

Return of the Gilded Age: Income Shares within the Richest 10%

Year	Share to Richest				
	10%	1%	½ of 1% (top 1 of 200)	1/10th of 1% (top 1 of 1,000)	1/100th of 1% (top 1 of 10,000)
1920	38.1	14.4	10.9	5.3	1.6
1940	44.4	15.7	11.6	5.6	1.7
1960	31.6	8.3	5.5	2.1	.6
1970	31.5	7.8	5.1	1.9	.5
1980	32.8	8.1	5.5	2.2	.6
1990	38.8	12.9	9.7	4.9	1.8
1995	40.1	13.3	9.8	4.9	1.8
1998	41.4	14.5	11.1	6.0	2.5
2004	42.9	16.2	12.5	6.9	2.8
2007		18.0			

1. Today, the richest 1% of households have approximately 1.5 times as much income as the entire poorest 40% of households combined.

Equation 1

Dependent Variable is loginc2

```

regdw loginc2 loginc2lag dempreslag time variable: obs, 1950 to 1983
Source |          SS          df          MS          Number of obs =      34
-----+-----+-----+-----+-----+-----+-----+-----
      Model | 1731.11213          2    865.556066          F( 2, 31) = 155.93
      Residual | 172.081971         31    5.55103133          Prob > F      = 0.0000
-----+-----+-----+-----+-----+-----+-----
      Total | 1903.1941          33    57.6725486          R-squared      = 0.9096
                                          Adj R-squared = 0.9037
                                          Root MSE     = 2.3561
-----+-----+-----+-----+-----+-----+-----
      loginc2 |          Coef.      Std. Err.      t      P>|t|      [95% Conf. Interval]
-----+-----+-----+-----+-----+-----+-----
      loginc2lag |   .9123342      .0517841      17.62   0.000      .8067198      1.017948
      dempreslag |  -2.090848      .8280496      -2.53   0.017     -3.779666     -.4020295
      _cons |   6.417277      3.4925        1.84   0.076     -.7057239     13.54028
-----+-----+-----+-----+-----+-----+-----

```

Durbin-Watson Statistic = 2.05022

Variables: Variable loginc2 is annual natural log, times 100, of the ratio of net income (money income - including cash transfers - plus income underreporting, education benefits, in-kind benefits, fringe benefits less taxes) of the richest 20% to the poorest 40% of American households. The average 20/40 ratio over the 1950-1983 period was 1.97 which in natural logs is 2.71828 to the .678 power. Now take .678 x 100 (i.e., 67.8) and we have the log of the "income gap" or the percentage gap in net income between the two groups. Variable loginc2lag is loginc2 from the previous year. Variable dempreslag is the partisanship of the president from the previous year (Democrat = 1, Republican = 0).

Equation 2

Dependent Variable is loginc2

```
. regdw loginc2 loginc2lag demconglag
```

Source	SS	df	MS	Number of obs = 34		
Model	1713.8706	2	856.935298	F(2, 31)	=	140.32
Residual	189.323507	31	6.10720991	Prob > F	=	0.0000
				R-squared	=	0.9005
				Adj R-squared	=	0.8941
Total	1903.1941	33	57.6725486	Root MSE	=	2.4713

loginc2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
loginc2lag	.8682536	.0539649	16.09	0.000	.7581915	.9783156
demconglag	-.1348218	.0782054	-1.72	0.095	-.2943228	.0246792
_cons	16.29395	6.360111	2.56	0.015	3.322421	29.26548

Durbin-Watson Statistic = 2.026621

Note: demconglag = percentage Democratic of the House and Senate combined from the previous year

Equation 3

Dependent Variable is loginc2

```
. regdw loginc2 loginc2lag u transhr2 dempreslag demconglag
```

Source	SS	df	MS	Number of obs = 34		
Model	1792.48507	5	358.497014	F(5, 28)	=	90.67
Residual	110.709035	28	3.9538941	Prob > F	=	0.0000
				R-squared	=	0.9418
				Adj R-squared	=	0.9314
Total	1903.1941	33	57.6725486	Root MSE	=	1.9884

loginc2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
loginc2lag	.6243348	.1105678	5.65	0.000	.3978469	.8508227
u	1.904019	.492092	3.87	0.001	.8960146	2.912024
transhr2	-1.035093	.3273671	-3.16	0.004	-1.705674	-.3645115
dempreslag	.4376646	1.024469	0.43	0.672	-1.660865	2.536194
demconglag	-.0477286	.0762277	-0.63	0.536	-.203874	.1084168
_cons	27.73259	9.776886	2.84	0.008	7.705545	47.75963

Durbin-Watson Statistic = 1.90182

Note: u = annual unemployment rate; transhr2 = transfer payments to persons as a percentage share of aggregate personal income (inclusive of in-kind benefits)

Multicollinearity – Part 1

Variable List: Y = is the percentage of the county vote for Peron in the 1946 Presidential election; X_1 = urban blue-collar workers (as a percentage of the economically active population); X_2 = rural blue collar workers (as a percentage of the economically active population); X_3 = urban white-collar workers (as a percentage of the economically active population); X_4 = rural white-collar workers (as a percentage of the economically active population) and X_5 = internal migrants (as a percentage of Argentinian-born males)

Results

$$.52 + .18X_1 - .10X_2 - .57X_3 - 3.57X_4 + .29X_5$$

$$(.43) \quad (.41) \quad (.43) \quad (2.54) \quad (.07)$$

$$R^2 = .24$$

Estimated standard errors in parentheses.

Question: How would you interpret the results above?

Multicollinearity – Part 2

The results of the “explained variance test” (i.e., the R squared from regressing each independent variable on all other independent variables) are as follows: $X_1 = .98$; $X_2 = .99$; $X_3 = .98$; $X_4 = .75$; $X_5 = .32$.

Question: Now, what would you do?

Multicollinearity – Part 3

$$.42 + .28X_1 - .47X_3 - 3.07X_4 + .30X_5$$

(.07) (.10) (1.41) (.07)

$$R^2 = .24$$

Estimated standard errors in parentheses.

Interpretation

All independent variables are statistically significant and signed as expected (blue collar workers and internal migrants are positively associated with the Peron vote while white collar workers are negatively associated with the Peron vote). Notice that the coefficient value and standard error for migrant workers (X_5) is virtually unchanged. This is because this variable is not very collinear with the others. The results of the “explained variance test” (i.e., the R^2 from regressing each independent variable on all other independent variables are as follows: $X_1 = .29$; $X_3 = .38$; $X_4 = .20$; $X_5 = .30$ (remember that X_2 was omitted from this equation).

Descriptive Statistics for Federal Tax Model

Variable List

Tax = Percentage of times the senator vote in favor of federal tax changes where over 50% of the benefits went to households earning less than the median family income on 76 amendments to the Tax Reform Act of 1976. This would mean either favoring changes primarily benefiting households with incomes below the median income or opposing changes primarily benefiting households above the median income.

Cons = Percentage of times the senator voted for positions favored by the Americans for Constitutional Action (a conservative interest group).

Party = Senator's party affiliation (1 = Democrat, 0 = Republican)

Stinc = Median household income in the senator's state

Variable	Obs	Mean	Std. Dev.	Min	Max
tax	100	46.54	28.73193	7	97
cons	100	35.11	31.24258	0	100
party	100	.62	.4878317	0	1
stinc	100	9.205	1.524174	6.1	12.4

Question: What does a comparison of the mean and the standard deviation for the above data tell us?

TAX					
Percentiles		Smallest			
1%	7	7			
5%	9.5	7			
10%	11.5	7	Obs	100	
25%	21	8	Sum of Wgt.	100	
50%	44		Mean	46.54	
			Std. Dev.	28.73193	
		Largest			
75%	72.5	94	Variance	825.5236	
90%	89.5	96	Skewness	.2649516	
95%	92	97	Kurtosis	1.66381	
99%	97	97			

Note: The median score on "tax" is 44. Additionally, 95% of the scores are at, or below, 92. The four highest values are 94, 96, 97 and 97 while the four lowest values are 7,7,7 and 8.

Skewness refers to the degree of asymmetry of a distribution. The more asymmetrical the distribution the more it deviates from a normal curve. Normal distributions have a skewness of zero. A positive value indicates a positive (rightward) skew (e.g., p. 25) while a negative value indicates a negative (leftward) skew. If the mean is greater than the median there is usually a positive skew. If the mean is less than the median there is usually a negative skew.

Kurtosis refers to the height or peakedness of the distribution. The normal distribution has a coefficient of kurtosis (i.e., what STATA reports above) of 3.0 with numbers below 3.0 indicating a flatter than normal distribution and numbers above 3.0 indicating a distribution that is higher (i.e., taller) in the middle than a normal distribution.

CONS				

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	100
25%	8	0	Sum of Wgt.	100
50%	27.5		Mean	35.11
		Largest	Std. Dev.	31.24258
75%	61	95		
90%	87.5	96	Variance	976.0989
95%	94	96	Skewness	.6253713
99%	98	100	Kurtosis	2.05739

PARTY				

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	100
25%	0	0	Sum of Wgt.	100
50%	1		Mean	.62
		Largest	Std. Dev.	.4878317
75%	1	1		
90%	1	1	Variance	.2379798
95%	1	1	Skewness	-.4944514
99%	1	1	Kurtosis	1.244482

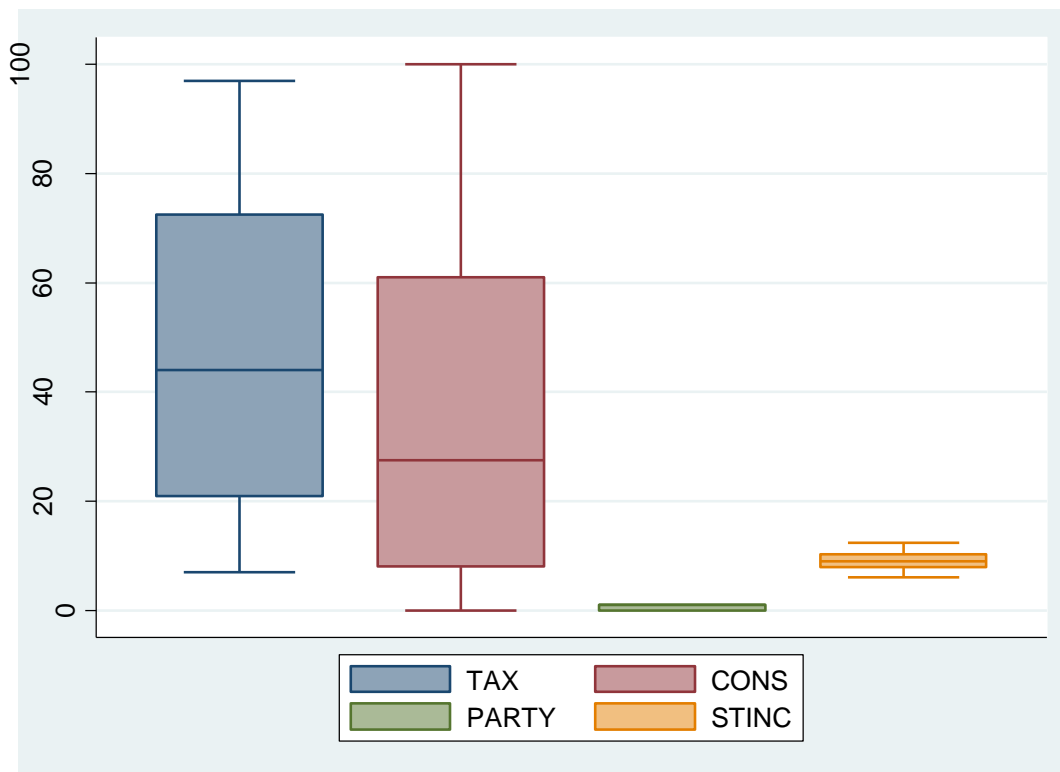
STINC				

	Percentiles	Smallest		
1%	6.1	6.1		
5%	7.3	6.1		
10%	7.4	6.3	Obs	100
25%	7.8	6.3	Sum of Wgt.	100
50%	9		Mean	9.205
		Largest	Std. Dev.	1.524174
75%	10.35	12.4		
90%	11.25	12.4	Variance	2.323106
95%	11.8	12.4	Skewness	.1904308
99%	12.4	12.4	Kurtosis	2.342715

Questions:

- (1) Interpret the numbers under "Percentiles"?
- (2) Interpret the skewness and kurtosis of each variable?
- (3) What is the median score for each variable?
- (4) What is the significance of the difference between the median and the mean score for each variable?

**Box Plot of Tax, Conservatism, Party Affiliation
and State Median Family Income (Median, 75th and 25th Percentiles)**



Note: The bold line in each box represents the median score on that particular variable. The “top of the box” is the 75th percentile while the “bottom of the box” is the 25th percentile.

California County Data – Variable Means and Standard Deviations

Variable	Obs	Mean	Std. Dev.	Min	Max
coll100	58	21.57241	9.636859	10.3	51.3
coll190	58	18.77414	7.690289	9	44
coll180	58	14.49573	5.49478	7.57449	34.33821
coll170	58	10.70517	4.02263	3	26.6
medinc05	58	48.49655	12.07092	29.5	78
medinc90	58	30.56216	7.490968	20.494	48.544
medinc79	58	19.23843	3.30014	13.522	29.721
medinc70	58	9.417241	1.446125	6.6	13.9
obama	58	53.22931	13.18758	30	84.2
dukakis	58	45.23448	8.256429	31.1	72.8
mcgovern	58	40.85345	6.144009	26.9	56.1
brown94	58	35.79483	9.655149	21.4	69.1
brown74	58	48.43103	5.250036	39.3	61.8
brown66	58	40.43448	6.261202	22.2	58.9
prop8	58	56.66552	13.41972	24.9	75.4
prop209	58	61.57759	8.996063	29.5	72.3
prop187	58	64.33448	10.49171	29.3	77.2
prop128	58	28.18377	9.601343	12.15736	62.05421
prop13	58	65.05192	6.733435	46.47887	76.27118
prop14	58	63.52031	7.180588	48.2243	78.16655

Correlation of Change in Percentage of the Countywide Vote for the Democratic Presidential Candidate from 1988 to 2008

	ch8808	coll100	medinc05
ch8808	1.0000		
coll100	0.6385	1.0000	
medinc05	0.6485	0.7962	1.0000

Correlation of Countywide Vote In Favor of Proposition 8 with Socioeconomic, Demographic and Political Variables

	prop8	obama	coll100	medinc05	dens06	white05	afam05
prop8	1.0000						
obama	-0.8810	1.0000					
coll100	-0.8588	0.7457	1.0000				
medinc05	-0.5862	0.5984	0.7962	1.0000			
dens06	-0.3906	0.4162	0.4551	0.2599	1.0000		
white05	0.3393	-0.5394	-0.4523	-0.4484	-0.5694	1.0000	
afam05	-0.0080	0.2728	0.0732	0.2327	0.2531	-0.7316	1.0000
hispan05	0.2989	0.0942	-0.2579	0.0210	-0.0590	-0.0755	0.2553

Correlation of Countywide Vote on Ballot Propositions

	prop8	prop128	prop187	prop209
prop8	1.0000			
prop128	-0.8813	1.0000		
prop187	0.8652	-0.8923	1.0000	
prop209	0.7524	-0.8600	0.9419	1.0000

**Cross Tabulation of Senator Conservatism
and Support for Tax Changes Primarily Benefiting Households
With Median, or Lower, Incomes**

Cons1 0-33 = 1, 34-66 = 2, 67-100 = 3

Tax1 0-33 = 1, 34-66 = 2, 67-100 = 3

tabulate tax1 cons1, row column all

```

+-----+
| Key    |
+-----+
|  frequency  |
|  row percentage  |
|  column percentage  |
+-----+

```

Note: Interpret by the Independent Variable (cons1). Thus, column percentages (the lowest row of each cell) are most important. This is why I setup the table so that conservatism was across the columns rather than down the rows.

tax1	cons1			Total
	1	2	3	
1	7	16	21	44
	15.91	36.36	47.73	100.00
	12.28	76.19	95.45	44.00
2	23	5	1	29
	79.31	17.24	3.45	100.00
	40.35	23.81	4.55	29.00
3	27	0	0	27
	100.00	0.00	0.00	100.00
	47.37	0.00	0.00	27.00
Total	57	21	22	100
	57.00	21.00	22.00	100.00
	100.00	100.00	100.00	100.00

```

Pearson chi2(4) = 58.8499   Pr = 0.000
likelihood-ratio chi2(4) = .
Cramér's V = 0.5424
gamma = -0.9467   ASE = 0.029
Kendall's tau-b = -0.6695   ASE = 0.041
correlation = -0.6963   (correlation of cons1 and tax1)
correlation = -0.8017   (correlation of cons and tax)

```

Notice that the correlation is higher when the full range of scores is used instead of the recoded version (i.e., 0-34 = 1, etc.).

**Cross Tabulation of Senator Conservatism
And Support for Tax Changes Primarily Benefiting Households
With Median, or Lower, Incomes for Republican Senators**

tabulate tax1 cons1 if party==0, row column all

```

+-----+
| Key    |
+-----+
|  frequency  |
|  row percentage  |
|  column percentage  |
+-----+

```

tax1	cons1			Total
	1	2	3	
1	2	8	18	28
	7.14	28.57	64.29	100.00
	20.00	80.00	100.00	73.68
2	8	2	0	10
	80.00	20.00	0.00	100.00
	80.00	20.00	0.00	26.32
Total	10	10	18	38
	26.32	26.32	47.37	100.00
	100.00	100.00	100.00	100.00

```

Pearson chi2(2) = 21.4971   Pr = 0.000
likelihood-ratio chi2(2) = .
Cramér's V = 0.7521
gamma = -0.9677   ASE = 0.032
Kendall's tau-b = -0.6687   ASE = 0.082
correlation = -0.7257   (correlation of cons1 and tax1)
correlation = -0.7814   (correlation of cons and tax)

```

Cross Tabulation of Senator Conservatism
And Support for Tax Changes Primarily Benefiting Households
With Median, or Lower, Incomes for Democratic Senators

tabulate tax1 cons1 if party==1, row column all

```

+-----+
| Key   |
+-----+
|       |
| frequency |
| row percentage |
| column percentage |
+-----+

```

tax1	cons1			Total
	1	2	3	
1	5	8	3	16
	31.25	50.00	18.75	100.00
	10.64	72.73	75.00	25.81
2	15	3	1	19
	78.95	15.79	5.26	100.00
	31.91	27.27	25.00	30.65
3	27	0	0	27
	100.00	0.00	0.00	100.00
	57.45	0.00	0.00	43.55
Total	47	11	4	62
	75.81	17.74	6.45	100.00
	100.00	100.00	100.00	100.00

```

Pearson chi2(4) = 26.0495   Pr = 0.000
likelihood-ratio chi2(4) = .
Cramér's V = 0.4583
gamma = -0.9077   ASE = 0.054
Kendall's tau-b = -0.5697   ASE = 0.068
correlation = -0.5892   (correlation of cons1 and tax1)
correlation = -0.7169   (correlation of cons and tax)

```

Logarithmic Variable Relationships

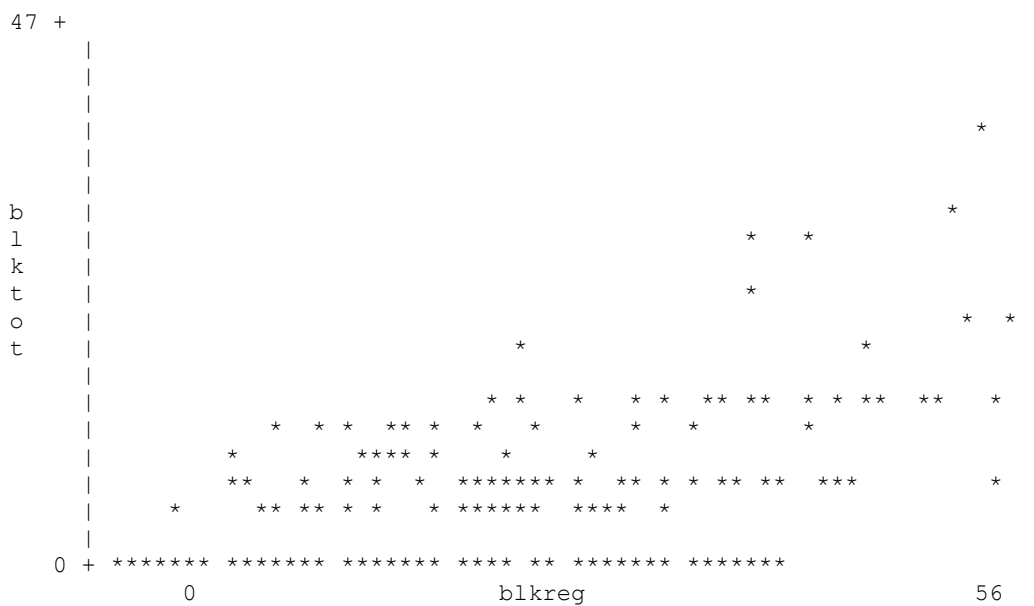
Variable List: blktot = percentage of the county elected officials in North Carolina were African-American; blkreg = percentage of the registered voters in a county who are African-American (1980, 1982 and 1984 – i.e., three years for each of the 100 counties)

