-0.002	0.004	-0.640	0.523	-0.010	0.005
Expenditures per student lag	0.000	0.001	0.120	0.907	-0.001	0.001
1990-2000 dummy = 1	6.839	2.219	3.080	0.003	2.405	11.274

Source: WSU regression analysis.

Table 3. Regression Results for Equation Regarding Population Growth

R-squared: 0.4201

Explanatory Variable	Coefficient	Standard Error	t-stat	p-value	95% Conf. Interval	
					Lower Bound	Upper Bound
Intercept	-12.193	18.478	-0.660	0.512	-49.153	24.768
Percent public lands: revenue generating and other	0.236	0.104	2.270	0.027	0.028	0.443
Percent public lands: conservation, habitat, and passive recreation	0.184	0.103	1.780	0.080	-0.023	0.391
Median income lag	0.000	0.000	1.210	0.232	0.000	0.001
Employment density	0.009	0.018	0.510	0.610	-0.027	0.045
Unemployment rate lag	-0.376	0.568	-0.660	0.510	-1.512	0.759
Graduation rate lag	4.350	6.424	0.680	0.501	-8.500	17.201
Interstate highway density	5.372	39.929	0.130	0.893	-74.498	85.242
Forestry employment share lag	-7.534	14.579	-0.520	0.607	-36.696	21.628
Dividends incomes share lag	40.953	53.746	0.760	0.449	-66.556	148.462
Percent productive arable land	5.482	3.403	1.610	0.112	-1.324	12.288
Average slope	-1.033	0.355	-2.910	0.005	-1.743	-0.322
Population per square mile lag	-0.015	0.007	-2.080	0.042	-0.029	-0.001
Expenditures per student lag	0.001	0.001	1.070	0.288	-0.001	0.004
Coastal (dummy=1 if coastal)	-0.166	3.452	-0.050	0.962	-7.071	6.739
Average May precipitation	1.289	1.308	0.990	0.328	-1.328	3.906
Average July temperature	-0.163	0.458	-0.360	0.723	-1.078	0.753
1990-2000 dummy = 1	5.779	4.790	1.210	0.232	-3.803	15.360

Source: WSU regression analysis.

Regression Terms

Term	Definition	Example based on Table 1, Row 4
R-Squared	The R-squared value is an indicator of how much variation in the output is explained by all of the explanatory variables. The closer an R-squared value is to 1.0, the better the equation overall is at explaining the output.	The R-squared value of 0.7809 for Table 1 means that 78% of the variation found in income growth across counties is explained by the variables in the model.
Coefficient	A coefficient is an estimate of the relationship between an explanatory variable and a dependent variable. The coefficient does not indicate that the explanatory variable caused the dependent variable.	A coefficient of 0.28 means that for every 1 percent change in percentage of conservation, habitat, and passive recreation lands (explanatory variable), we predict that there also is a 0.28 percent increase in income growth (dependent variable).
Standard Error	Standard error of the estimate measures the variability of the regression coefficients. A smaller standard error means that the values are tightly grouped around the regression line. The smaller a standard error is compared to its coefficient, the greater the accuracy of the estimate.	A standard error is best interpreted in relation to its associated coefficient value. In the example, the standard error of .080 indicates that the estimate of the relationship (1% change in land related to .28% change in income growth) is relatively accurate, because .080 is much smaller than 0.28. The standard error provides information to determine the upper bound and lower bound of the 95% confidence interval (see below).
t-stat	A t-stat value reports the level of reliability that the relationship estimated in the regression is not due to random chance. T-stat and p-values communicate similar information, but p-values are stated in terms of probability. A large t-stat value means that a relationship is likely to exist.	In the example, the t-stat value of 3.500 is large enough to indicate that a relationship exists between the percentage of conservation, habitat, and passive recreation lands and income growth.
p-value	P-value is an indicator of the confidence that a relationship between two variables is not due to chance. A common standard for determining a statistically significant relationship, or confidence that a relationship is not due to chance, is a value of ≤ .05.	A p-value of .001 means that there is 99.9 percent confidence that the relationship between percentage of conservation, habitat, and passive recreation lands and income growth is not due to chance.
95% Confidence Interval (Lower Bound, Upper Bound)	95% confidence interval estimates how confident one can be that the true relationship between the explanatory variable and the dependent variable is within the values of the lower and upper bounds.	The 95% confidence interval for percent of conservation, habitat, and passive recreation lands and income growth is 0.12 and 0.44. This means that 95 times out of 100, we can expect that a 1% increase in conservation lands is related to a 0.12% to 0.44% increase in income growth. If the confidence interval extends over a negative and positive range, such as -0.1 to 0.6, then the conclusion is that there is no statistically significant relationship between the dependent and explanatory variable.