Linear Model

Source	SS	df	MS			
Model	6182.53094	1	6182.53094	Number of obs =	300	
Residual	9644.30573	298	32.363442	F(1, 298) =	191.03	
-----				Prob > F =	0.0000	
-----				R-squared =	0.3906	
-----				Adj R-squared =	0.3886	
Total	15826.8367	299	52.9325641	Root MSE =	5.6889	

blktot	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	

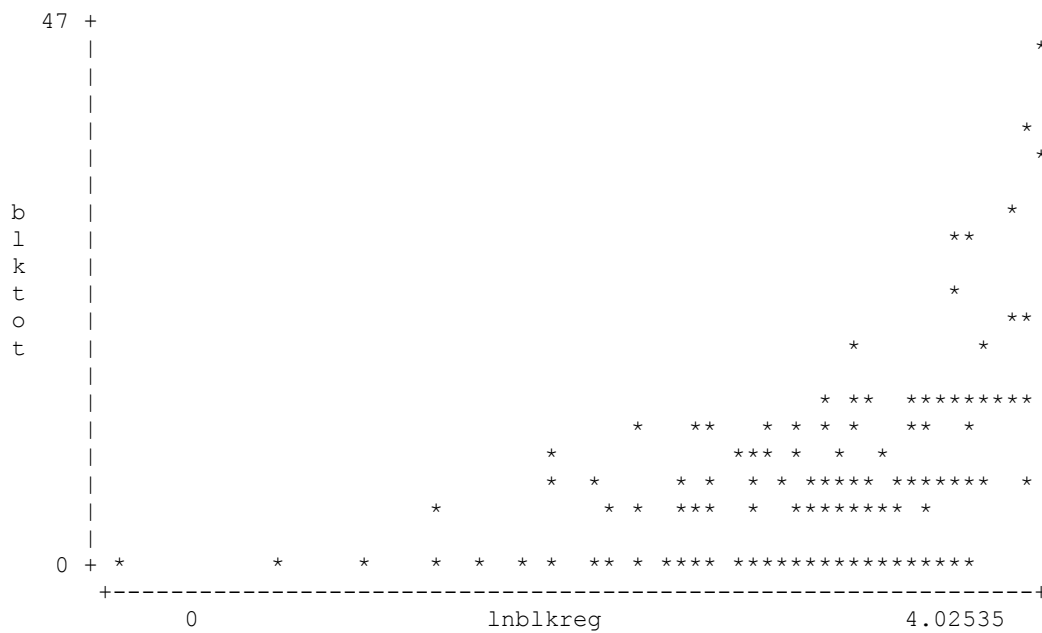
blkreg	.3113559	.0225269	13.82	0.000	.267024	.3556879
_cons	-1.248558	.5381414	-2.32	0.021	-2.307597	-.1895195



Logarithmic Independent Variable Model

Source	SS	df	MS	Number of obs = 286		
Model	3803.4413	1	3803.4413	F(1, 284)	=	92.27
Residual	11706.772	284	41.2210281	Prob > F	=	0.0000
				R-squared	=	0.2452
				Adj R-squared	=	0.2426
Total	15510.2133	285	54.421801	Root MSE	=	6.4204

blktot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnblkreg	3.396098	.3535504	9.61	0.000	2.700187	4.09201
_cons	-3.88385	.9872943	-3.93	0.000	-5.827192	-1.940507



1. Interpret the coefficients, t ratios and r-squared for each model?
2. Which model fits the data better?
3. What logic would have suggested a logarithmic model?

Polynomial Variable Relationships

North Carolina - 100 counties for 1980, 1982, 1984

Variable List:

blktot = percentage of county elected officials who are African-American

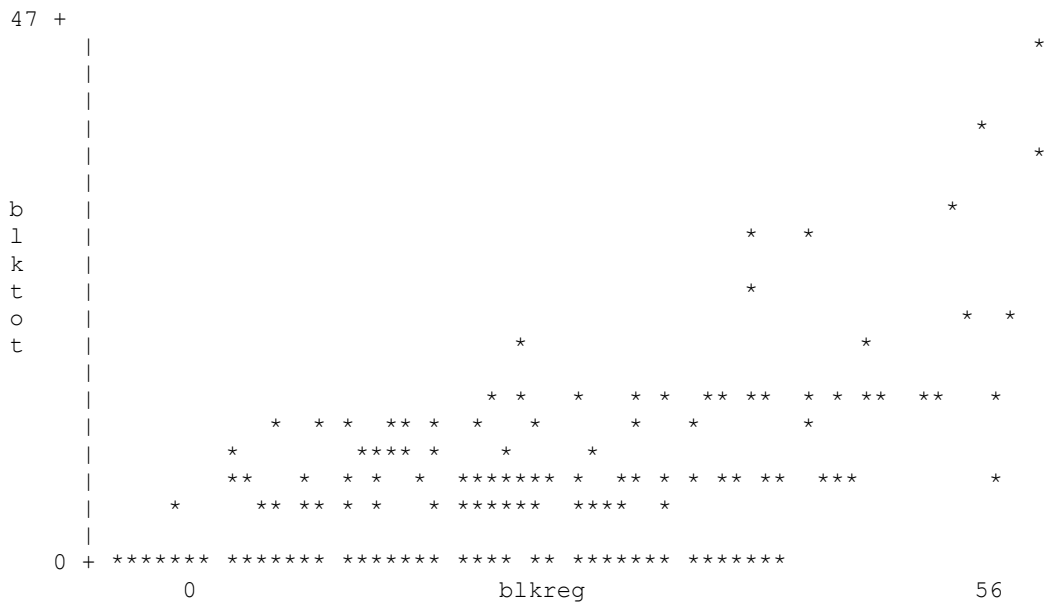
blkreg = percentage of registered voters in a county who are African-American

blkregsq = blkreg x blkreg

blkregcub = blkreg x blkreg x blkreg

Linear Model

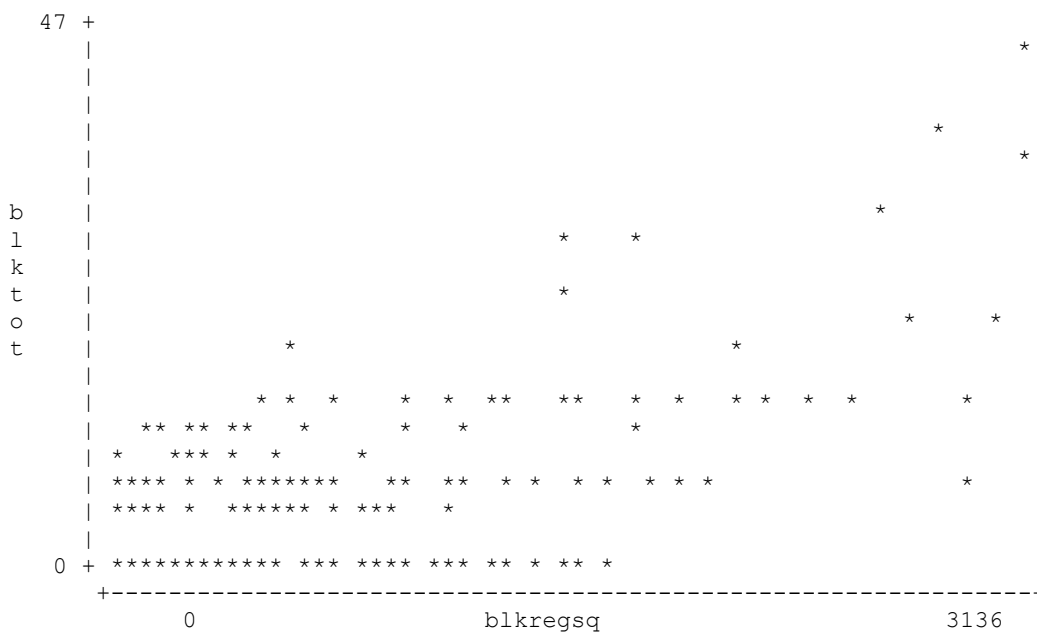
Source	SS	df	MS			
Model	6182.53094	1	6182.53094	Number of obs =	300	
Residual	9644.30573	298	32.363442	F(1, 298) =	191.03	
Total	15826.8367	299	52.9325641	Prob > F =	0.0000	
				R-squared =	0.3906	
				Adj R-squared =	0.3886	
				Root MSE =	5.6889	
blktot	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
blkreg	.3113559	.0225269	13.82	0.000	.267024	.3556879
_cons	-1.248558	.5381414	-2.32	0.021	-2.307597	-.1895195



Model Containing Squared African-American Voter Strength

Source	SS	df	MS	Number of obs = 300	
Model	7128.50933	1	7128.50933	F(1, 298)	= 244.22
Residual	8698.32734	298	29.1890179	Prob > F	= 0.0000
				R-squared	= 0.4504
				Adj R-squared	= 0.4486
Total	15826.8367	299	52.9325641	Root MSE	= 5.4027

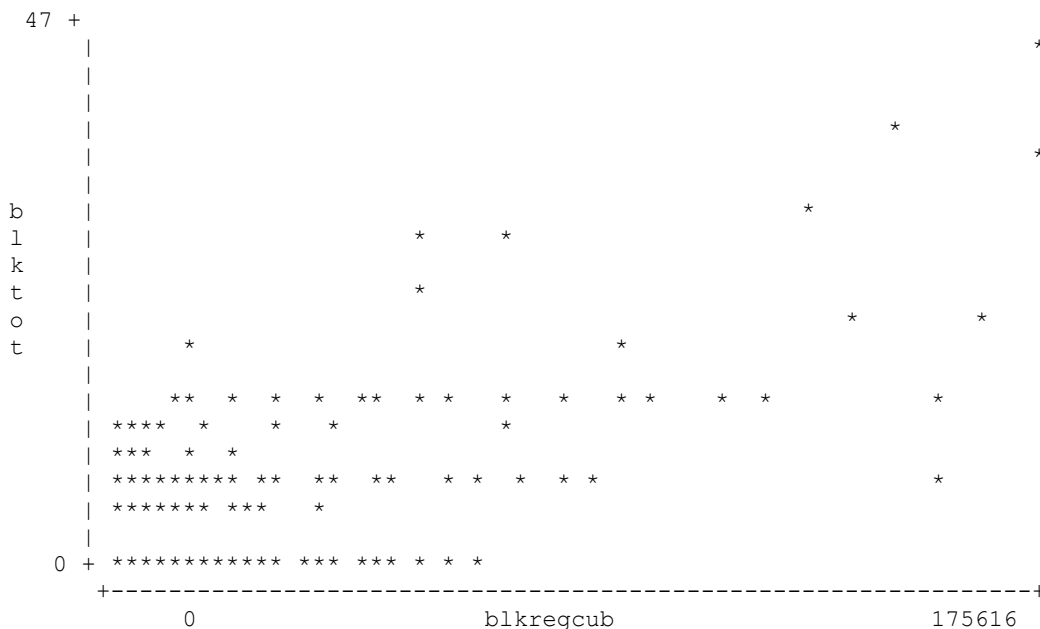
blktot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
blkregsq	.0070043	.0004482	15.63	0.000	.0061222	.0078863
_cons	.646155	.4033848	1.60	0.110	-.1476889	1.439999



Model Containing Cubic African-American Voter Strength

Source	SS	df	MS	Number of obs = 300		
Model	7438.3761	1	7438.3761	F(1, 298)	=	264.25
Residual	8388.46057	298	28.1491965	Prob > F	=	0.0000
				R-squared	=	0.4700
				Adj R-squared	=	0.4682
Total	15826.8367	299	52.9325641	Root MSE	=	5.3056

blktot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
blkregcub	.0001485	9.13e-06	16.26	0.000	.0001305	.0001665
_cons	1.60719	.3587689	4.48	0.000	.9011486	2.313232



Multiple Regression Model

Source	SS	df	MS	Number of obs = 300		
Model	8037.19616	3	2679.06539	F(3, 296)	=	101.80
Residual	7789.6405	296	26.3163531	Prob > F	=	0.0000
				R-squared	=	0.5078
				Adj R-squared	=	0.5028
Total	15826.8367	299	52.9325641	Root MSE	=	5.1299

blktot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
blkreg	.7186047	.1509154	4.76	0.000	.4216015	1.015608
blkregsq	-.0322815	.0071578	-4.51	0.000	-.046368	-.0181949
blkregcub	.0005315	.0000919	5.78	0.000	.0003506	.0007123
_cons	-1.399176	.7664234	-1.83	0.069	-2.907505	.1091539

Correlation between Powers of Black Registration

	blkreg	blkregsq	blkreg~b
blkreg	1.0000		
blkregsq	0.9508	1.0000	
blkregcub	0.8654	0.9752	1.0000

Multiple Regression Including Percent Supporting George Wallace

Source	SS	df	MS	Number of obs = 300		
Model	8422.69127	4	2105.67282	F(4, 295)	=	83.90
Residual	7404.1454	295	25.098798	Prob > F	=	0.0000
				R-squared	=	0.5322
				Adj R-squared	=	0.5258
				Root MSE	=	5.0099
Total	15826.8367	299	52.9325641			

blktot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
blkreg	.9915165	.1630062	6.08	0.000	.670714	1.312319
blkregsq	-.037464	.0071142	-5.27	0.000	-.051465	-.023463
blkregcub	.0005588	.00009	6.21	0.000	.0003817	.0007359
wall	-.1548252	.0395056	-3.92	0.000	-.2325737	-.0770767
_cons	1.051	.9752407	1.08	0.282	-.868311	2.970311

Regression and Correlation

Variable List

coll00 – percentage of the population 25, or older, in the county that has at least a bachelor's degree

prop8 – percentage of the countywide vote in favor of Proposition 8 (ban on gay marriage)

prop128 – percentage of the countywide vote in favor of Proposition 128 (environmental initiative – “Big Green”)

```
correlate coll00 prop8 prop128
(obs=58)
      |   coll00   prop8   prop128
-----+-----
coll00 |   1.0000
prop8  |  -0.8588   1.0000
prop128|   0.8627  -0.8813   1.0000
```

NOTE: In the regression results below, the entry in the “Coef.” column for “cons” is “a” (the y intercept) and the entry above “cons” is “b” - the impact of education on the dependent variable.

```
regress prop8 coll00
Source |         SS          df           MS                Number of obs =      58
-----+-----
Model |   7570.70588         1   7570.70588                F( 1, 56) = 157.35
Residual |  2694.36519        56   48.1136641                Prob > F      = 0.0000
-----+-----
Total |  10265.0711         57   180.088966                R-squared     = 0.7375
                                           Adj R-squared = 0.7328
                                           Root MSE    = 6.9364

      prop8 |          Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----+-----
coll00 |   -1.195901     .095337    -12.54  0.000    -1.386884   -1.004918
_cons |    82.46399     2.249299     36.66  0.000     77.9581    86.96988
```

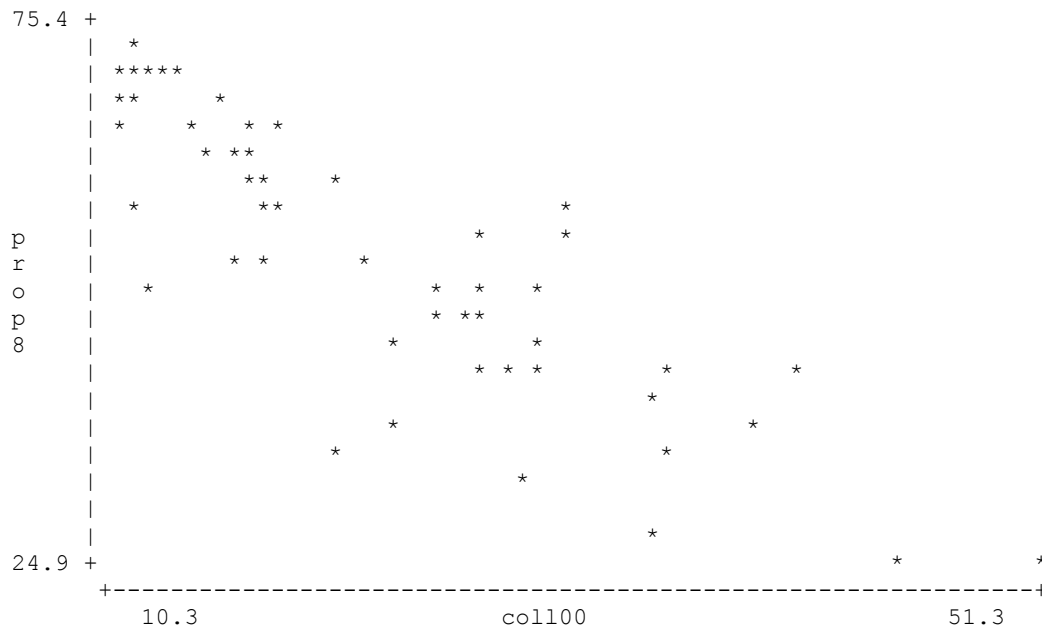
```
. regress prop128 coll00
Source |         SS          df           MS                Number of obs =      58
-----+-----
Model |   3910.80131         1   3910.80131                F( 1, 56) = 162.98
Residual |  1343.78879        56   23.9962284                Prob > F      = 0.0000
-----+-----
Total |   5254.5901         57   92.1857912                R-squared     = 0.7443
                                           Adj R-squared = 0.7397
                                           Root MSE    = 4.8986

      prop128 |          Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----+-----
coll00 |    .8595278     .0673284    12.77  0.000     .7246528    .9944029
_cons |    9.641677     1.58849     6.07  0.000     6.459549    12.82381
```

Graph of the Relationships

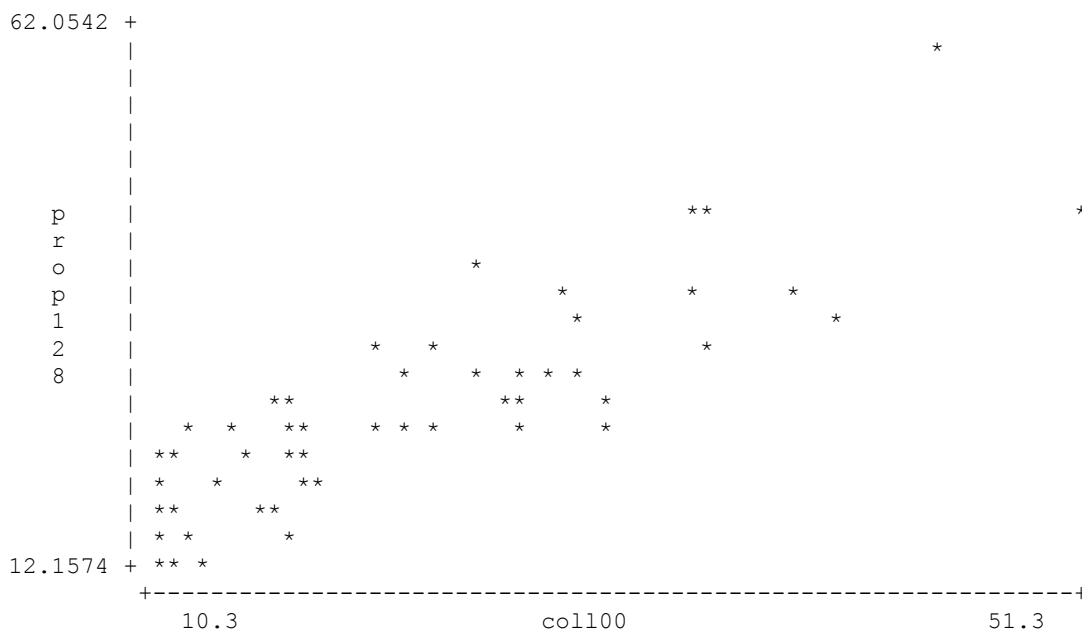
County College Attainment and County Support for Proposition 8

plot prop8 coll100



County College Attainment and County Support for Proposition 128

plot prop128 coll100



Practice Quiz on Covariance

Calculate and interpret the covariance using the following formulas and data:

	X	Y
Observation #1	1	2
Observation #2	3	3
Observation #3	4	3
Observation #4	4	4

After you calculate and interpret the answer see the calculations and interpretation that appear on next page in the coursepack.

$$\bar{X} = \frac{\sum X}{N} \quad \bar{Y} = \frac{\sum Y}{N}$$

$$\text{Cov.}(X, Y) = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{N}$$

Practice Quiz on Covariance

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$$\bar{X} = \frac{\sum X}{N} \quad \bar{Y} = \frac{\sum Y}{N}$$

$$\text{COV}(X, Y) = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{N}$$

$$\bar{X} = \frac{1+3+4+4}{4} = \frac{12}{4} = 3$$

$$\bar{Y} = \frac{2+3+3+4}{4} = \frac{12}{4} = 3$$

$$\text{COV}(X, Y) = (1-3)(2-3) = (-2)(-1) = 2$$

$$(3-3)(3-3) = (0)(0) = 0$$

$$(4-3)(3-3) = (1)(0) = 0$$

$$(4-3)(4-3) = (1)(1) = 1$$

$$\frac{3}{4} = .75$$

There is a positive association between X and Y.

Practice Quiz on Interpreting Bivariate Regression

Interpret the following regression results where:

Y = The number of people killed in violent acts per 1,000,000 in a nation (i.e., if the computer reads a score of 6.2 it means that there were 6.2 persons killed in violent acts for every 1,000,000 people in that particular nation)

X = The average age of the population in the nation (i.e., if the computer reads a score of 31.3 it means that the average person in that nation is 31.3 years old)

a = 77.9 b = -.800 standard error of b = .532 R² = .25

Write your answers and then look at the next page.

Answers to Practice Quiz on Bivariate Regression

Interpretation of “a”: If the average person in a nation were zero years old our model predicts there would be 77.9 violent deaths per million people per year in that same nation. [Note: I realize it would be somewhere between extremely difficult to impossible to actually have the average person be zero years old. This is only an interpretation of the results, not necessarily a situation which would occur in the “real” world. The principle value of “a” is to use it in conjunction with “b” and make predictions for conditions that might occur in the world (e.g., to make a prediction when the average age might be 29.2 years – a figure that could actually occur). Notice also the interpretation says “predict” – we don’t know what would actually happen. This is just a prediction based on the statistical results for our data. When you interpret “a” on a quiz don’t write a “note” such as this one. I just wrote this note to help you better understand the situation.]

Interpretation of “b”: For every additional year older the average person in a nation the number of violent deaths per million people per year in that nation decreases, on average, by eight-tenths of a person.

Interpretation of the Standard Error of “b”: Since b (-.800) is not at least twice the absolute value of the standard error of b (.532) the t ratio is less than 2.0 ($-.800/.532 =$ less than 1.6) and we do not reject the null hypothesis that the average age in the population has no effect on the violent death rate in a nation because the null hypothesis is true greater than 5% of the time (i.e., the results are statistically insignificant at the .05 level). [Note: on a quiz you wouldn’t need to calculate the t ratio – just “eyeball it” – thus, if the standard error were .532 wouldn’t b have to have an absolute value (i.e., either “+” or “-“) of at least 1.064 to be at least twice the size of the standard error and thus be statistically significant at the .05 level? Yes!! Since -.800 is not close to plus or minus 1.064 we automatically know that the t ratio must have an absolute value of less than 2.0 and, therefore, that “ b ” is statistically insignificant at the .05 level.]

Interpretation of “ R^2 ”: Variation in the average age of a person in a nation explains 25 percent of the variation in the number of violent deaths per million people per year in that same nation. (Note: if you either said that we correctly predicted the score on violent deaths per million people per year 25% of the time or that there was a 25% chance that the average age impacted the number of violent deaths per year you would have been incorrect.)

Practice Quiz on Multiple Regression

Interpret the following regression results where:

Y = the percentage of seats gained or lost by the president's party in the House of Representatives (i.e., if the computer read a score of -5 it would mean that the president's party lost 5% of the seats in the House of Representative in the last congressional election – since there are 435 seats, this would mean a loss of about 21 – i.e., 21 is about 5% of 435)

X₁ = percentage change in real income per capita (meaning that income data have been adjusted for inflation and calculated the change on a per person basis – so if the computer read a score of 1.5 it would be mean that after removing the effects of inflation, income per person increased one and one-half percent since the last congressional election)

X₂ = the percentage of the public that approves of the job the president is doing (i.e., if the computer reads a score of 38 it means that 38% of those surveyed approved of how the president was performing his job).

a = -17.70 b₁ = 1.29 standard error of b₁ = .29

b₂ = -.25 standard error of b₂ = .19 R² = .47

Interpret the above results and then look at the next page.

Answers to Practice Quiz on Multiple Regression

Interpretation of “a”: If the change in real income per capita is zero (i.e., the average person gained or lost nothing) and zero percent of the public approved of the president’s job performance, the president’s party would be predicted to lose 17.7% of the seats (about 70 seats) in the next congressional election. **Note:** the dependent variable is not the number of seats the president’s party has in the House of Representatives but the percentage change in seats from the last election. So, -17.70 doesn’t mean a prediction that if change in real per capita income and presidential popularity are both 0% the president’s party would have -17.7% of the seats in the House. Rather, it means that the president’s party would be predicted to lose 17.7% of the 435 seats in the House. For example, if the president’s party had 50% seats after the last congressional election and lost 17.7% of the total seats in the next election they would then have 32.3% of the total seats in the House of Representatives (i.e., $50\% - 17.7\% = 32.3\%$). Although not necessary, you could make this more informative by converting the percentages into seats. Thus, the president’s party would go from approximately 218 seats (218 is approximately 50% of 435) to about 141 seats (i.e., 141 is approximately 32.3% of 435).

Interpretation of “b₁”: If the president’s approval remained the same (e.g., 40% of the public approved of the president’s job performance and it remained at 40%), for each one percentage point increase in real income per capita, on average, the president’s party would gain approximately 1.29% of the seats in the House of Representatives (i.e., about 5 seats – 5 is about 1.29% of 435). Since the t ratio has an absolute value of over 2.0 (i.e., 1.29 is well over twice the size of .29) we reject the null hypothesis that the change in real income per capita has no effect on the change in the percentage of seats in the House of Representatives held by the president’s party since the null hypothesis is true less than 5% of the time.

Interpretation of “b₂”: If the change in real income per capita remained the same (e.g., it was running at 1% and remained at 1%) for each one percentage point increase in the percentage of the public that approves of the president’s job performance, on average, the president’s party would lose (remember, it’s -.25 not .25) about one-fourth of one percentage point of the seats in the House of Representatives (since one-fourth of a percentage point of 435 is approximately 1 seat, you could mention this in addition to one-fourth of one percentage point decrease and make the answer a bit more informative – not a requirement however). Since the t ratio has less than an absolute value of 2.0 (i.e., -.25 is less than twice the absolute value of .19) we do not reject the null hypothesis that presidential approval is unrelated to the change in the share of seats the president’s party has in the House of Representative because the null hypothesis is true greater than 5% of the time.

Interpretation of R²: Variation in the change in real per capita income and the president’s approval rating together explain 47% of the variation in the percentage change in seats in the House of Representative held by the president’s party.

Since you're just beginning the paper project, why not see if you can get a "match" between an interest you have and that of a practitioner who could eventually write a letter of recommendation for you? As I will discuss extensively at our first class meeting, one of the biggest weaknesses you are likely to have either in applying to a professional master's degree program or to secure employment in a field that interests you is the lack of experience. The practitioner approach mentioned ahead will allow you to build a relationship with a practitioner who can then write a very useful letter of recommendation for you. As you'll see when you read the ensuing section, you'd need to get this person involved right from the beginning of the project.

What might be an extremely beneficial way to start the term paper would be to ask practitioners if they are going to face a problem in a policy area that interests you over the next 6 to 9 months (i.e., a time frame over which you could prepare an analysis). Take a look at both the "generic" and "specific" examples ahead.

Generic Example

Subject Line: Saratoga, FL – Communications Policy
(putting the location the recipient works in the subject line along with a policy name applicable to the work they do should increase the probability of a response)

Body of the Message:

I am graduate student in political science who is preparing a policy analysis. Looking ahead over the next 6 to 9 months, is there a problem area in which a policy analysis of two, or more, policies or policy proposals would be helpful either to you or your organization? If you can provide me with the specifics of the proposals, or tell me where I could find them, I could prepare an analysis that would, hopefully, be of value to you and/or your organization.

NOTE: When you send it out don't use general terms such as "your organization." Use their specific job title and organization. The more the recipient feels the message is specifically "for them," the more likely they are to respond.

For the same reason, don't "forward" a message. If the respondent sees a "forward" sign either in the subject line, or anywhere else in the message, they are much less likely to respond.

Specific Example

The sample term paper deals with proposals to expand broadband communication in rural areas. If I had such an interest and was just beginning the process of building the term paper, I would begin by searching for people in government organizations, or private businesses, who deal with communications policy. State governments typically have large enough bureaucracies that they will have specialists in many policy areas. To get started, I “googled” the state of Minnesota. I found that they had an Office of Enterprise Technology. Clicking on that option I then noticed that there was a heading for “Planning.” The planning link led me to a pdf. file entitled, “Strategic IT Planning Assistance at OET” which I downloaded. On page 13 of the report I found a state official, Keith Goettsch, who was conducting a survey about technology needs. Both a phone number and email address were listed (keith.goettsch@state.mn.us). His job title and survey suggested that he would be a good person to contact. The following message would be what I would’ve sent:

Subject Line: Minnesota: Technology Needs

Body of the Message:

Mr. Goettsch,

I am graduate student in political science who is preparing a policy analysis on communications/technology policies for state governments. Looking ahead over the next 6 to 9 months, is there a problem area in which a policy analysis of two, or more, communications/technology policies or policy proposals would be helpful either to you or the Office of Enterprise Technology? If you can provide me with the specifics of the proposals, or tell me where I could find them, I could prepare an analysis that would, hopefully, be of value to you. Please don’t hesitate to suggest persons that would be useful to contact. Any advice would be greatly appreciated.

Sincerely,

Chris Dennis
Dept. of Political Science
Cal. State Univ. at Long Beach

Initially, I’d try a few states and see what, if anything, received. There could be some interesting material to follow through on. Don’t hesitate to write down phone numbers of specific individuals to call.

The main goal of this assignment is to demonstrate that you have both the necessary materials and a sufficient grasp of important concepts in policy analysis (explained ahead) so that you can complete the term paper. You are writing the paper to explain the tradeoffs in various policy options. Thus you are an “analyst” not an “advocate.” Few policies are optimal for every goal. For example, expanding the rights/protections of immigrants can be a good cause, but current immigrants tend to reduce the wages of low wage non-immigrant workers (current research suggests by about 8%). Thus, helping the “poor” and helping immigrants may pose tradeoffs. A significant portion of your paper is to explain such tradeoffs to the reader.

On the date this assignment is due (check the syllabus for the exact date) you need to accomplish three tasks. First, you need to compare at least two policies/proposals to each other. You can compare either a current public policy and an alternative policy or two policy proposals. You need specific actual policies or policy proposals. For example, you can’t just say “I want to examine health care policy.” You need two *actual* policies or policy proposals that *detail* the *specifics* of the policy. One policy can be the status quo. If there isn’t an “enacted policy,” then you can evaluate the proposed policy against a “free market” alternative (an example will be forthcoming, just keep reading) Note that the sample term paper compares three policies/proposals (the Rural Broadband Access Loan & Loan Guarantee Program, the E-Rate Program and the 700 MHz License Auction). Second, you need to compare the policies/proposals on at least four different criteria. For example, notice that the analysis in the sample term paper (pages 347-367) compares the three aforementioned policies on four criteria (minimizing the variance in broadband consumption between rural and urban regions, efficient and appropriate use of technology, promoting competition and administrative feasibility). The criteria appropriate to your policy analysis may be much different than what is used in the sample term paper. Make sure that you explain how you would measure each of the four criteria. For example, how would measure “efficiency” (e.g., efficient for what? – see the discussion of efficiency which appears ahead) or political feasibility (e.g., what factors would make one proposal more politically feasible than another proposal?)? Third, you need to apply at least four of the concepts discussed later in this assignment (pages 296-302 – e.g., public goods, opportunity costs, consumer surplus, net present value, etc.) to the policies or proposals you are comparing. You need to demonstrate both a knowledge of what the terms mean and how they apply to your analysis. For example, you can’t say something is a “public good” because it is for “the public” and is “good.” That’s not what makes something a “public good.” *Don’t “skip ahead,” just continue with this discussion.*

As previously mentioned, you will need at least two policy alternatives to compare. You do not necessarily need two policy proposals (i.e., you can compare the status quo to one proposed policy change). For

example, you could compare one proposed policy alternative to an existing policy or two, or more, proposed policy alternatives to each other. In order to accomplish this task, you need specific and detailed information. For example, if you are comparing various state health care plans you would need to know if the proposal set minimum and/or maximum rates physicians could charge? What cost savings does each plan contain? For example, does the plan contain incentives for patients to follow their doctor's advice (e.g., you either pay less and/or get better care if you follow your doctor's advice than if you do not)? Keep in mind that there is "always a policy in force." Thus, not having a policy regulating how much pharmaceutical companies can charge for particular drugs is still a government policy. In this case "the policy" would be to let drug prices go to whatever level the market dictated. Such an approach is still "a policy."

You can pick from a seemingly limitless supply of policies. Thus, regardless of your particular interest in political science, you should be able to find some interesting policies/proposals to compare. If your interests are in domestic policy you can select any city council, state, group of states or federal policy change. You can analyze the policy impact of federal, state or local court decisions. If your interests are in global policy you can analyze policies by any nation, group of nations (e.g., the European Union) or international regulatory body (e.g., the United Nations, the International Criminal Court, etc.). If your interests are in governmental policy toward nonprofit organizations you can analyze proposed policy changes regarding nonprofits by any sub-national unit (i.e., states, counties or cities, or courts at that same government level), national unit (the government of any nation or court at that same level), or international unit (e.g., the United Nations). Additionally, you can examine policy proposals nonprofit organizations make to governing officials. Furthermore, if your interests involve the impact of governmental policies/regulations on business, there is an almost unlimited number of possibilities (e.g., environment regulation, health and safety laws, etc.). Finally, you can pick policies/proposals that internally govern an organization. For example, you could compare two policies/proposals for organizing work in an organization (e.g., flexible working hours, bonuses vs. set salary, etc.).

Given that you are a political scientist, some of the microeconomic terms commonly used in policy analysis are unlikely to be familiar to you. Don't let this bother you. You don't need to become an economist! You just need to be familiar with several important concepts. That's all! This discussion will make the sample term paper much easier to read.

One of the fundamental concepts used in policy analysis is a public good. ***Public goods have the following two attributes: (1) nonexcludability (i.e., someone cannot be denied access to a public good – for example, clean air); and (2) nonrivalrous***

consumption (your consumption of the good does not impact someone else's consumption of the same good). A lighthouse would be a public good because no ship can be excluded from seeing the light provide by the lighthouse (i.e., nonexcludability) and one ship's use of the lighthouse has no impact on other ships using the lighthouse (i.e., nonrivalrous consumption).

By contrast a private good has both excludability and rivalrous consumption. For example, those artery clogging McDonald's hamburgers are a private good because if you don't pay you don't receive the hamburger (hence failure to pay would "exclude" you from eating the hamburger) and two people cannot eat the same hamburger (i.e., rivalrous consumption - your consumption of a particular hamburger precludes someone else from eating that same hamburger). It is important to keep in mind that "goods" are typically not either "pure public goods" or "pure private goods." For example, in the case of a lighthouse, 10 million ships could not simultaneously benefit from the same lighthouse. However, since ports rarely have the crowding necessary to effectively preclude a ship from benefiting from an existing lighthouse, a lighthouse is probably best thought of as "virtually" a "pure public good."

A central concern in public policy is why doesn't the market provide a public good? To return to the lighthouse example, unless the benefit to one particular ship owner would be great enough to warrant paying the entire cost of the lighthouse (e.g., purchasing the land, building and maintaining the lighthouse, paying the property taxes, the cost of employees, etc.) their incentive would be not to pay the entire cost of the lighthouse. If each ship owner came to the same conclusion either the lighthouse wouldn't be built, ship owners might form an association whereby they each contributed to the cost of the lighthouse, or perhaps the government could be persuaded to provide the lighthouse.

One of the principle reasons that the government is more likely to provide the lighthouse than an association of ship owners is nonexcludability. For example, if 10 ship owners formed an association to distribute the cost of the lighthouse over their members, wouldn't the incentive for the 11th ship owner be not to contribute to the cost of the lighthouse because they could not be excluded from benefiting from a lighthouse the other 10 ship owners provided (i.e., "free ride")? If the lighthouse is not provided by private actors (e.g., ship owners) it is likely to be the function of one of two reasons: (1) nonexcludability (i.e., the inability to deny non-contributing ship owners the benefit of the lighthouse); and/or (2) the high cost of providing the lighthouse. This is why lighthouses tend to be governmentally provided. Lots of other governmental functions come about for similar reasons (i.e., there may be a compelling philosophical argument to provide the good but the economic incentives do not give private actors ample incentive to provide it - e.g., national defense, slum clearance, social safety net programs, etc.).

An additional role for government involves economic regulation. In many instances citizens may be adversely affected by the actions of others. For example, while the buyer and seller of cigarettes may agree on a price innocent third parties (e.g., people walking down a street) may be adversely impacted by their decision (e.g., smokers forcing nonsmokers to breathe second-hand smoke). The cost of the cigarettes did not include fair compensation to those who had to breathe less healthy air as a result of smoking. An adverse impact on a third party (i.e., not the buyer or seller) is called a ***negative externality*** (i.e., a negative impact on someone “external” to the buyer and seller) and is frequently the reason for government regulation (e.g., smoking bans in public places).

Externalities can also be positive. For example, a new high-rise building may provide the opportunity for citizens to freely enjoy a more panoramic view of the city. The citizens who benefit are unlikely to ask the government for regulation. Rather, it is citizens who receive negative externalities (e.g., nonsmokers) who are likely to ask the government to regulate (either through taxation, limitation or prohibition of the activity producing the negative externality).

Social values also provide an important role for government. For example, a perfectly operating free market may result in a very high level of economic inequality. Therefore, a fundamental role for government may be to redistribute income through progressive taxation and programs designed to increase the earning capacity of lower income households. The performance of democracy itself may require a strong redistributive role for government. High levels of economic inequality can easily result in the wealthy dominating campaign contributions. In a well-functioning democracy, citizens should have relatively equal influence. Having one income group dominate campaign finance can result in public policy being skewed to the interest of the group dominating political contributions.

As economists use the term, “***rent***” means a payment to the owner of a resource which is higher than the owner would receive from any alternative use of that resource. For example, if you sold an engraved plate to a plate collector for \$500 and the most anyone else would pay for it was \$30, you realized a “rent” of \$470. However, rent is different than profit. Let us say you bought land for \$20,000 and after deducting taxes and realtor fees sold the land a month later for \$22,000. If you buried the \$22,000 in a jar in your backyard for 10 years, you would have made a profit of \$2,000 but had a “negative” rent (i.e., lost money) because the foregone interest on the \$22,000 would have been greater than the \$2,000 profit. Remember, “rent” is based on the next most profitable alternative use of the resource. A minimally profitable alternative to burying the money in your backyard would have been to put it in a 10 year money market fund. An economist calculating “rent” would have assumed at least as profitable an alternative as a money market fund. Additionally, we need to consider the dissipation of rents. Dissipation means reductions in rent. For example, perhaps the reason you realized such a quick \$2,000 profit on the land purchase was that

the city council decided to locate a new public building across the street from the land you purchased. However, if you spend \$3,000 on campaign contributions to members of the city council in order to encourage them to choose this location, you would have more than completely dissipated the \$2,000 rent. Because you were using the campaign contributions as a means of increasing rent, the campaign contributions are termed “rent seeking” behavior.

The previous discussion of “rent” is closely related to another important concept: opportunity costs. **Opportunity Costs** are the value of forgone options. For example, suppose a county government owns a parcel of land. If the county pays \$6,000,000 to build a hospital on the land, the cost of the hospital would appear to be \$6,000,000. Now suppose a private developer offered to buy the land from the county for \$10,000,000. If the county refused the private developer’s offer and built the hospital, the “true” cost of the hospital to the county is \$16,000,000, not \$6,000,000 (i.e., the \$6,000,000 the county spent plus the \$10,000,000 the county forwent – did not receive - from the private developer).

Marginal cost or benefit means the cost or benefit of the next item consumed. Let us say you wanted to open a used car dealership and were purchasing cars. If you purchased 100 cars, the marginal price would be the price of the 101st car (not the price of an individual car you already purchased or the average price per car of cars 1 through 100). Marginal cost or benefit is important because non-marginal costs/benefits (i.e., previous costs/benefits) are irrelevant to decision-making. If you are trying to decide whether or not to buy a possible 101st car, whatever prices you paid for cars 1-100 should have no bearing on your decision (i.e., they are “**sunk costs**” – you already paid these costs and cannot now change them). Only the cost and potential resale value of the 101st car should influence your decision to purchase, or not purchase, the 101st car.

Some public policies involve what is termed “**open access.**” Open access, as you would probably guess, means that no one can be excluded. To provide an example, let me use government policy concerning salmon fishing. If salmon are treated as “open access” goods fisherman will not control access to the streams. If so, there would be little incentive for individual fisherman to reduce their immediate catch in order to increase the size of future catches. The fish “foregone” by one fisherman would likely be caught by another fisherman. Thus, fisherman will “rush to fish.” Not surprisingly, a major part of policy analysis about salmon fishing concerns methods to limit the salmon catch. Limitations could be obtained either through regulation and/or allowing individual fisherman to obtain property rights to specific fishing areas. If individual fisherman have property rights to particular locations they have an incentive to conserve (i.e., they “own it”, can exclude non-owners from fishing, and may gain larger long-term benefits through smaller short-term sacrifices).

Price Elasticity of Demand measures how responsive consumers are to price changes. The formula is change in the quantity demanded

(typically the number of items sold) divided by the change in price. For example, suppose the government increases cigarette taxes enough that the retail price of cigarettes increases 10% (e.g., due to a tax increase a pack of cigarettes that previously cost \$3 now costs \$3.30 – i.e., a 10% increase). If cigarette sales decrease by 3% then the price elasticity of cigarettes is $-.3$ (i.e., $-3/10 = -.3$ - the demand fell 30% as much as the price increased – note that since the quantity demand decreased by 3% this is represented by -3 in the numerator). In the developed world, the price elasticity of cigarettes appears to be between $-.3$ and $-.4$ (i.e., a 1% increase in price reduces sales between .3% and .4% or a 10% increase in price reduces sales between 3% and 4%). Since the quantity of a good that is purchased always decreases as the price increases, the price elasticity of demand is always negative. Price elasticity of demand is particularly important when government tries to accomplish social goals through taxation (e.g., improve health by reducing smoking). The following price elasticities of demand have may have relevance for your policy area: gasoline $-.2$ (short-term, example a few weeks), gasoline $-.7$ (long-term, an increase in price that will remain for a long period of time), airline travel (short-term) $-.1$, airline travel (long-term) -2.4 (i.e., a 10% increase in price reduces money spent on long-term air travel 24%), physician services $-.6$, residential natural gas $-.1$, residential natural gas (long-term) $-.5$, housing (owner-occupied – long-term) -1.2 , private education -1.1 , restaurant meals -2.3 , movies $-.9$, legal services $-.4$, foreign travel (long-run) -4.0 , fresh green beans -2.8 and fresh tomatoes -4.6 . Notice that trying to improve health by encouraging people to eat fresh vegetables may be difficult (i.e., small price increase result in large reductions in sales).

The demand for **Complementary Goods** changes in the same direction as demand for the initial good (i.e., a positive relationship – just keep reading – it will clear up). For example, the sample term paper concerns increasing broadband usage in rural areas. If broadband usage increased in rural areas, the demand for computers (i.e., sales) in rural areas would likely increase because the greater speed broadband offers would spur rural residents to either buy a computer for the first time or replace their old computer with a more powerful one in order to realize more of the benefits broadband offers. Thus, broadband usage and computers would be complementary goods.

The demand for **Substitutable Goods** changes in the opposite direction (i.e., a negative relationship). To return to the broadband example, the greater the use of broadband the greater the demand for computers (i.e., a positive relationship – as discussed previously) but probably a lesser demand for television sets (because people will spend more of their leisure time using a computer and less time watching television than before broadband usage increased). Thus, residents would be “substituting” computers for television sets.

Net present value allows us to estimate the value of time. For example, how much would someone have to pay you next year in order to

have you reduce your expenditures this year by \$100? If you value \$110 next year the same as \$100 this year, your discount rate is 10%. Put another way, \$110 next year has a “present value” to you of \$100. “Net” simply means to subtract costs from benefits. Thus, if you encounter a statement that says the present value is negative, it means that future costs are greater than future benefits.

Consumer Surplus is the amount of benefit consumers receive *above* the price they paid. For example, supposing a company sold the same DVD to four consumers for \$20 each. However, unknown to the company is that while consumers 1 and 2 would have been willing to pay no more than \$20 for the DVD (i.e., if the DVD had been priced at \$21 they would not have bought it), consumers 3 and 4 would each have been willing to pay \$50. If so, the consumer surplus for the four consumers would be \$60 (i.e., no surplus for either consumers 1 or 2 since they paid the maximum amount they were willing to pay but a surplus of \$30 each for consumers 3 and 4 since they paid \$30 less than they each were willing to pay).

The private sector frequently has methods for charging different consumers different prices based upon their willingness to pay. For example, if you bring a coupon to the grocery store you have signaled that you are a more “price sensitive” consumer than someone who feels that the time spent finding the coupon is worth more than the savings they would gain from the coupon. Equally important is that the coupon provides a method of charging customers different prices that will be accepted as “fair” by all customers. While customers without coupons may not appreciate the longer checkout time caused by customers with coupons, I don’t believe I’ve ever heard a non-coupon customer say that they didn’t think the coupon users deserved their discount. Optimal pricing is often more difficult in the public sector because in many circumstances the customer does not have to reveal how much they would pay. For example, when you walk out on a state-owned fishing pier, do you have to pay? If not, how does the state estimate your willingness to pay, and hence, how valuable the pier is? Such information is very useful in trying to decide how many piers the state should build.

Producer Surplus is the same as consumer surplus except that it is from the vantage point of the producer rather than the consumer. For example, if four consumers each spent \$25 for a DVD the producer was willing to sell for \$15, then the producer’s surplus was \$40 (i.e., each of the four consumers paid \$10 more than the price the producer would have been willing to sell the DVD).

Social Surplus is the “total surplus” accruing to both consumers and producers. Thus, social surplus is simply consumer surplus plus producer surplus. Social surplus is an important concept because the greater the social surplus a project offers, the more total benefit society receives. Since there is a greater demand for government expenditures

than the amount of money the government can actually spend, the “value” of a project becomes important.

Efficiency is often used in discussions of public and private policies. Let me offer the following discussion concerning mining vs. meditating in Yellowstone National Park as an example of how to think about efficiency: “There is nothing intrinsically more efficient about mining than about meditating. ... we must set the expected value of what would be obtained from mining against the expected value of what would be lost. The issue comes down to this: By what process should the prospective benefits and costs of mining in Yellowstone Park be evaluated?” (Paul Heyne, *The Economic Way of Thinking*, 5th ed., p. 131) Efficiency could only be judged if someone owned Yellowstone Park and we knew the relative value the owner placed on mining vs. meditation. Otherwise, we can’t assess efficiency.

The following pages provide two examples of the first term paper assignment. Example #1 has “difficulties.” Both Example #1 and the response to it should help you more fully understand how to undertake this assignment. Example #2 (the assignment done by Kim Tang) is a good example of what to do. Make sure you read both examples.

Example #1 – What to Avoid

The policy area that I wish to study regards corporate spending affecting political campaigns. The Bipartisan Campaign Reform Act of 2002 (otherwise known as the McCain-Feingold act) was an amendment of the Federal election Campaign Act on 1971 and its main objective was to regulate the financing of political campaigns.¹ There have been certain provisions within the bill that have been deemed both controversial and unconstitutional by various individuals, organizations and corporations. In particular, Citizens United (which is a conservative nonprofit organization) took this issue to the Supreme Court, where after they were prohibited from televising “*Hillary: The Movie*” before the 2008 election. Certain aspects of the McCain- Feingold act were subsequently found to violate the First Amendment; and therefore found to be unconstitutional by the Supreme Court. The decision struck down a provision that barred both for-profit and nonprofit corporations and unions from broadcasting “electioneering communications” in the 30 days before a presidential primary, and in the 60 days before the general elections.²

Policies Analyzed **McCain-Feingold Act**

¹ *The Library of Congress*: <http://thomas.loc.gov/cgi-bin/cpquery/T?&report=hr131p1&dbname=107&>

² *The Supreme Court website*: <http://origin.www.supremecourtus.gov/qp/08-00205qp.pdf>

The purpose of the McCain-Feingold Act is to set federal limits on soft money contributions, essentially regulating corporate donations. Additionally, it prohibits corporations from independently running campaign ads that are not supported by the candidate, and thus specified in the advertisement. The constitutional question within the McCain-Feingold Act is whether or not corporations have the same free speech rights as regular citizens. The argument against McCain-Feingold asserts that corporations are run by groups of citizens, and therefore should be granted personhood, as the Supreme Court has already ruled in favor of. Therefore, according to McCain-Feingold Act critics, corporations should not only be granted open access to campaign contributions, but should be allowed to fund electoral broadcasting in favor of particular candidates. Supporters of the McCain Feingold Act assert that regulating corporate money in elections alleviates the possibility of corruption, and thus increases the efficiency of elected officials. For example, politicians adhere to the needs of their constituencies, and will be less likely to be persuaded by big corporate donors whose political preferences may be contradictory to that of an average citizen. Furthermore, McCain-Feingold seeks to decrease the supply of money within the political system, which in turn, decreases the demand for politicians receiving campaign contributions. This could be considered a negative externality because money being given to a politician from a private contributor could conceivably increase the possibility of bribery, which negatively impacts the average citizen's representation, and the public political debate as a "public good" is not compromised. This is why the McCain Feingold Act's objective was government regulation of campaign contributions.³

Citizens United v. Federal Election Commission

The McCain Feingold Act will be compared to the Citizens United v. Federal Election Commission Supreme Court case. The case is considered to be landmark, because it is speculated that it will not only transform the way in which campaigns are now run, but it gives an unprecedented view of the rights that corporations have in today's society. The 5-4 decision said that First Amendment's free speech principle that the government cannot regulate political speech. The Citizens United case overruled two precedents: *Austin v. Michigan Chamber of Commerce* (which in 1990 upheld restrictions on corporate spending) to support or oppose political candidates, and *McConnell v. Federal Election Commission* a decision in 2003 that upheld the part of the McCain-Feingold Act that restricted campaign spending by corporations and Unions.⁴

Criteria For Policy Comparisons

The goals set for these policy comparisons are to: 1) evaluate the appropriate role of corporations and private special interests in the political system 2) if corporations maintain the rights given, then unions should get an equal opportunity 3) increase

³ *The supply and Demand of Campaign Finance Reform*: Justin A. Nelson
<http://www.jstor.org/pss/1123475>

⁴⁴ *Justices, 5-4, Reject Corporate Spending Limit*: Adam Liptak:
<http://www.nytimes.com/2010/01/22/ua/politics/22scotus.html?ref=politics>

efficiency in the U.S. democratic system 4) protect constitutional rights of citizens. The Citizens United Act gives equal financial rights to both corporations and unions. However, this could be considered unequal, due to the fact that corporations usually have more money than unions. There is also the question of whether or not a corporation should have personhood- considering that its main objective is to increase profits. In addition, there is speculation that this decision may increase the likelihood of corruption, which would result in unfair representation for average citizens.

Response to Example #1

There's a couple difficulties with Assignment 4. First, there is no use of any of the policy analysis terms in Assignment 4 (e.g., opportunity costs, sunk costs, producer surplus, etc.). Remember you need to use at least four of the terms. Second, the criteria that you propose are either vague or normative concerns that are well outside the bounds for this paper and this course. For example, you mentioned "increased efficiency in the U.S. democratic system." Efficiency for what? As the discussion of policy terms in Assignment 4 indicates, absent a goal we can't measure efficiency. In the current context, what would efficiency mean in terms of the ratio of incumbent spending to challenger spending? Or would efficiency simply be based upon cost per vote? Thus, if McCain/Feingold either reduced campaign expenditures, or reduced the rate of increase in campaign expenditures, then you might be able to say that the amount of campaign expenditures per voter was reduced. Is that what you mean by efficiency (i.e., campaign expenditures per voter)?

Even if you used the concept of efficiency mentioned above, there would then be problems with your other goals. Here are some. You mentioned a goal of "evaluating the appropriate role of corporations and private special interests in the political system." YOU CAN'T DO THAT! That's a normative question. Our purpose is to discuss the impact of a policy, not what a "good" role or "bad" role for corporations or special interests is. That's outside the scope of this course. That's also a problem for your second criteria: "if corporations maintain the rights given, then unions should get an equal opportunity." Again, you can't go there. What you could have as a comparison would be how the two policies affect the degree of inequality between corporate contributions and union contributions. That's an empirical question. It does not suggest what such a ratio "should be."

The discussion of efficiency above would conflict with another possible goal: political competitiveness. One of the major criticisms of the McCain/Feingold approach is that limiting campaign expenditures reduces electoral competitiveness. Typically, incumbents start with a huge name recognition advantage over challengers. In order to have a competitive election, the challenger will almost invariably have to either outspend the incumbent or have spending parity with an incumbent in a very high spending race. Thus, to have a competitive race the challenger typically needs to spend a great deal of money. Anything, such as McCain/Feingold, which may reduce total campaign expenditures may well preserve the incumbent's advantages and, hence, reduce competitiveness. Thus, electoral competitiveness and reduced campaign expenditures (i.e., greater "efficiency" in the above discussion) are contradictory goals. A policy that is "good" for one would be "bad" for the other.

My guess is that you're a political theorist and aren't use to courses like 550 or term papers that are empirically oriented. I can understand that. However, thinking like this course/term paper is important to your overall development as a political scientist and your likely career. Probably no one will hire you because of normative considerations (e.g., whether you favor or oppose McCain/Feingold). They'll be interested in your analytical skills. That's what this paper helps develop. A word to the wise: stay in touch with me. If you had called me, or sent me a draft of this, I could've alerted you to the problems mentioned above. Please utilize me!!!

Chris

Example #2 - Kim Tang – POSC 550

The policy area I want to examine concerns expanding broadband internet service to rural areas. In section 706 of the Telecommunications Act of 1996, the FCC is responsible for ensuring the deployment of advanced telecommunications and for facilitating deployment by promoting competition and removing infrastructure barriers (Wayne Leighton, "Broadband Deployment and the Digital Divide," Policy Analysis, August 7, 2001). In addition, section 254 of the Act requires that citizens in rural and underserved areas have access to advanced telecommunications and at reasonable costs. In response to the objectives set by the Telecommunications Act, two programs have emerged that address the technological disconnect between rural and urban/suburban neighborhoods – the Rural Broadband Access Loan and Loan Guarantee Program and the E-Rate Program. An additional policy some advocate, and will be analyzed, is the 700MHz Auction Policy.

Policies Analyzed

The Rural Broadband Access Loan & Loan Guarantee Program

The broadband problem can be understood as a private goods problem where the cost of providing additional service in unserved areas is not profitable enough (marginal revenue does not exceed marginal costs) for firms to invest in rural Internet development. The purpose of the Rural Broadband Access Loan & Loan Guarantee Program is to finance the construction and development of facilities and equipment necessary to provide broadband service in rural areas not currently receiving it. The program seeks to induce companies to increase the supply of broadband in rural neighborhoods by offsetting the high cost of entry and infrastructure through low-interest loan guarantees (supply-side subsidies). One of the benefits of subsidizing increased broadband supply is that it lowers the carrier's cost to provide service, thereby increasing firm revenue (producer surplus) and willingness to invest in Internet development. The program is a supply-side subsidy plan aimed at

lowering the barriers to entry by alleviating high operational and development costs through low-interest loan guarantees. The United States Department of Agriculture reports that as of April 2007, since the launch of the Rural Broadband Access Loan and Loan Guarantee Program in 2002, the program has approved 70 loans in 40 states, totaling over \$1.22 billion. The broadband loans serve 1,263 communities with a total of 582,000 household subscribers. Approximately 40 percent of these communities were unserved at the time of the loan approval, and an additional 15 percent had only one provider (USDA Rural Development Report, June 14, 2007. Available at <http://www.rurdev.usda.gov/rd/pubs/RDBroadbandRpt.pdf>).

The E Rate Program

The second policy that this paper will compare to the Rural Broadband Access Loan and Loan Guarantee Program is the E-Rate program. The purpose of the E-Rate program is to provide qualifying public schools and libraries in rural neighborhoods with discounted telephone services, Internet access and telecommunications equipment. The E-Rate program is part of a broader program known as the Universal Service fund that emerged out the universal service concept mentioned earlier. While the program does not explicitly outline goals for broadband penetration in rural regions, the program has demonstrated significant success in bridging the technological gap between urban and rural residents. Since the program's inception in 1998, funding for the E-Rate program has totaled approximately \$19 billion where targeting funding has benefited the most impoverished and rural regions. The program is responsible for increasing instructional classroom Internet access in rural areas from 14 percent in 1996 to 95 percent in 2005 ("10 Years of Connecting Kids and Community," February 28, 2007. Available at http://www.edlinc.org/pdf/NCTETReport_212.pdf).

The 700 MHz Auction Policy

The third policy this study analyzes is the 700 MHz Auction Policy. The 700 MHz spectrum has traditionally been used by television broadcasters for analog TV transmission. In 2006 Congress passed legislation ordering broadcasters to switch from analog TV transmission to digital transmission, thereby clearing 108 MHz in the 700 MHz band for Wi-Max. Under this alternative, a silent auction would be held in January of 2008 where firms would compete for licenses within the 700 MHz band to provide wireless broadband to consumers. The 700 MHz auction provides an ideal "third pipe" for internet transmission because the 700 MHz band has the capacity to penetrate buildings and cover large areas. Due to these characteristics, wireless providers have identified the 700 MHz spectrum as an important vehicle for rural broadband deployment.

Criteria For Policy Comparisons

In order to make a meaningful comparison of policies, there needs to be a set of goals. While different policy areas should have different goals, the following goals seem consistent with the purpose of the Telecommunications Act of 1996: (1) minimize the variance of broadband consumption between rural and urban regions (i.e., the degree of parity between the percentage of urban residents using broadband and the percentage of rural residents using broadband); (2) promote the efficient (lowest Net Present Value per user) and appropriate use of technology; (3) promote competition (maximize the number of firms able to compete in a given market); and (4) administrative feasibility (minimize the severity of barriers to firms trying to enter a particular market and consumers to obtain broadband from a firm that has entered the market). Many of the specific/numerical benefits and costs of these two proposals used to compare the Rural Broadband Access Loan & Loan Guarantee Program and the E-Rate Program on the four aforementioned goals are found in the GAO (Government Accounting Office) Report to a congressional committee, "Broadband Deployment is Extensive Throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas," May 2006 (available at: <http://www.gao.gov/new.items/d06426.pdf>).

NOTE: With the exception of goal #1 above, many of the aforementioned goals should be applicable to the policy area you select. One goal which is not used in the sample term paper, but which would be good to incorporate if you are comparing proposed policies (as opposed to already enacted policies) is political feasibility. For example, are the benefits from a proposed policy particularized or general? If the policy has particularized benefits the beneficiaries typically know who they are (e.g., the wealthy heirs who would pay the estate tax know who they are and roughly how much they would benefit from repealing the estate tax). Alternatively, if the policy promises more generalized benefits (e.g., lives saved from cleaner air), the beneficiaries are less likely to know who they are (i.e., those who will not get lung cancer if the air is less polluted do not know that their particular life will be saved if the policy is enacted). Typically, more generalized benefits, especially if they occur at some future time point, are more difficult to obtain the necessary political support for than policies that provide more particularized benefits. If political feasibility is a reasonable criterion on which to compare the proposed policies, then it makes sense to compare them in this manner. However, the *vast bulk* of the analysis should involve non-political criteria. I want you to thoroughly utilize the concepts discussed in Assignment 4 (e.g., social, consumer or producer surplus, sunk costs, net present value, etc.). Thus, this paper should not be a "political analysis."

Term Paper Outline – Kim Tang – POSC 550

I. Introduction

- A. Access to broadband communications has important economic and social implications.**
 - 1. Lack of access to broadband reduces economic growth and social communication.**

- B. Broadband access in the U.S. lags behind much of Western Europe.**
 - 1. Broadband access in rural America lags behind urban America.**

- C. The Telecommunications Act of 1996 was designed, in part, to increase broadband access in rural America.**

- D. Increasing broadband access fits well with America’s traditional commitment to expanding communication.**
 - 1. The idea that all citizens are entitled to affordable access to telecommunication services is line with the mores of American society. This concept, known as “universal service,” was first introduced by the 1934 Communications Act in which the Federal Communications Commission (FCC) was assigned to ensure that “rapid, efficient, Nation-wide, world-wide wire and radio communications service” was made available to all Americans and at affordable costs.**

II. Approaches to Increasing broadband access in rural America.

- A. The broadband problem can also be understood as a private goods problem where the cost of providing additional service in unserved areas is not profitable enough (marginal revenue does not exceed marginal costs) for firms to invest in rural Internet development. The high cost of deploying broadband in rural areas due to infrastructure limitations deters new firms from entering the market. This creates a monopolistic market where incumbent local exchange carriers are undersupplying broadband service to specific geographic regions. In addition,**

high barriers to entry create uncontestable markets that can result in inefficient pricing if broadband is deployed in rural neighborhoods.

- 1. In examining broadband penetration a case is made for government intervention on the grounds of human dignity and economic efficiency.**

B. Policies to Compare

1. The Rural Broadband Access & Loan Guarantee Program

- a. The purpose of the Rural Broadband Access Loan & Loan Guarantee Program is to finance the construction and development of facilities and equipment necessary to provide broadband service in rural areas not currently receiving it. The program seeks to induce companies to increase the supply of broadband in rural neighborhoods by offsetting the high cost of entry and infrastructure through low-interest loan guarantees (supply-side subsidies). One of the benefits of subsidizing increased broadband supply is that it lowers the carrier's cost to provide service, thereby increasing firm revenue (producer surplus) and willingness to invest in Internet development.**

2. The E-Rate Program

- a. The purpose of the E-Rate program is to provide qualifying public schools and libraries in rural neighborhoods with discounted telephone services, Internet access and telecommunications equipment. One of the benefits of the E-Rate program is that by offering Internet services at below market cost, the program generates a steady stream of demand for broadband services.**
- b. Studies have shown that one of the major determinants of broadband access is income and that rural residents are less likely to pay for Internet service than urban and suburban residents. This is due to a combination of rural residents having lower incomes, less education and their perceived utility of internet access. If**

low internet utilization rates in rural areas is strictly a function of lower income, this can be corrected by subsidies. However, if lower internet utilization in rural areas is the result of rural residents who have the same standard of living as urban/suburban residents placing a lower relative value on high speed internet service, then the E-Rate program needs to educate rural residents as well as provide financial assistance.

3. 700 MHz License Auction

a. The 700 MHz spectrum has traditionally been used by television broadcasters for analog TV transmission. In 2006 Congress passed legislation ordering broadcasters to switch from analog TV transmission to digital transmission, thereby clearing 108 MHz in the 700 MHz band for Wi-Max. Under this alternative, a silent auction would be held in January of 2008 where firms would compete for licenses within the 700 MHz band to provide wireless broadband to consumers. The 700 MHz auction provides an ideal “third pipe” for internet transmission because the 700 MHz band has the capacity to penetrate buildings and cover large areas. Due to these characteristics, wireless providers have identified the 700 MHz spectrum as an important vehicle for rural broadband deployment.

III. Policy Analysis

A. Policy Goals

1. In order to ensure that current and new broadband Policies penetrate rural areas, the primary purpose of policy should be to minimize the variance of broadband consumption between rural and urban regions.

a. Rural Broadband - In a 2006 report assessing the extent of the digital divide in rural areas, the GAO found that one of the main issues for “analyzing and targeting any federal aid for broadband is a lack of reliable data on the deployment of networks. Current reporting

requirements have proven to be ineffective measures for rural broadband penetration and program measures for the Rural Broadband Access Loan and Loan Guarantee Program.

b.E-Rate - The status quo performs very well in terms of minimizing the technological variance between rural and urban school districts. Subsidies for the E-Rate Program are disbursed to individual schools or districts based on the percentage of students eligible for the National School Lunch Program. This formula has resulted in funding being disproportionately allotted to the poorest schools and communities. In analyzing the impact of the E-Rate Program in public schools, Goolsbee and Guryan (2006) found that the E-Rate Program was able to reverse the growing Internet gap between the richest school districts and poorest school districts, and by 2000, some districts were able to surpass the richest school districts in the number of internet connections.

c.700 MHz License Auction - The 700 MHz Auction is estimated to do well in minimizing the broadband consumption gap between rural and urban regions if performance benchmarks are not imposed on rural service area (RSA) providers.

2.The policy should promote the efficient and appropriate use of technology.

a.Rural Broadband - While the Rural Broadband Access Loan and Loan Guarantee Program is open to all broadband providers, the program has shown to be more partial towards DSL providers where infrastructure equipment is owned by the provider. In order to receive funding, the company is required to provide collateral for the loan; in the case of Satellite companies,

consumers must purchase the equipment in order to access the satellite signal, therefore the equipment is owned by the consumer, putting satellite providers at disadvantage for loan approval. In calculating the costs of increasing the supply of broadband, Goolsbee estimated that supply-side subsidies in unserved markets would cost \$14.25 million and that consumer benefits would exceed the costs (consumer surplus) by \$210 million when adjusted for inflation (Net Present Value – NPV).

b.E-Rate - One of the weaknesses of the E-Rate Program is that there are many restrictions on what products and services can be subsidized. Currently, discounts cannot be applied to products such as software applications, computers, modems, tech support and teacher training. This presents a problem because while discounts may provide schools in the poorest districts with the infrastructure for broadband, without funding for computers or software, the utility of broadband is greatly minimized. According to ISET surveys, the lack of tech assistance relating to the installation and maintenance of hardware and software was a major barrier for teachers in integrating the use of technology into daily classroom curriculum. One of the main criticisms of the E-Rate Program is its high cost – capped at \$2.25 billion a year. Opponents argue that as more and more schools develop the infrastructure necessary for broadband deployment the cost to maintain the program should decrease.

c.700MHz License Auction - Due to the infrastructure restrictions associated with DSL and Cable, the characteristics of wireless broadband in the 700 MHz spectrum band is seen as a viable tool for deployment in rural communities. Unlike

DSL, where service is only available to subscribers who are within 18,000 feet of the central office, the spectrum band has the capacity to penetrate buildings and cover large areas. Adding a “third pipe” for internet transmission will give rural consumers more broadband coverage by allowing for a mix of technologies to be used in deployment. In terms of economic efficiency, Compaine (2003) found that broadband wireless fixed access (BWFA) is more cost effective than cable or DSL in rural regions with low population densities

3.The policy should promote competition. In order to maximize consumer surplus, policy needs to allow for the entry of new firms in the market. Subsidies, grants, loans, spectrum licenses, etc., should not favor incumbent local exchange carriers over others.

a.Rural Broadband - One of the weaknesses of the program is that funds are only dispersed to companies offering to provide broadband to communities with no existing broadband service. This means that communities with poor or limited Internet access find themselves with only one provider.

b.E-Rate - Funding through the E-Rate Program is not directly dispersed to the school, instead, schools or districts select vendors through competitive bids and these vendors are then reimbursed with E-Rate funds. While a competitive bidding process is in place, poor oversight has resulted in multiple cases of bid-rigging and program fraud. In response to audit reports citing high levels of fraud, waste and abuse, the DOJ created a task for to investigate E-Rate fraud and efforts are currently being made to improve program oversight.

c.700 MHz License Auction - The 700 MHz spectrum will be divided based on geographic licensing blocks called Cellular

Market Areas (CMAs), medium Economic Areas (EAs) and Regional Economic Areas Groupings (REAGs). The auction of licenses according to CMAs, EAs and REAGs gives small firms a chance to bid for licensing blocks which will promote service to rural communities.

4.The policy should be administratively feasible.

a.Rural Broadband - Strict loan requirements have created barriers to entry as well as hindered efficient administration. Inflexible eligibility criteria such as requiring firms to have enough cash-on-hand to operate for one year and limiting assistance to communities with only 20,000 residents or less has resulted in only 5% of available funds being dispersed to qualifying applicants in 2005.

b.E-Rate - The FCC has shown to be responsive to E-Rate audit and OIG reports. In 2003 the FCC implemented new rules to improve the efficiency of the application process and adopted stricter bidding requirements. In addition, due to the burgeoning popularity of wireless broadband as a “third pipe” for internet transmission, the FCC has made wireless services eligible for E-Rate discounts.

c.700 MHz License Auction - The 700 MHz spectrum auction is scheduled to take place on January 28, 2008. Due to the immature status of the policy, it is difficult to assess the administrative feasibility of the program.

IV.Conclusions

A.Through supply-side and demand-side subsidies, both the Rural Broadband Loan Guarantee Program and the E-Rate Program have made progress in rural broadband penetration. However, both programs have issues in administration that negatively impact program efficiency. In addition, both

programs have generally turned to DSL as their primary means for broadband deployment which may not be the most cost-effective method.

B. According to Compaine (2003), broadband wireless fixed access (BWFA) is a more appropriate method for rural regions with low population densities and is more cost effective than cable or DSL. Moreover, DSL service is only available to subscribers who are within 18,000 feet of the central office and therefore is unable to reach the most remote rural areas.

C. Price Water Coopers (2004) recommends that broadband availability be maximized by exploring and implementing a mix of DSL, Satellite and BFWA technologies.

How to Prepare Appendix A

One of the skills that the term paper demonstrates is the ability to think through a theoretical model (i.e., what independent variables logically influence the dependent variable). The first step is to carefully think through what dependent variable(s) would be useful to explain for someone working in the policy area of your term paper. Notice that Appendix A in the sample term contains a theoretical rationale for each question. For example, notice how scores on question #1 in Appendix A of the sample term paper could predict scores on question #2. Additionally, scores on questions #1- #3 in Appendix A of the sample term paper could logically be used to predict scores on question #4. Make sure you do the same. We want the reader to come away with a sense that you can think through a useful model and write a series of survey questions that would measure the variables necessary to estimate this model.

In writing survey questions there are several factors to keep in mind. First, think through the model (i.e., the dependent and independent variables) clearly. If a potential question is not a measure of either the dependent variable or an independent variable that theory suggests should help explain the dependent variable, then it probably shouldn't be asked. Be prepared to provide a theoretical defense for each question that will appear in the appendix of your term paper. Second, keep the survey short. The more questions you ask the greater the likelihood respondents will cease participating.

With these two general comments in mind, let me mention, and illustrate, some suggestions for writing survey questions. First, don't assume that respondents have much information. Few people follow public affairs very closely. As a result, not many people are going to know about particular pieces of legislation or particular policies. For example, avoid statements such as the following:

The courts should give different rulings on immigrant rights.

Strongly agree	Agree somewhat	Uncertain	Disagree somewhat	Strongly disagree
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The statement above is poorly phrased because it assumes that the respondent knows what the courts have ruled. If you are trying to measure the respondent's attitudes toward immigration it would be better to ask more specific questions that don't presume much knowledge. For example, a more specific question specifically addressing the respondent's opinion about the desirability of illegal immigrants obtaining drivers licenses might be phrased as follows:

Do you think that illegal immigrants should be allowed to obtain drivers licenses?

Yes

No

Uncertain

While this is a more specific question than the previous example, the formulation is still not desirable. In general, try to avoid “yes/no” answers. They simply do not allow respondents to reveal more nuanced answers.

For example, if you are asking for someone’s views about drivers licenses for illegal immigrants, you might provide four or five options that indicate a range of possible opinions (e.g., 1 - Not favor under any circumstances, 2 - Only permit operating a vehicle to go to work or for a medical emergency, 3 – Permit driving only within 25 miles of home, 4 – Be allowed to obtain a drivers license with the same privileges as legal residents – notice how the range of answers form a continuum from least privileges to most privileges).

Measuring how much information the respondent has about the subject, or providing information, may result in a more accurate assessment of a respondent’s viewpoint. Continuing with the topic of drivers licenses for illegal immigrants, consider the following question:

Which of the following is closest to the opinion of law enforcement officials concerning the effect that permitting illegal immigrants to obtain drivers licenses would have on the cost of auto insurance?

Reduce it by approximately \$100, or more, per year

Reduce it by approximately \$50 per year

Have no effect

Increase it by approximately \$50 per year

Increase it by approximately \$100, or more, per year

The question immediately above provides an indication of the information base the respondent had in answering previous questions on this topic. Such information can be very illuminating. For example, in studies of opinions about the federal budget, political scientists have found that many respondents think much of the federal budget is spent on relatively unpopular items such as welfare (10%-15%) and foreign aid (10%-15%). Welfare and foreign aid each constitute approximately 1% of federal spending.

You could also suggest a state of the world and ask the respondent to reply to it. For example, a question such as the following:

If law enforcement authorities feel that, on balance, traffic fatalities would be reduced if illegal immigrants were allowed to obtain drivers licenses, which of the following would best represent your viewpoint concerning the desirability of permitting illegal immigrants to obtain drivers licenses?

- 1 – Not permitting illegal immigrants to obtain drivers licenses is more important than reducing traffic accidents.
- 2 – Unless it would lead to a large reduction in traffic accidents illegal immigrants should not be allowed to obtain drivers licenses.
- 3 – If it would result in even a small reduction in traffic accidents illegal immigrants should be allowed to obtain drivers licenses.
- 4 – Even if it increased the number of traffic accidents, illegal immigrants should be allowed to obtain drivers licenses.

Having the respondent rate the importance of various explanations for a phenomena can produce much useful information. For example, the following statements were used to ascertain how respondents viewed various explanations for economic inequality:

We'd like to know why you think it is, that in America today, some people have better (worse) jobs and higher (lower) incomes than others do. I'm going to read you some possible explanations, and I want you to tell me how important you think each is – very important, somewhat important, or not important at all.

	Very Important	Somewhat Important	Not Important
Some people don't get a chance to get a good education			
Some people just don't work as hard			
Some people have more inborn ability to learn			
Discrimination holds some people back			
Government policies have helped high-income workers more			
Some people just choose low-paying jobs			
God made people different from one another			

Avoid questions with two, or more, referents (i.e., “double-barreled” questions). For example, avoid questions or statements such as the following:

President Obama should reduce the pay of banking executives whose banks receive government assistance and use this money to help poor people buy medical insurance.

Strongly agree	Agree somewhat	Uncertain	Disagree somewhat	Strongly disagree
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This should be handled by two separate questions. One question would deal with the desirability of reducing the pay of banking executives whose banks receive government assistance while the second question would probe the respondent’s attitudes toward helping poor people buy medical insurance.

Avoid having the same meaning of answers to a series of questions. For example, suppose you are asking people their agreement with the following series of statements:

Statement	Answers				
	Strongly agree	Agree somewhat	Uncertain	Disagree somewhat	Strongly disagree

City parks are clean

**City parks provide
adequate children’s
playground
equipment**

City parks are safe

**City parks are
Beautiful**

In this series of statements a favorable answer about city parks always means that the respondent agrees with a positive statement. A preferable approach would be for the respondent to give a favorable assessment of the city parks by occasionally having to disagree with a negative statement. For example, the following would be a better formulation:

Strongly **Agree** **Disagree** **Strongly**
agree **somewhat** **Uncertain** **somewhat** **disagree**

City parks are clean

City parks provide
adequate children's
playground
equipment

City parks are not safe

City parks are
Beautiful

Notice that the third statement, city parks are safe, has now been changed to city parks are not safe. Thus, to give a favorable answer to this statement, the respondent would have to disagree with a negative statement. Changing the implications of a particular answer (e.g., strongly agree) helps force the respondent to think about their answers. It avoids what is termed "response set." This example appears in Quantitative Methods for Public Administration, 2nd edition, by Susan Welch and John Comer, page 75.

Scale responses that are rank-ordered without a precise mathematical are ordinal level measures. For example, we know that "strongly agree" indicates greater agreement than "agree" and that "agree" indicates greater agreement than "uncertain." However, we do not know the amount of difference between categories. Thus, is the difference between "strongly agree" and "agree" greater than, equal to, or less than the difference between "agree" and "uncertain"? We do not know. People who select the same category of response (e.g., "strongly agree") may mean two different degrees of agreement. In voting studies respondents are often asked how likely they are to vote. The possible answers are often: almost certain, very likely, somewhat likely, not likely and very unlikely.

Charles Manski suggests that respondents can provide precise probabilities of behavior. For example, the voting turnout question could be rephrased as follows: What do you think is the PERCENT CHANCE that you will cast a vote for President? The respondent then indicates a particular percentage. When Manski compared the answers of the same respondents to both versions of this question, he found very different probabilities. Some respondents who answered that they were "highly likely to vote" listed their percent chance of voting in the 50% range while others listed probabilities of 80%, or greater. Although this approach is

not currently used by any major survey organization, it would appear to hold great promise in reducing measurement error.

Politics and policy often involve “tradeoffs” (e.g., question #4 in Appendix A of the sample term paper). Frequently, government can not simultaneously achieve the greatest amount of each of several goals. For example, since government spending on the environment reduces pollution, there may be a tradeoff between the goals of reducing government spending and reducing pollution. Thus, lower government spending may result in increased pollution. The previous question concerning drivers licenses for illegal immigrants and traffic fatalities involved tradeoffs. Thus, it can be informative to ask respondents to choose between competing goals. For example, political scientist John Mark Hansen (American Political Science Review, 1998, pp. 513-531) used the following battery of “tradeoff” questions to measure support for reducing taxes:

Each year the government in Washington has to make decisions about taxes, spending, and the deficit. We'd like to know your opinions about what the government should do about the budget. I'm going to read you three proposals for cutting taxes, and I'd like you to tell me whether or not you favor each of them.

Yes,
Favor

No, Do
Not Favor

Don't
Know

Do you favor cuts in spending on national defense in order to cut the taxes paid by ordinary Americans?

Do you favor cuts in spending on domestic programs like Medicare, education, and highways in order to cut the taxes paid by ordinary Americans?

Do you favor an increase in the federal budget deficit in order to cut the taxes paid by ordinary Americans?

While the above appear to be “yes/no” questions, the respondent is answering either “yes” or “no” to a series of options. Thus, it's not one question with a “yes” or “no” answer.

Frequently social science theories involve examining the relationships between variables that involve “sensitive” topics. For example, a person’s educational attainment or income is often a good predictor’s of their opinions. Measuring such variables requires researchers to ask questions that respondents may feel are “intrusive,” and as a result are reluctant to answer. For this reason, surveys will frequently include confidentiality statements. The following approach, adapted from a survey by the Public Policy Institute of California, is quite common.

We understand and respect that this information is confidential, we ask only for research purposes and will keep all of this information absolutely anonymous.

What was the last grade of school that you completed?

- 1 some high school or less
- 2 high school graduate/GED
- 3 some college
- 4 college graduate
- 5 post graduate
- 6 trade school
- 9 refuse

Which of the following categories best describes your total annual household income before taxes, from all sources?

- 1 under \$20,000
- 2 \$20,000 to under \$40,000
- 3 \$40,000 to under \$60,000
- 4 \$60,000 to under \$80,000
- 5 \$80,000 to under \$100,000
- 6 \$100,000 to under \$200,000
- 7 \$200,000 or more
- 9 don’t know/refuse

The ordering of questions can affect the answers you receive. For example, in studying peoples’ opinions about affirmative action and the traits they ascribe to African-Americans, researchers found that if you ask a question about affirmative action immediately *prior* to asking a question about what traits the respondent attributes to African-Americans (e.g., hard working, lazy, etc.), the view of African-Americans is much less positive than if the question order is *reversed* (i.e., ask a question about the traits the respondent ascribes to African-Americans and then ask about

affirmative action). The “mere mention” of affirmative action appears to conjure up negative images of African-Americans.

The previous example also suggests that dealing with sensitive topics, such as racial attitudes, requires care in constructing a survey/measuring instrument. While a respondent may harbor negative attitudes toward a particular racial, ethnic or religious group, they are probably unlikely to directly state this to an interviewer or agree with a blatant statement expressing contempt for the group they dislike. The example of affirmative mentioned previously is such a topic. Due to “social desirability,” respondents holding negative opinions about affirmative action may be reluctant to express them. Therefore, the measuring instrument needs to contain non-blatant options presented in a manner that conceals the respondent’s answers.

One such approach is the list experiment. The respondent is shown a list of items that they are told might make people angry or upset. The respondent is then told to tell the interviewer how many of the items on the list make them angry or upset, but *not* which particular items. Here is a list used by political scientist James Kuklinski and his collaborators (American Journal of Political Science, 1997, pp. 402-419):

1. Government increasing the tax on gasoline
2. Professional athletes earning large salaries
3. Requiring seatbelts be used when driving
4. Corporations polluting the environment

A randomly selected group was given the list as constituted above while an equally sized randomly selected group was given the same list with the following fifth item added: Awarding college scholarships on the basis of race. If the average of the first group (i.e., the group shown statements 1-4) is 2.3 (i.e., the average person found 2.3 of items 1-4 made them angry or upset) and the average of the group shown all 5 items is 2.9, it would mean that 60% of the second group said that awarding college scholarships on the basis of race made them either angry or upset. You could try such a procedure in a survey by dividing a randomly selected group into two equal parts and administering two forms of answers as shown above.

Question wording can also affect the respondents’ answers. An interesting example of this phenomenon comes from the political science literature on tolerance. In the 1950s Samuel Stouffer found that many Americans held rather intolerant views of communists. In the 1970s, using the same questions that Stouffer used, political scientists found that Americans had become more tolerant of communists. However, this did not necessarily mean that tolerance “per se” had increased.

To better assess tolerance, political scientist John Sullivan first asked respondents to name their least favored group from a large list of potentially unpopular groups. Then Sullivan asked the same questions

that Stouffer had except that communists were replaced by the respondent's least favored group. What Sullivan found was that tolerance was not appreciably greater in the 1970s than the 1950s. The difference was strictly in the groups people were intolerant toward. Thus, while tolerance toward communists increased, Americans were as intolerant of their least favored group in the 1970s as they had been of communists in the 1950s. All of this suggests that much thought and care go into the preparation of survey questions and answers.

The file for preparing Appendix B of the term paper provides many examples of actual survey questions used by prominent surveyors. Remember, don't just "write a series of questions." Make sure that theory is guiding you. Notice that Appendix A in the sample term contains a theoretical rationale for each question. Make sure you do the same. We want the reader to come away with a sense that you can think through a useful model and write a series of questions that would measure the variables necessary to estimate this model.

How to Prepare Appendix B

One of the skills that the term paper demonstrates is the ability to think through a statistical model (i.e., the dependent variable in an equation and the independent variable used to explain the dependent variable) and estimate the statistical results. The first step is to examine the data sets listed ahead and see how the variables in a particular data set might contain both a dependent variable that would be useful to explain and a group of independent variables that might logically be related to the dependent variable you select.

Paragraphs 1-4 of Appendix B in the sample term paper contain a discussion of why attitudes toward the Kyoto Protocol may tell us something useful about attitudes toward high speed internet access. You need to have a similar pattern of reasoning. Thus, why should the reader be concerned about the analysis you will subsequently provide? Both the version of Appendix B you submit for the take-home quiz and the version that appears in the term paper itself need to have a firm rationale for the model used in the statistical analysis. As the data sets ahead are not likely to directly examine the policy area of your term paper, you need to think “creatively.”

Since the data sets are surveys of people (i.e., a person is the “unit of analysis”), let me mention several “fundamental” relationships between a person’s income and education and their likely positions on political issues/policies that might be useful in formulating your model. In economic issues (or issues argued on an economic basis, e.g., the minimum wage, health care) income is typically a good predictor of someone’s opinion. The “basic” relationship is that the higher a person’s income the less supportive they will be of liberal economics (using the government to reduce economic inequality and maintain economic security). Alternatively, we could say that the relationship between income and support for economic liberalism is negative. Thus, those with higher incomes are less likely to support universal health insurance, increasing the minimum wage and having the wealthy bear a higher proportion of the tax burden than are those with lower incomes. In economic issues, self-interest is a good, but far from perfect, predictor of opinion.

In noneconomic issues education is a better predictor of a person’s opinion than income. The “basic” relationship is that the higher the level of education an individual has the more liberal their opinions on noneconomic issues (i.e., supporting the freedom to differ on noneconomic issues – e.g., support for gay marriage - civil rights, the right of dissent, rights of the accused, etc.). Alternatively, we could say that the relationship between education and noneconomic liberalism is positive. The probable reason for this relationship is that education exposes a person to different ideas and cultures. While this process does not mean a person will change their views, it does typically lead to a greater appreciation and understanding for why others may hold different

opinions. Since tolerance and equality are the underpinnings of liberal positions on noneconomic issues, increasing education often translates into more liberal thinking on noneconomic questions.

Variable List for Datasets for Appendix B

This file contains the variable names and descriptions for the various datasets available for the statistical analysis in Appendix B. You need to email me and ask for which file you want. I'll send you the file you want in Excel. Later instructions will show how to read Excel files into STATA 11 (the statistical package we'll use). After the variable descriptions for each dataset, I will explain how to estimate the statistical results which appear in Appendix B of the term paper.

550Cigarette

This dataset examines cigarette consumption. The data are annual by state (i.e., a state is the unit of analysis) over the 1985-95 period. The data were supplied by Professor Jonathan Gruber (MIT) and was taken from:

<http://econpapers.repec.org/paper/bocbocins/>
http://fmwww.bc.edu/ec-p/data/stockwatson/cig_ch10.dta

packpc – packs of cigarettes consumed per person

educ90 – percentage of a state's who are 25, or older, who have at least a bachelor's degree (as of 1990)

incpc – income per capita (i.e., per person)

avgprs – average price of a pack of cigarettes including excise taxes

taxs – average excise taxes for fiscal year, including sales taxes

cpi – consumer price index

pop – state population

550Environmental1

This dataset contains respondents' attitudes toward the Kyoto Treaty on Global Warming, international trade as well as other variables. The variables were selected from the Global Climate Change Data Project. The data were provided by Professor David Weimer of the University of Wisconsin.

Potential Dependent Variables

kyoto - The U.S. Senate has not yet voted on whether to ratify the Kyoto Protocol. If the U.S. does not ratify the treaty, it is very unlikely that the Protocol can be successfully implemented.

Suppose that a national vote or referendum were held today in which U.S. residents could vote to advise their Senators whether to support or oppose ratifying the Kyoto Protocol. If U.S. compliance with the treaty would cost your household (randomly selected price for a gallon of gasoline - e.g., \$2.75) dollars per year in increased energy and gasoline prices, would you vote for or against having your Senators support ratification of the Kyoto Protocol? Keep in mind that the (the dollar figure used previously is repeated here) dollars spent on increased energy and gasoline prices could not be spent on other things, such as other household expenses, charities, groceries, or car payments. Note: The form of this question is especially interesting because respondents were told that ratification would result in higher gasoline prices (amount randomly chosen for each respondent). Therefore, respondents knew that ratification of the Kyoto Protocol would not be "costless."

Numerical Label

0 against
1 for

intagree - Government officials in the US are currently considering a proposed international treaty that concerns global climate change, called the Kyoto Protocol. In 1997 representatives from the U.S. and approximately 150 other nations developed and signed the Kyoto Protocol, which calls for reducing the production of greenhouse gasses. The U.S. has negotiated similar treaties with other nations to try to deal with other environmental problems, such as acid rain and ozone depletion. On a scale from zero to ten where zero means it is a very bad idea and ten means it is a very good idea, how do you view international treaties as a way to deal with environmental problems?

Numerical label

0 very bad idea
1
2
3
4
5
6
7

8
9
10 very good idea

trade - Where tradeoffs must be made between environmental protection and property rights, the emphasis should be on protecting property rights.

Numeric Label

0 strongly disagree
1 disagree
2 agree
3 strongly agree

brink - On a scale from zero to ten where zero means that there is no real environmental threat to civilization and ten means that human civilization is on the brink of collapse due to environmental threats, what do you think about the current environmental situation?

Numeric Label

0 no real threat
1
2
3
4
5
6
7
8
9
10 brink of collapse

Potential Independent Variables

educ - education level

Numeric Label

0 less than high school
1 some high school
2 high school graduate
3 some college
4 college graduate
5 some graduate school
6 graduate degree

income - income in dollars—midpoint of ordinal income categories (e.g. if

the respondent selected an income category of between \$25,000 to \$30,000 - see categories in "Incord" above - the computer would read a score of \$27,500 (i.e., the midpoint between \$25,000 and \$30,000).

age - respondent's age in years

gender

Numeric Label
0 = male; 1 = female

ideology - Which of the following best describes your political ideology?

Numeric Label
0 strongly liberal
1 liberal
2 slightly liberal
3 middle of the road
4 slightly conservative
5 conservative
6 strongly conservative

party - With what political party do you identify?

Numeric Label
0 = Republican party
1 = Independent/No party
2 = Democratic party
3 = Green party

Thus, a continuum from most conservative to most liberal

hear- Has the respondent heard about the proposed international treaty called the Kyoto Protocol? Note: I listed "Hear" as a potential independent variable. It is also a potential dependent variable. Thus, it could be useful to explain the information level the respondent has (e.g., How well is the respondent's information level explained by the education, income, age, etc.?)

Numeric Label
0 no
1 yes

comph - Do you have regular access to a computer at your residence?

Numeric Label
0 no
1 yes

compo - Do you have regular access to a computer outside home--like at work or school?

Numeric Label
0 no
1 yes

550Fatalities

This dataset examines highway fatalities. The data are for 48 U.S. states (excluding Alaska and Hawaii) annually for 1982 through 1988. The data were provided by Professor Christopher J. Ruhm of the Department of Economics at the University of North Carolina.

mrall - Vehicle Fatality Rate - the number of traffic deaths in a given state in a given year, per 10,000 people living in that state in that year. Traffic fatality data were obtained from the U.S. Department of Transportation Fatal Accident Reporting System.

spircons - Spirits Consumption

beertax - Tax on Case of Beer - The beer tax is the tax on a case of beer, which is an available measure of state alcohol taxes more generally.

yngdrv - % of Drivers Aged 15-24

jaild - Mandatory Jail Sentence – Coded “1” if the state requires jail time for an initial drunk driving conviction and “0” otherwise.

comserd - Mandatory Community Service – “Coded” if the state requires community for an initial drunk driving conviction and “0” otherwise.

unrate - Unemployment Rate

perinc - Per Capita Personal Income

educ90 – As of 1990 the percentage of those 25, and older, who have at least a bachelor’s degree.

550 Hibbs

This is a portion of the dataset used by Douglas A. Hibbs and Violeta Piculescu in “Tax Toleration and Tax Compliance: How Government Affects the Propensity of Firms to Enter the Unofficial Economy” (American Journal of Political Science, January, 2010, pp. 18-33). The data were provided by Professor Douglas A. Hibbs. The “unofficial” economy refers to the production and sale of goods that evade official taxation and regulation. This data could be useful for examining factors impacting the degree to which business complies with tax policy/regulation and the

perception by business managers of the impact of various government policies.

Most of the data are based on interviews obtained from managers of 3,686 enterprises distributed over 55 countries by the World Bank's World Business Environment Surveys in 2000. The following variables are responses by the business managers surveyed to the following type of question: "Please judge on a four point scale how problematic are these different regulatory areas for the operation and growth of your business? (0 = no obstacle, 1 = minor obstacle, 2 = moderate obstacle and 3 = major obstacle)

q17lic – business licensing (i.e., Please judge on a four point scale how problematic business licensing is for the operation and growth of your business? - 0 = no obstacle, 1 = minor obstacle, 2 = moderate obstacle and 3 = major obstacle)

q17cus – customs/foreign trade regulations (same setup as q17lic)

q17lab – labor regulations (same setup as q17lic)

q17for – foreign currency/exchange regulations (same setup as q17lic)

q17env – environmental regulations (same setup as q17lic)

q17fir – fire and safety regulations (same setup as q17lic)

q17hit – high taxes (same setup as q17lic)

q49fin – financing (same setup as q17lic)

q49jud – functioning of the judiciary (same setup as q17lic)

paytax99 - payroll taxes (i.e., social insurance taxes) as a percentage of a nation's gross domestic product in 1999.

cintax - highest marginal tax rate on corporate profits in 2000

assets – managers' estimates of value of their firm's fixed assets (land, buildings and equipment) in U.S. dollars – 10 categories (1-11 ranging from \$250,000 to \$500,000 or more).

taxcomp – tax compliance – percentage of a firm's total sales which are reported for tax purposes (broken into seven categories of responses - 0= <50%, 1=50%-59%, 2=60%-69%, 3=70%-79%, 4=80%-89%,5=90-99% and 6=100%). This is the central dependent variable in this study.

550California1

The variables in 550California1 were selected from the Public Policy Institute of California's November, 2008 survey on Californian's attitudes toward California's public colleges and universities.

Q36. How about spending more state government money to keep down tuition and fee costs, even if it means less money for other state programs? (Do you favor or oppose this proposal?)

0 favor
1 oppose

Q37. How about having a sliding scale for tuition and fee costs, so that students pay according to their income status? (Do you favor or oppose this proposal?)

0 favor
1 oppose

Next, California Community College enrollment fees are currently \$20 dollars per unit, which is a decrease from \$26 dollars per unit two years ago.

[ROTATE Q38 AND Q39 - This is to minimize "order of questions" effect.]

Q38. Do you think that enrollment fees in the California Community College system are currently about the right amount, too high or too low?

0 too low
1 about the right amount
2 too high

Q39. Do you think that enrollment fees in the California Community College system are currently about the same as, higher than, or lower than enrollment fees in other states?

0 lower than
1 about the same as
2 higher than

Changing topics,

As you may know, the state government has an annual budget of around \$100 billion dollars and currently faces a multibillion dollar gap between spending and revenues.

Q40. How concerned are you that the state's budget gap will cause significant spending cuts in higher education?

0 very concerned
1 somewhat concerned
2 not too concerned
3 not at all concerned

Q41. Given the state's current budget situation, on a scale of 1 to 5--with 1 being a very low priority and 5 being a very high priority--what priority should be given to spending for California's public colleges and universities? [INTERVIEWER: Do not read text of answers, if necessary repeat, "on a scale of 1-5 with 1 being a very low priority and 5 being a very high priority, what priority should be given to spending for California's public colleges and universities?"]

- 0 very low priority
- 1 low priority
- 2 medium priority
- 3 high priority
- 4 very high priority

Next, what if the state said it needed more money just to maintain current funding for public colleges and universities.

Q42. Would you be willing to pay higher taxes for this purpose, or not?

- 0 yes
- 1 no

Q43. Would you be willing to increase student fees for this purpose, or not?

- 0 yes
- 1 no

Q44. Next, in general, how important is California's higher education system to the quality of life and economic vitality of the state over the next 20 years--very important, somewhat important, not too important, or not at all important?

- 0 very important
- 1 somewhat important
- 2 not too important
- 3 not at all important

Q45. In thinking ahead 20 years, if current trends continue do you think California's economy will need [2] a higher percentage, [0] a lower percentage, [OR] [1] about the same percentage of college educated workers as today?

- 0 lower percentage
- 1 about the same percentage
- 2 higher percentage

Q46. In thinking ahead 20 years, if current trends continue, do you think California will have (2) more than enough, (0) not enough, [OR] (1) just enough college educated residents needed for the jobs and skills likely to be in demand?

- 0 not enough
- 1 just enough
- 2 more than enough

Q47. In thinking ahead 20 years, how important do you think it is for the state government to be spending more public funds to increase capacity in public colleges and universities—very important, somewhat important, not too important, or not at all important?

- 0 very important
- 1 somewhat important
- 2 not too important
- 3 not at all important

Q48. How much confidence do you have in the state government's ability to plan for the future of California's higher education system—a great deal, only some, very little, or none?

- 0 a great deal
- 1 only some
- 2 very little
- 3 none

Q49. Generally speaking, how much interest would you say you have in politics—a great deal, a fair amount, only a little, or none?

- 0 great deal
- 1 fair amount
- 2 only a little
- 3 none

Q50. Would you consider yourself to be politically:

- 0 very liberal
- 1 somewhat liberal
- 2 middle-of-the-road
- 3 somewhat conservative
- 4 very conservative

D1. Finally, we have a few demographic questions. What is your age?
[IF NECESSARY: READ LIST]

D4. What do you hope will be the highest grade level that your youngest child will achieve: some high school; high school graduate; some college; college graduate; or a graduate degree after college?

- 0 some high school
- 1 high school graduate
- 2 some college
- 3 college graduate
- 4 a graduate degree after college

D6. What was the last grade of school that you completed?
[IF NECESSARY: READ LIST; ENTER "ASSOCIATES DEGREE" AS PUNCH <3>
SOME COLLEGE]

- 0 some high school or less
- 1 high school graduate/GED
- 2 some college
- 3 college graduate
- 4 post graduate

D9. Finally, which of the following categories best describes your total annual household income before taxes, from all sources?

[PROBE: your best estimate is fine AND/OR REREAD LIST BEFORE ACCEPTING DON'T KNOW OR REFUSED"]

[IF RESPONDENT REFUSES, SAY "We understand and respect that this information is confidential, we ask only for research purposes and will keep all of this information absolutely anonymous"]

- 0 under \$20,000
- 1 \$20,000 to under \$40,000
- 2 \$40,000 to under \$60,000
- 3 \$60,000 to under \$80,000
- 4 \$80,000 to under \$100,000
- 5 \$100,000 to under \$200,000
- 6 \$200,000 or more

550California2

The variables in 300California2 were selected from the Public Policy Institute of California's January, 2007 survey. The topics include spending levels on various budget categories (corrections, K-12 public education, colleges and universities, health and human services and roads and infrastructure), tradeoffs between spending reductions and tax increases and health care.

Q13. How about the state's corrections system, including prisons? (Do you think that the state government should spend more money than it does now, the same amount as now, or less money than now?)

- 0 more money
- 1 same amount of money
- 2 less money
- 3 [VOL] should spend no money at all

Q14. How about the K through 12 public education system? (Do you think that the state government should spend more money than it does now, the same amount as now, or less money than now?)

- 0 more money
- 1 same amount of money
- 2 less money
- 3 [VOL] should spend no money at all

Q15. How about public colleges and universities? (Do you think that the state government should spend more money than it does now, the same amount as now, or less money than now?)

- 0 more money
- 1 same amount of money
- 2 less money
- 3 [VOL] should spend no money at all

Q16. How about health and human services? (Do you think that the state government should spend more money than it does now, the same amount as now, or less money than now?)

- 0 more money
- 1 same amount of money
- 2 less money
- 3 [VOL] should spend no money at all

Q17. How about roads and other infrastructure projects? (Do you think that the state government should spend more money than it does now, the same amount as now, or less money than now?)

- 0 more money
- 1 same amount of money
- 2 less money
- 3 [VOL] should spend no money at all

Q19. And, in general, which of the following statements do you agree with more—I'd rather pay higher taxes and have a state government that provides more services, or I'd rather pay lower taxes and have a state government that provides fewer services?

- 0 higher taxes and more services
- 1 lower taxes and fewer services

Q48. Which would you prefer [0] the current health insurance system in the United States, in which most people get their health insurance from private employers, but some people have no insurance [OR] [1] a universal health insurance program, in which everyone is covered under a program like Medicare that is run by the government and financed by taxpayers?

- 0 current system
- 1 universal health insurance system

Q49. Do you favor or oppose the U.S. government guaranteeing health insurance for all citizens, even if it means raising taxes?

- 0 favor
- 1 oppose

Q53. Next, would you consider yourself to be politically:
[READ LIST, ROTATE ORDER TOP TO BOTTOM]

- 0 very liberal
- 1 somewhat liberal
- 2 middle-of-the-road
- 3 somewhat conservative
- 4 very conservative

D1. Finally, we have a few demographic questions. What is your age?

D7. What was the last grade of school that you completed?

- 1 some high school or less
- 2 high school graduate/GED
- 3 some college
- 4 college graduate
- 5 post graduate

D10. Finally, which of the following **categories** best describes your total annual household income before taxes, from all sources?

- 1 Under \$20,000
- 2 \$20,000 to under \$40,000
- 3 \$40,000 to under \$60,000
- 4 \$60,000 to under \$80,000
- 5 \$80,000 to under \$100,000
- 6 \$100,000 to under \$200,000
- 7 \$200,000 or more

Gender: 1 Male 2 Female

550California3

This data contains the percentage of the county-wide vote in favor of some important ballot initiatives in California. One of the initiatives may concern a subject logically related to your term paper. If you use this data, you need to put a disclaimer in Appendix B of your term paper. Assuming your model is that the vote on a ballot initiative is the dependent variable and the independent variables are a group of county demographics (e.g., educational attainment, median household income, etc.), the hypotheses you can test with this data concern county-level voting while the theory underlying the hypotheses is based on the behavior of individuals, not counties. As the readings discuss, there is a potential fallacy in using aggregate measures (e.g., a county vote) to infer the behavior of individuals (550 Coursepack, pp. 12-13; POSC 300 Reader, pp. 13-14). Given that we do not have access to individual-level data on the variables we need, a county-level analysis is the best available alternative. *For this reason, among others, I'd recommend this dataset only as a "last resort." See if you can't use one of the other datasets.*

<u>Variable Name</u>	<u>Description</u>
county	Name of county
prop8	Percentage of the vote cast in the county in favor of Proposition 8 in November, 2008. A “yes” vote was in favor of banning same-sex marriage.
prop10	Percentage of the countywide vote in favor of Proposition 10 (tobacco tax increase use used for early childhood development – brought by Rob Reiner), November 3, 1998 (California Secretary of State – Statement of the Vote).
prop56	Percentage of the countywide vote in favor of Proposition 56 (reduce budget threshold in both houses of the state legislature to 55%), 2004.
prop71	Percentage of the countywide vote in favor of Proposition 71 (stem cell research), November, 2004.
prop75	Percentage of the countywide vote in favor of Proposition 75 (requiring union members to give their consent for their dues to be used for political purposes). November, 2005.
prop79	Percentage of the countywide vote in favor of Proposition 79 (using bulk buying power of the state to obtain lower drug prices to those eligible). November, 2005 special election.
prop128	Percentage of the countywide vote in favor of Proposition 128 (“Big Green” – environmental), November, 1990.
prop187	Percentage of the countywide vote in favor of Proposition 187 (deny government benefits to illegal immigrants), November, 1994.

prop209	Percentage of the countywide vote in favor of Proposition 209 (prohibit the State of California from using affirmative action), November, 1996.
coll00	Percentage of those 25, or older having a least a Bachelor's degree in 2000.
coll90	Same as "coll00" except for 1990.
medinc05	Median household income in the county in 2005 in thousands of dollars. Thus, a score of 45.4 means that half the households in that county had an income greater than \$45,400 and half the households in that same county had an income less than \$45,400 in 2005.
medinc90	Same as "medinc05" except for 1990.
dens06	Persons per square mile of land area in the county in 2006. This is a measure of population density.
white05	Percentage of the county population who were white in 2005.
afam05	Percentage of the county population who were African-American in 2005.
asian05	Percentage of the county population who were Asian in 2005.
hispan05	Percentage of the county population who were either Latino or Hispanic in 2005.
senior05	Percentage of the county population who were 65, or older, in 2005.

NOTE: Demographic data are from the County and City Databook: 2007 (www.census.gov/prod/2008pubs/07ccdb) and earlier editions. Most of the votes are from the California Secretary of State website. Pre-2000 demographic data was supplied by Dan Hopkins (Harvard University from geolytics – which makes available Census Bureau data.

Estimating the Statistical Results for Appendix B of the Term Paper

Now that you have selected the data set you wish to work with, you can estimate the statistical results that will appear in Appendix B of your term paper. ***Make sure read all remaining portions of this document before attempting the statistical analysis for Appendix B of your term paper. As you will read later, the type of dependent variable you are working with will dictate the appropriate statistical technique. Therefore, you need to read the entire discussion before attempting the statistical analysis. Don't just "do what I did" in Appendix B of the sample term paper (i.e., use the same statistical estimator). The estimation procedure I used may not be appropriate for your analysis.***

The statistical package we will use is called "Stata" and is available in SSPA – 206. The greatest "hurdle" will be to get access to the lab in SPA-206. Currently, it's the only place on campus that has Stata. Here's how to proceed: (1) Call 985-4986 (which is the phone in the SPA-206 lab) and find out what hours you can use Room 206 (i.e., that Room 206 is open and there is not a class scheduled in it); (2) since you should always expect things not to work well - try to coordinate the time you will be in the lab with my phone office hours (i.e., so you can call me at home if you have trouble - 562-597-7287 – see syllabus/coursepack for the hours I'm available). For reasons that will become clear, bring a "flash drive" to the lab with you.

You can save yourself much time and consternation in the computer lab by going through the variable lists for the available data sets and thinking through what model(s) you want to estimate *prior* to going to the computer lab. For example, read through Appendix B of the sample term paper and follow the reasoning. Pay particular attention to the discussion of why attitudes toward the Kyoto Protocol might be useful in understanding attitudes toward high speed internet service. Your topic may be much different than the one in the sample term paper and, hence, a different data set and/or different model may be appropriate. Just a piece of advice: write out the variable names, beginning with the dependent variable and then proceeding through the independent variables, that you want to estimate *before* going to the computer lab.

Look under "programs" for STATA 11 (DO NOT USE STATA 9). You can download each of the data sets from my website (www.csulb.edu/~cdennis click on "Courses" and look under POSC 550). Since the datasets are in Excel, you need to save the file as a "tab delimited textfile" in order to read the file into Stata. For example, if you are using the Excel file "550Environmental1" do the following: (1) download the file into Excel on the computer you are using; (2) save the file as

550Environmental1 but change the “Save as Type” to “Text (Tab delimited)” to a lettered drive (e.g., a flash drive in the “F” or “H” drives – don’t save it to a non-capital lettered drive – e.g., “documents” or “my computer” – because I can’t tell you how to access it in Stata). **WHEN YOU TRY TO SAVE YOUR FILE AS A TAB DELIMITED TEXT FILE EXCEL WILL ASK YOU QUESTIONS – ANSWER EITHER “OKAY” OR “YES” (WHICHEVER OPTION YOU ARE GIVEN). BE CAREFUL: ONE OF THE BIGGEST PROBLEMS PEOPLE HAVING DOING THIS ASSIGNMENT IS THAT THEY WERE NOT ABLE TO SAVE THE EXCEL FILE AS A “Text (Tab delimited)” FILE (i.e., they thought they saved it as such but actually didn’t). You can check to see if your file has been saved as a Text (Tab delimited) file by going in to Excel and: (1) click on “open”; (2) look in the lower right corner of the box which appeared as a result of step 1 and change the header from “All Excel Files” to “Text Files” and see if you actually have a file by the correct name (i.e., the only Excel files that should now be visible will be Tab delimited text files – so if the file name doesn’t appear, you need to repeat the previous steps on creating the Text (Tab delimited) file).**

Assuming you saved the file as a Text (Tab delimited) file to the H drive, type your version of the following two commands in the Stata 11 command box to retrieve the file: set mem 500000k (press “enter”) insheet using H:/550Environmental1.txt (press “enter”). **BE CAREFUL!** (e.g., don’t forget insheet using in the previous command line). Now your data should be read into Stata 11. The variable names should appear on the left side of the screen. Read through the variable list which appears in the coursepack. The variable list tells you the variable names for the variables in each data set.

Although the following doesn’t appear in Appendix B of the sample term paper, I want you to demonstrate a knowledge of descriptive statistics and the command necessary to obtain them in Stata 11. As an example, take the first equation in Appendix B of the sample term paper (i.e., probit kyoto educ income gender brink hear comph compo). The mean, standard deviation, and the high and low scores for each variable can be attained by typing the following in the command box (you can put the results in a Word file by highlighting, copying and pasting – Stata 11 results look best in courier new 9 font): summarize kyoto educ income gender brink hear comph compo (press enter)

Variable	Obs	Mean	Std. Dev.	Min	Max
kyoto	15788	.5523182	.497271	0	1
educ	28041	4.502443	1.272586	1	7
income	22538	53242.97	36561.17	2500	252500
gender	28052	.5013903	.500007	0	1
brink	28013	5.76386	2.233743	0	10
hear	28032	.1886059	.3912022	0	1
comph	27735	.9036957	.2950134	0	1
compo	27732	.6555243	.4752056	0	1

Put together an analysis like the one above and email it to me. The generation and discussion of descriptive statistics shouldn't go in Appendix B. Rather email it to me as part of the take-home quiz. Your version of Appendix B that appears in your term paper should look similar to the sample term paper.

The "Obs" column tells the number of observations. This is a large data set. Many of the variables have 20,000, or more, observations (i.e., respondents in this survey). Additionally, the results for "income" tell me that the lowest earners made approximately \$2,500 per year while the highest earners made approximately \$252,500. Since the standard deviation for income is over 50% of the size of the mean (i.e., 36,561 is over half of 53,242) this tells me that the mean of \$53,242 was achieved by incomes not close to the mean (such as \$252,000!) averaging to the mean rather than a situation where most of the scores were quite close to the mean.

Before estimating your model, read through page 345. You need to understand the entire discussion over pages 342-345 before continuing. As discussed in the multivariate readings for this course, since the dependent variable in the analysis in Appendix B of the sample term paper is dichotomous (i.e., two possible responses - the respondent either favored or opposed ratification of the Kyoto Protocol) multiple regression could not be used. If the dependent variable has two categories of responses (as in Appendix B), the researcher can use either probit or logit. The choice is largely arbitrary. I used probit in Appendix B of the sample term paper. The dependent variable must be listed immediately to the right of the estimation procedure (just keep reading). For example, notice the first equation estimated in Appendix B of the sample term paper:

```
probit kyoto educ income gender brink hear comph compo
```

The above command tells Stata 11 that: (1) "probit" is the estimation procedure to be executed; (2) the dependent variable is kyoto; and (3) there are 7 independent variables (educ income gender brink hear comph compo).

If the dependent variable has *more* than two categories of responses there are several possibilities. First, let us suppose that the dependent variable has three, or more, categories of responses and is an ordinal level measure (just keep reading). Remember from previous readings and class discussion that ordinal means that the response categories *can* be rank-ordered but that we do not know that the difference between the categories is equal. For example, suppose that a survey question asks the respondent to indicate a level of agreement/disagreement with a statement and the possible responses are:

strongly agree, agree, neutral, disagree and strongly disagree. This set of possible responses *are* rank-ordered because each succeeding category indicates less agreement with the statement. However, the level of measure is ordinal, not interval, because we do not know that there is an equal distance between each response. Thus, we do not know that the difference between “strongly agree” and “agree” is the same as between “agree” and “neutral.” Many of the variables in the datasets mentioned in this appendix are similarly measured.

If the dependent variable is ordinal then choose either ordinal probit (i.e., replace probit in the above command line with oprobit) or ordinal logit (replace probit with ologit in the command line). Once you use either ordinal probit or ordinal logit, the statistical output will contain what are called “cutpoints.” Just forget about them. For purposes of this course “cutpoints” are not necessary.

If you use any form of either probit or logit the results are interpreted in the same manner as regression *except* that you *cannot* directly make the magnitude statements that were made on pages 109-110 of the 550 Coursepack or pages 68-69 and 72-73 of the 300Reader. We can make magnitude statements in either probit or logit, but there are a number of “hoops” to jump through first. These “hoops” are beyond the scope of this course. However, the rest of the discussion over the aforementioned pages *is* applicable (i.e., the direction of the relationship between each independent variable and the dependent variable after removing the impact of all other independent variables and the 2.0 t statistic standard for achieving statistical significance at the .05 level).

As an example, look at the first statistical results in Appendix B of the sample term paper (reprinted ahead).

```
probit kyoto educ income gender brink hear comph compo
```

Probit regression

Number of obs	=	12409
LR chi2(7)	=	2055.10
Prob > chi2	=	0.0000
Pseudo R2	=	0.1210

Log likelihood = -7463.2865

kyoto	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
educ	.0789208	.0104864	7.53	0.000	.0583678 .0994737
income	1.74e-06	3.51e-07	4.95	0.000	1.05e-06 2.43e-06
gender	.0251577	.024829	1.01	0.311	-.0235063 .0738216
brink	.2381675	.0058842	40.48	0.000	.2266348 .2497003
hear	-.0940281	.0332897	-2.82	0.005	-.1592748 -.0287814
comph	-.0332803	.0366544	-0.91	0.364	-.1051216 .0385609
compo	.1800847	.0265302	6.79	0.000	.1280865 .2320829
_cons	-1.727818	.0649327	-26.61	0.000	-1.855084 -1.600553

Since the coefficient for “educ” is positive (i.e., .078 rather than -.078) we know that after removing the impact of all other independent variables in the model (i.e., income, gender, etc.) the more highly educated the respondent the more likely they are to support ratification of the Kyoto

Protocol. I used “probit” as the estimation technique because the dependent variable (support or opposition to the Kyoto Protocol) had only two categories of responses (0 = against, 1 = for). A positive relationship between education and support for the Kyoto Protocol means that higher scores on “educ” (higher levels of education) are associated with a higher score on “kyoto.” Since “1” means support for the Kyoto Protocol and “0” means opposition, and “1” is a higher score than “0,” this means that higher levels of education are associated with a greater probability that the respondent will favor ratification of the Kyoto Protocol. If the probit coefficient for “educ” had been negative (e.g., -.078) it would have meant that the more educated the respondent the less likely they are to favor ratification of the Kyoto Protocol. Read the variable list carefully. You need to know what higher or lower scores on each variable indicate.

Since the absolute value (i.e., disregard positive or negative sign) of the t statistic for education is 7.53 (see “Z” column above) and this figure is well above the 2.0 threshold, we know that there is less than a 5% chance that a respondent’s level of education has no impact on their probability of favoring ratification of the Kyoto Protocol (the actual probability is less than 1 in 1,000 – see “P>|z|” column where the entry is 0.000). Much of the analysis in Appendix B of the sample term paper is based upon these interpretations.

Keep in mind that the choice of an estimation technique is determined by the level of measurement of the *dependent variable*. For example, I could use ordinal level *independent* variables in regression, but *not* an ordinal level *dependent* variable. If the dependent variable is either an interval or ratio level measure (i.e., where we can rank-order the responses and we are sure that there is an equal interval between the categories of responses) we should use regression as the estimation procedure (i.e., replace probit with regress in the Stata 11 command line).

I can’t stress enough that you need to look very carefully at how the variables are measured. For example, consider the “taxcomp” variable in the Hibbs dataset. The variable list defines “taxcomp” as follows: percentage of a firm’s total sales which are reported for tax purposes (broken into seven categories of responses - 0= <50%, 1=50%-59%, 2=60%-69%, 3=70%-79%, 4=80%-89%, 5=90-99% and 6=100%). This is not either an interval or ratio level variable (i.e., the variable is not measured as a percentage). If the firm scores “0” they could report anywhere from “0%” to “50%” of their total sales for tax purposes. If the responses were individual firm percentages rather than broad categories (e.g., the computer read the actual percentage – thus such scores such as 25%, 27%, 52%, 71%, etc.) then the variable would have been a percentage. If this variable was the dependent variable (as in Hibbs’ study) then regression would have been appropriate. However, since the World Bank (the data source Hibbs used) coded the responses in the previously mentioned categories, this variable is ordinal (each succeeding score on the 0 through 6 scale indicates a higher percentage of sales reported) but not either

interval or ratio (e.g., all scores within a category are treated the same – thus 52% and 59% are in the same category when they are actually different scores and the difference between the broad categories is not equal – category 0 is from 0% to 49% while the next several categories cover only 10%). For these reasons Hibbs had to use either ordinal probit or ordinal logit instead of regression.

If the scores on the dependent variable *cannot* logically be rank-ordered use multinomial probit (i.e., enter “mprobit” instead of “probit” in the Stata 11 command line). For example, suppose the dependent variable is race. What would the continuum be: African-American, Asian, Latino, White, or Latino, White, African-American, Asian? Race is simply not a variable that can be rank-ordered. In such circumstance multinomial probit is the appropriate estimation procedure.

If the categories of responses of the dependent variable can be rank-ordered and each unit on the measuring continuum is equal (e.g., the computer is reading actual percentages – the difference between 32% and 33% is the same as the difference between 72% and 73%) regression is the appropriate estimation procedure (i.e., replace probit with regress in the Stata command line). For regression, use the interpretation procedure discussed on pages 109-110 of the 550 Coursepack or pages 68-69 and 72-73 of the 300Reader.

Let me mention an additional procedure that can enhance the discussion in Appendix B. In some instances, you will be interested in the impact of particular independent variables in the statistical analysis. In Appendix B of the sample term paper, a variable I wanted to have (and didn't) was the respondent's location. Thus, to what extent did the respondent live in a rural area? Such a variable would have been useful because the purpose of the broadband program is to increase high speed internet usage in rural areas. So, does location (after removing the impact of education, income, etc.) impact the relative value respondents place on high speed internet access? Unfortunately, since the data set didn't contain an urban/rural variable, I couldn't discuss this in Appendix B.

Let's say that the data set did contain an urban/rural variable. Had such a variable been available, it would have been included as an independent variable in the analysis that appears in Appendix B. Further suppose that the location variable was statistically insignificant (i.e., had a t statistic with an absolute value less than 2.0). Perhaps location was statistically insignificant because it was highly related to the other independent variables in the model. This is the situation described over pages 115-123 in the 550 Coursepack and page 77 of the 300Reader: an independent variable that is theoretically important may be statistically insignificant due to high multicollinearity. Remember from the discussion (either pages 115-123 in 550 Coursepack or page 77 of the 300Reader) that we only need to be concerned about high multicollinearity for statistically insignificant independent variables.

Fortunately, Stata 11 provides a very easy way to check for how much of the variation in each independent variable is explained by all the other independent variables in the analysis. To assess the degree of multicollinearity execute the following steps: (1) run the equation of interest (e.g., the first equation that appears in Appendix B of the sample term paper:

probit kyoto educ income gender brink hear comph compo); (2) rerun this equation using regress rather than probit (i.e., regress kyoto educ income gender brink hear comph compo); (3) after running the regression in step 2, type vif in the command box and press “enter.” Following the aforementioned three steps with the first equation in Appendix B produced the following results:

vif

Variable	VIF	1/VIF
educ	1.20	0.834214
income	1.15	0.872184
compo	1.11	0.899267
hear	1.11	0.900412
gender	1.10	0.905312
brink	1.04	0.962844
comph	1.03	0.967975
Mean VIF	1.11	

Remember that multicollinearity is only a concern for statistically insignificant independent variables. From the results for the first equation in Appendix B of the sample term paper, we see that “comph” (whether or not the respondent had a home computer) was statistically insignificant (t statistic -0.91 – well below an absolute value of 2.0). Was the statistical insignificance of the home computer variable likely due to high multicollinearity? The results immediately above provide the answer.

Subtracting the number in the 1/VIF column from 1.0 indicates that only 3% of the variation in the home computer variable is explained by all other independent variables together (i.e., look at the figure for “comph” in the 1/VIF column: $1 - 0.967 = 0.033$). Since 3% is well below the threshold for high multicollinearity of 70% (i.e., 0.03 is well below 0.70), high multicollinearity is not likely the reason having access to a home computer is a statistically insignificant predictor of attitudes toward the Kyoto Protocol.

If you have a strong theory linking a statistically insignificant independent variable to the dependent variable, use the above discussion in your version of Appendix B. Just apply the three-step procedure above. Thus, don’t explain Stata’s approach in Appendix B. Simply mention how much of the variation in the statistically insignificant independent variable in question is explained by the other independent variables and what this indicates.

Increasing Broadband Access in Rural America

Kim Tang

Increasing Broadband Access in Rural America

Executive Summary

Expanding broadband usage in rural America is an important priority for both citizens and businesses. Currently, rural Americans are less likely to use broadband capabilities than either urban or suburban residents. Additionally, rural Americans are less likely to value broadband as highly as either urban or suburban residents. The purpose of this analysis is to assess different federal policies to increase broadband usage in rural America. This analysis does not recommend a particular policy.

Introduction

The latest broadband report by the Organization for Economic Cooperation & Development finds that as of December 2006, the U.S. ranks number 15 out of 30 countries in per-capita broadband subscriptions.⁵ In a knowledge-based society, these findings raise concern about the current state of the digital divide and its social and economic impact on the 'have-nots' of broadband.

As more and more individuals, businesses, organizations, institutions, etc., become connected to the internet, the internet as a primary medium for communication, business transactions, information dissemination and accumulation and other electronic services becomes more valuable. This shift away from offline services may have generated considerable benefits for broadband users; however, the failure of markets to guarantee a minimum level of consumption for rural residents has spawned a technological disconnect that is known today as the digital divide.

The purpose of this paper is to examine how existing policies have addressed the lack of broadband supply in rural areas, the extent to which these policies have increased broadband penetration and what alternative policies can best facilitate broadband deployment.

Broadband Problem

The broadband problem can also be understood as a private goods problem where the cost of providing additional service in unserved areas is not profitable enough (marginal revenue does not exceed marginal costs) for firms to invest in rural Internet development. The high cost of deploying broadband in rural areas due to infrastructure limitations deters new firms from entering the market. This creates a monopolistic market where incumbent local exchange carriers are undersupplying broadband service to specific geographic regions. In addition, high barriers to entry create uncontestable markets that can result in inefficient pricing if broadband is deployed in rural neighborhoods.

In examining broadband penetration a case is made for government intervention on the grounds of human dignity and economic efficiency. According to Savage and Waldman (2005), there is a positive association between internet access and income and education. Those less likely to be connected to the internet are individuals of lower socio-economic status. As the internet continues to permeate every facet of society, those on the wrong side of the digital divide will be further disadvantaged as access to basic public and private services move online. A valid justification for government intervention in the digital divide is to ensure the equality of opportunity. Broadband penetration

⁵ http://www.oecd.org/document/7/0,2340,en_2649_34223_38446855_1_1_1_1,00.html

in rural areas can minimize social and economic inequities by equalizing the informational playing field. Access to job resources, information, educational e-services, etc. can minimize inequalities as the benefits of the internet are distributed to everyone.

Analysts have also argued that broadband is essential for continued economic growth. Areas with developed broadband infrastructure have the capacity to offer more advanced communications applications that can lure businesses and jobs into the community.⁶ According to Ferguson (2002), U.S. productivity growth can decline by as much as 1% per year or more if steps aren't taken to improve the rate of deployment and quality of services.⁷

Brief History of the Internet

The idea that all citizens are entitled to affordable access to telecommunication services is line with the mores of American society. This concept, known as "universal service," was first introduced by the 1934 Communications Act in which the Federal Communications Commission (FCC) was assigned to ensure that "rapid, efficient, Nation-wide, world-wide wire and radio communications service" was made available to all Americans and at affordable costs.⁸

Since the establishment of the FCC, the universal service concept has been expanded to reflect advances in telecommunications. Following the privatization and deregulation of the internet, public policy has consistently emphasized the importance of ensuring that all Americans have reasonable access to the internet. For the purpose of this paper it is important look at the Telecommunications Act of 1996 and to examine the initiatives that developed to facilitate broadband penetration in underserved regions.

Telecommunications Act of 1996

In section 706 of the Telecommunications Act of 1996, the FCC is responsible for ensuring the deployment of advanced telecommunications and for facilitating deployment by promoting competition and removing infrastructure barriers.⁹ In addition, section 254 of the Act requires that citizens in rural and underserved areas have access to advanced telecommunications and at reasonable costs.¹⁰ In response to the objectives set by the Telecommunications Act, two programs have emerged that address the technological disconnect

⁶ Leighton, Wayne. *Broadband Deployment and the Digital Divide*. Policy Analysis August 7, 2001.

⁷ Ferguson, Charles. "The United States Broadband Problem: Analysis and Policy Recommendations," *The Brookings Institution*, May 31, 2002.

⁸ Gilroy, Angele. "Universal Service Fund: Background and Options for Reform," *CRS Report for Congress*, April 25, 2007.

⁹ Leighton, Wayne. "Broadband Deployment and the Digital Divide." *Policy Analysis*, August 7, 2001.

¹⁰ Leighton, Wayne. "Broadband Deployment and the Digital Divide." *Policy Analysis*, August 7, 2001.

between rural and urban/suburban neighborhoods – the Rural Broadband Access Loan and Loan Guarantee Program and the E-Rate Program.

Rural Broadband Access Loan & Loan Guarantee Program

The purpose of the Rural Broadband Access Loan & Loan Guarantee Program is to finance the construction and development of facilities and equipment necessary to provide broadband service in rural areas not currently receiving it.¹¹ The program seeks to induce companies to increase the supply of broadband in rural neighborhoods by offsetting the high cost of entry and infrastructure through low-interest loan guarantees (supply-side subsidies). One of the benefits of subsidizing increased broadband supply is that it lowers the carrier's cost to provide service, thereby increasing firm revenue (producer surplus) and willingness to invest in Internet development.

Although the Rural Broadband Access Loan and Loan Guarantee Program was designed to lower the economic barriers to entry, the program is riddled with so many eligibility requirements that in 2005 only 5% of available funds were allocated.¹² Cash-on-hand qualifications requiring applicants to have enough funds to support their business for one year countermands the objectives of the program. In addition, strict definitions on what constitutes a 'rural community' unfairly exclude many underserved areas from benefiting from the program.¹³

The Loan Program has been criticized for not reaching the communities in greatest need and these administrative issues need to be worked out as the program is up for reauthorization in September of 2007.¹⁴

E-Rate Program

As opposed to the Rural Broadband Loan Guarantee Program, the E-Rate reduces the cost of service to consumers below which they are willing to pay (consumer surplus). Cutbacks in costs stimulate a demand for broadband (demand-side subsidies) that are usually relatively low in rural neighborhoods.

The purpose of the E-Rate program is to provide qualifying public schools and libraries in rural neighborhoods with discounted telephone services, Internet access and telecommunications equipment.¹⁵ One of the benefits of the E-Rate

¹¹ www.usda.gov/rus/telecom/broadband.htm

¹² Kruger, Lennard. "Broadband Loan Grant Programs in the USDA's Rural Utilities Service," *CRS Report for Congress*, May 23, 2007

¹³ Kruger, Lennard. "Broadband Loan Grant Programs in the USDA's Rural Utilities Service," *CRS Report for Congress*, May 23, 2007

¹⁴ Kruger, Lennard. "Broadband Loan Grant Programs in the USDA's Rural Utilities Service," *CRS Report for Congress*, May 23, 2007

¹⁵ Puma, Michael et. al. "The Integrated Studies of Educational Technology: A Formative Evaluation of the E-Rate

program is that by offering Internet services at below market cost, the program generates a steady stream of demand for broadband services. Studies (Prieger, 2002) have shown that one of the major determinants of broadband access is income and that rural residents are less likely to pay for Internet service than urban and suburban residents. This is due to a combination of rural residents having lower incomes, less education and their perceived utility of internet access. If low internet utilization rates in rural areas is strictly a function of lower income, this can be corrected by subsidies. However, if lower internet utilization in rural areas is the result of rural residents who have the same standard of living as urban/suburban residents placing a lower relative value on high speed internet service, then the E-Rate program needs to educate rural residents as well as provide financial assistance. Thus, there does seem to be justification for retaining that portion of the E-Rate program devoted to educating rural residents about the value of high speed internet service.

While reports have shown promising improvements in the availability of digital technology in poor and rural communities¹⁶ there are several administrative and oversight issues that have plagued the program throughout its term. One criticism about the E-Rate program is its high cost where the annual funding cap for the program is set at \$2.25 billion.¹⁷ This raises concern because although funding for the program is based on mandated contributions from telecommunications service providers, providers have passed these costs onto consumers.¹⁸

Another problem with the E-Rate program is the lack of oversight that has led to fraud and inefficient use of funds. During the first two years of the program (1998-2000) a GAO audit found that program administrators spent millions of dollars on ineligible products and services.¹⁹ In addition, the GAO also found that by the end of August 2000, \$1.3 billion (35%) approved for allocation to applicants and vendors were never dispersed.²⁰

Despite these administrative issues, the program has demonstrated success in deploying internet access to poor and rural school districts. According the E-Rate administrative data, "84% of approved discounts have gone to public schools, and significantly higher discounts have been directed to poor and rural communities."²¹ In order to continue improving the availability of digital

Program." <http://www.urban.org/publications/410579.html>.

¹⁶ Puma, Michael et. al. "The Integrated Studies of Educational Technology: A Formative Evaluation of the E-Rate Program," *Urban Institute*, October 2002

¹⁷ Gilroy, Angele. "Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies," *CRS Issue Brief for Congress*, July 28, 2005

¹⁸ Gilroy, Angele. "Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies," *CRS Issue Brief for Congress*, July 28, 2005

¹⁹ Gilroy, Angele. "Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies," *CRS Issue Brief for Congress*, July 28, 2005

²⁰ Gilroy, Angele. "Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies," *CRS Issue Brief for Congress*, July 28, 2005

²¹ Gilroy, Angele. "Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies," *CRS Issue Brief for Congress*, July 28, 2005

technology at more efficient levels the administrative and oversight issues associated with the E-Rate program need to be further examined and addressed.

It is difficult to ascertain the overall effectiveness of the E-Rate program vs. the Rural Broadband Loan Guarantee Program because the E-Rate program is in the process of developing its long-term goals. While there have been numerous reports on E-Rate program management, the program currently has no performance measures and there have been no independent evaluations and data on how the program has achieved its objectives.²²

The Current and Expected State of Broadband Deployment

In a cost benefit analysis performed on the European digital divide, Price Water Coopers (2004) found that, in the short run, the projected benefits of deploying broadband in terms of the present dollar value (Net Present Value – NPV) would be negative for the first two years.²³ This means that during the initial stages, the costs of broadband penetration would exceed the benefits. The negative NPV is explained by the high-cost of infrastructure development in the beginning efforts of deployment. The study indicates that in the long-term, the NPV will slowly increase, eventually yielding a positive NPV. In the short run, the benefits of broadband deployment will not be enough to stimulate supply and competition. In order to induce supply, public policy is needed to counter short term losses incurred by providers of broadband.

The National Exchange Carrier Association's broadband study (2000) estimates that out of 9.5 million rural telephone lines, 3.3 millions lines did not have the capacity to be upgraded to broadband speeds by 2002.²⁴ The cost to upgrade the 3.3 million lines to broadband capability is estimated to cost \$10.9 billion.²⁵ Currently, the Rural Broadband Access Loan and Loan Guarantee Program directly addresses the economic costs of rural penetration. The program is a supply-side subsidy plan aimed at lowering the barriers to entry by alleviating high operational and development costs through low-interest loan guarantees. The United States Department of Agriculture reports that as of April 2007, since the launch of the Rural Broadband Access Loan and Loan Guarantee Program in 2002, "the program has approved 70 loans in 40 states, totaling over \$1.22 billion. The broadband loans serve 1,263 communities with a total of 582,000 household subscribers. Approximately 40 percent of these communities were unserved at the time of the loan approval, and an additional 15 percent had only one provider."²⁶

²² E-Rate Assessment Summary Available at <http://www.whitehouse.gov/omb/expectmore/detail/10004450.2005.html>

²³ Price Water Coopers, "Technical Assistance in Bridging the Digital Divide: A Cost Benefit Analysis for Broadband Connectivity in Europe." Available at <http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=14864>

²⁴ Glass, Victor et. al, "Technological Breakthroughs Lower the Cost of Broadband Service to Isolated Customers," *Government Information Quarterly*, 2003, Vol. 20, pgs. 121-133

²⁵ Glass, Victor et. al, "Technological Breakthroughs Lower the Cost of Broadband Service to Isolated Customers," *Government Information Quarterly*, 2003, Vol. 20, pgs. 121-133

²⁶ USDA Rural Development Report, June 14, 2007. Available at

In contrast, the E-Rate program is part of a broader program known as the Universal Service fund that emerged out the universal service concept mentioned earlier. While the program does not explicitly outline goals for broadband penetration in rural regions, the program has been demonstrated significant success in bridging the technological gap between urban and rural residents. Since the programs inception in 1998, funding for the E-Rate program has totaled approximately \$19 billion where targeting funding has benefited the most impoverished and rural regions.²⁷ The program is responsible for increasing instructional classroom Internet access in rural areas from 14 percent in 1996²⁸ to 95 percent in 2005.²⁹

Through supply-side and demand-side subsidies, both the Rural Broadband Loan Guarantee Program and the E-Rate Program have made progress in rural broadband penetration. However, both programs have issues in administration that negatively impact program efficiency. In addition, both programs have generally turned to DSL as their primary means for broadband deployment which may not be the most cost-effective method. According to Compaine (2003), broadband wireless fixed access (BWFA) is a more appropriate method for rural regions with low population densities and is more cost effective than cable or DSL.³⁰ Moreover, DSL service is only available to subscribers who are within 18,000 feet of the central office and therefore is unable to reach the most remote rural areas.³¹ Price Water Coopers (2004) recommends that broadband availability be maximized by exploring and implementing a mix of DSL, Satellite and BFWA technologies.³²

Policy Goals

In order to ensure that current and new broadband policies penetrate rural areas, the primary purpose of policy should be to minimize the variance of broadband consumption between rural and urban regions. Criteria for measuring this goal should be to implement detailed reporting requirements mandating service providers to report subscriber rates by zip code. Currently, FCC policy only requires that providers of broadband report on the total number of subscribers served, the zip codes in which at least one customer is served, a

<http://www.rurdev.usda.gov/rd/pubs/RDBroadbandRpt.pdf>

²⁷ "E-Rate Report, "10 Years of Connecting Kids and Community," February 28, 2007. Available at

http://www.edlinc.org/pdf/NCTETReport_212.pdf

²⁸ National Center for Education Statistics, "Internet Access in U.S. Public Schools and Classrooms 1994-1999." Available at <http://nces.ed.gov/pubs2000/2000086.pdf>

²⁹ "E-Rate Report, "10 Years of Connecting Kids and Community," February 28, 2007. Available at

http://www.edlinc.org/pdf/NCTETReport_212.pdf

³⁰ Compaine, Benjamin, "Revisiting Cost and Affordability Assumptions for High Speed Data Services in Low Population Density Locations." September 2003

³¹ Compaine, Benjamin, "Revisiting Cost and Affordability Assumptions for High Speed Data Services in Low Population Density Locations." September 2003

³² Price Water Coopers, "Technical Assistance in Bridging the Digital Divide: A Cost Benefit Analysis for Broadband Connectivity in Europe." Available at <http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=14864>

breakdown of what percentage of subscribers are served by which technology and an estimate of the percentage of subscribers who are residential.³³ In order to accurately assess the effects of policy, detailed data needs to be collected on the current state of broadband penetration.

Second, policy should promote the efficient and appropriate use of technology. Due to the universality of telephone lines, DSL may seem like the most suitable means for broadband penetration; however, DSL is unable to reach all rural regions and may not be the most cost-effective method.

Third, policy should promote competition. In order to maximize consumer surplus, policy needs to allow for the entry of new firms in the market. Subsidies, grants, loans, spectrum licenses, etc., should not favor incumbent local exchange carriers over others.

The fourth broadband policy should be administratively feasible. As witnessed with the E-Rate Program and Rural Broadband Access Loan and Loan Guarantee Program, issues of accountability, strict eligibility requirements and extensive application process have plagued current broadband policies. Current and new policies should be flexible enough to allow for the varying needs and capabilities of different regions and firms.

Some New Ways of Deploying Broadband

700 MHz License Auction

The 700 MHz spectrum has traditionally been used by television broadcasters for analog TV transmission.³⁴ In 2006 Congress passed legislation ordering broadcasters to switch from analog TV transmission to digital transmission, thereby clearing 108 MHz in the 700 MHz band for Wi-Max.³⁵ Under this alternative, a silent auction would be held in January of 2008 where firms would compete for licenses within the 700 MHz band to provide wireless broadband to consumers. The 700 MHz auction provides an ideal “third pipe” for internet transmission because the 700 MHz band has the capacity to penetrate buildings and cover large areas.³⁶ Due to these characteristics, wireless

³³ Providers have responded to proposals mandated detailed reporting requirements by zip code by claiming that such requirements are too costly and burdensome. GAO Report to Congressional Committee, “Broadband Deployment is Extensive Throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas,” May 2006. Available at: <http://www.gao.gov/new.items/d06426.pdf>

³⁴ <http://wireless.fcc.gov/services/index.htm?job=about&id=lower700>

³⁵ Stifel, Nicolaus & Company, Inc., “700 MHz Auction – Who, What, When, Where, Why,” March 2, 2007.

WiMAX, the **W**orldwide **I**nteroperability for **M**icrowave **A**ccess, is a [telecommunications](#) technology aimed at providing wireless data over long distances in a variety of ways, from [point-to-point](#) links to full mobile cellular type access – wikipedia.org.

³⁶ Stifel, Nicolaus & Company, Inc., “700 MHz Auction – Who, What, When, Where, Why,” March 2, 2007.

providers have identified the 700 MHz spectrum as an important vehicle for rural broadband deployment.³⁷

A Comparison of Alternatives

In this section the 700 MHz Auction and the two status quo policies presented earlier will be compared against the broadband policy goals: minimize variance, technological and economic efficiency, competition and administrative feasibility.

Status Quo: Rural Broadband Access Loan & Loan Guarantee Program

Minimize Variance: In a 2006 report assessing the extent of the digital divide in rural areas, the GAO found that one of the main issues for “analyzing and targeting any federal aid for broadband is a lack of reliable data on the deployment of networks.”³⁸ Current reporting requirements have proven to be ineffective measures for rural broadband penetration and program measures for the Rural Broadband Access Loan and Loan Guarantee Program. While the 2007 USDA Rural Development Report cited that the program has served 1,263 communities – 40 percent which were unserved at the time of loan approval, these figures may actually overestimate the success of the program. Past reporting requirements were waived for companies with less than 250 broadband connections and many small companies, especially those in rural regions do not report their subscriber data to the FCC.³⁹ Only recently have performance measures been implemented for the Rural Broadband Access Loan and Loan Guarantee Program and current 2006 data shows that as of 2005, rural broadband subscriber rates have increased by 9%.⁴⁰

Technological and Economic Efficiency: Due to the universality of telephone lines, DSL has primarily been seen as the preferred technology for rural broadband deployment. However, due to the logistical restrictions of upgrading telephone lines to DSL capability, many remote rural regions are unable to get DSL. While the Rural Broadband Access Loan and Loan Guarantee Program is open to all broadband providers, the program has shown to be more partial towards DSL providers where infrastructure equipment is owned by the provider. In order to receive funding, the company is required to

³⁷ Statement of Victor H. “Hu” Meena, President of Cellular South, Inc., April 19, 2007.

³⁸ GAO Report to Congressional Committee, “Broadband Deployment is Extensive Throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas,” May 2006.
Available at: <http://www.gao.gov/new.items/d06426.pdf>

³⁹ GAO Report to Congressional Committee, “Broadband Deployment is Extensive Throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas,” May 2006.
Available at: <http://www.gao.gov/new.items/d06426.pdf>

⁴⁰ Rural Broadband Loan Guarantee Program Assessment Summary:

Available at: <http://www.whitehouse.gov/omb/expectmore/detail/10003035.2006.html>

provide collateral for the loan; in the case of Satellite companies, consumers must purchase the equipment in order to access the satellite signal, therefore the equipment is owned by the consumer, putting satellite providers at disadvantage for loan approval.⁴¹

In calculating the costs of increasing the supply of broadband, Goolsbee estimated that supply-side subsidies in unserved markets would cost \$14.25 million and that consumer benefits would exceed the costs (consumer surplus) by \$210 million when adjusted for inflation (Net Present Value – NPV).⁴² While Goolsbee's findings indicate that supply-side subsidies are more efficient than inducing demand, consumer surplus gains can be further maximized through the utilization of wireless technology. Goolsbee's calculations were based on DSL data, and according to Compaine (2003), the cost of providing broadband fixed wireless access (BFWA) in lower population densities is approximately half the cost of DSL and Cable.⁴³

Promote Competition: One of the weaknesses of the program is that funds are only dispersed to companies offering to provide broadband to communities with no existing broadband service.⁴⁴ This means that communities with poor or limited Internet access find themselves with only one provider.

Administrative Feasibility: Strict loan requirements have created barriers to entry as well as hindered efficient administration. Inflexible eligibility criteria such as requiring firms to have enough cash-on-hand to operate for one year and limiting assistance to communities with only 20,000 residents or less has resulted in only 5% of available funds being dispersed to qualifying applicants in 2005.⁴⁵

Status Quo: E-Rate Program

Minimize Variance: The status quo has shown to perform very well in terms of minimizing the technological variance between rural and urban school districts. Subsidies for the E-Rate Program are disbursed to individual schools or districts based on the percentage of students eligible for the National School Lunch Program.⁴⁶ This formula has resulted in funding being disproportionately allotted to the poorest schools and communities. In analyzing the impact of the

⁴¹ GAO Report to Congressional Committee, "Broadband Deployment is Extensive Throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas," May 2006.

Available at: <http://www.gao.gov/new.items/d06426.pdf>

⁴² Goolsbee, Austan, "Subsidies, the Value of Broadband, and the Importance of Fixed Costs," in *Broadband: Should we Regulate High-Speed Internet Access?*, Robert Crandall & James H. Alaman, 2002, pgs. 278-294, Brookings Institution Press.

⁴³ Compaine, Benjamin, "Revisiting Cost and Affordability Assumptions for High Speed Data Services in Low Population Density Locations." September 2003.

⁴⁴ GAO Report to Congressional Committee, "Broadband Deployment is Extensive Throughout the United States, But it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas," May 2006.

⁴⁵ Kruger, Lennard. "Broadband Loan Grant Programs in the USDA's Rural Utilities Service," *CRS Report for Congress*, May 23, 2007.

⁴⁶ Puma, Michael et. al. "The Integrated Studies of Educational Technology: A Formative Evaluation of the E-Rate Program," *Urban Institute*, October 2002.

E-Rate Program in public schools, Goolsbee and Guryan (2006) found that the E-Rate Program was able to reverse the growing Internet gap between the richest school districts and poorest school districts, and by 2000, some districts were able to surpass the richest school districts in the number of internet connections.⁴⁷

Technological and Economic Efficiency: One of the weaknesses of the E-Rate Program is that there are many restrictions on what products and services can be subsidized. Currently, discounts cannot be applied to products such as software applications, computers, modems, tech support and teacher training.⁴⁸ This presents a problem because while discounts may provide schools in the poorest districts with the infrastructure for broadband, without funding for computers or software, the utility of broadband is greatly minimized. According to ISET surveys, the lack of tech assistance relating to the installation and maintenance of hardware and software was a major barrier for teachers in integrating the use of technology into daily classroom curriculum.⁴⁹

One of the main criticisms of the E-Rate Program is its high cost – capped at \$2.25 billion a year. Opponents argue that as more and more schools develop the infrastructure necessary for broadband deployment the cost to maintain the program should decrease. In addition, in computing demand curves using willingness-to-pay data collected through surveys, Goolsbee (2000) found that reductions in consumer costs from demand-side subsidies did not lead to prices below what consumers were willing to pay (i.e. negative expected consumer surplus).⁵⁰ Due to the low valuations placed by non-users of broadband, Goolsbee concluded that subsidizing broadband usage would result in a gain of only 80% of the subsidy.

Promote Competition: Funding through the E-Rate Program is not directly dispersed to the school, instead, schools or districts select vendors through competitive bids and these vendors are then reimbursed with E-Rate funds.⁵¹ While a competitive bidding process is in place, poor oversight has resulted in multiple cases of bid-rigging and program fraud.⁵² In response to audit reports citing high levels of fraud, waste and abuse, the DOJ created a task for to

⁴⁷ Goolsbee, Austan & Guryan, Jonathan. “The Impact of Internet Subsidies in Public Schools,” *The Review of Economics and Statistics*, 2006, Vol. 88, Pgs. 336-347.

⁴⁸ Products and services eligible for subsidies include: telecommunications services, Internet access and internal connections provided by telecommunications carriers as well as non-telecommunications carriers.

Gilroy, Angele. “Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies,” *CRS Issue Brief for Congress*, July 28, 2005.

⁴⁹ Puma, Michael et. al. “The Integrated Studies of Educational Technology: A Formative Evaluation of the E-Rate Program,” *Urban Institute*, October 2002.

⁵⁰ Goolsbee, Austan, “Subsidies, the Value of Broadband, and the Importance of Fixed Costs,” in *Broadband: Should we Regulate High-Speed Internet Access?*, Robert Crandall & James H. Alaman, 2002, pgs. 278-294, Brookings Institution Press.

⁵¹ Gilroy, Angele. “Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies,” *CRS Issue Brief for Congress*, July 28, 2005.

⁵² Gilroy, Angele. “Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies,” *CRS Issue Brief for Congress*, July 28, 2005.

investigate E-Rate fraud and efforts are currently being made to improve program oversight.

Administrative Feasibility: The FCC has shown to be responsive to E-Rate audit and OIG reports. In 2003 the FCC implemented new rules to improve the efficiency of the application process and adopted stricter bidding requirements.⁵³ In addition, due to the burgeoning popularity of wireless broadband as a “third pipe” for internet transmission, the FCC has made wireless services eligible for E-Rate discounts.

700 MHz License Auction

Minimize Variance: The 700 MHz Auction is estimated to do well in minimizing the broadband consumption gap between rural and urban regions if performance benchmarks are not imposed on rural service area (RSA) providers. The purpose of benchmarks is to ensure that providers geographically build out broadband service to their licensed area, not just the areas that are most profitable.⁵⁴ However, final FCC rules for the auction outline benchmark requirements for all license holders.⁵⁵ Performance measures are expected to negatively impact RSA licensees who have the burden of higher construction costs and infrastructure development. Rural providers who are unable to meet the performance benchmarks set by the FCC risk losing their spectrum license and this in turn results in rural communities being left without a service provider. The National Telecommunications Cooperative Association recommends that buildout requirements be mandated only for non-RSA licensees in order to promote rural broadband deployment.⁵⁶

Technological and Economic Efficiency: Due to the infrastructure restrictions associated with DSL and Cable, the characteristics of wireless broadband in the 700 MHz spectrum band is seen as a viable tool for deployment in rural communities. Unlike DSL, where service is only available to subscribers who are within 18,000 feet of the central office, the spectrum band has the capacity to penetrate buildings and cover large areas. Adding a “third pipe” for

⁵³ Gilroy, Angele. “Telecommunications Discounts for Schools and Libraries: The E-Rate Program and Controversies,” *CRS Issue Brief for Congress*, July 28, 2005.

⁵⁴ Comments of the National Telecommunications Cooperative Association before the Federal Communications Commission. May 23, 2007

⁵⁵ For smaller geographic market-area licenses (such as Economic Area licenses and Cellular Market Area licenses), licensees will be required to provide service to cover at least 35 percent of the *geographic area* of the licensed market within four years of license issuance; and 70 percent of the geographic area by the end of the license term.

For the larger, REAG market licenses, licensees will be required to provide service to cover at least 40 percent of the population of the licensed market within four years of license issuance; and 75 percent of the population by the end of the license term.

This information is available at: <http://www.telecomlawblog.com/wireless-fcc-adopts-final-rules-for-700-mhz-auction.html>

⁵⁶ Comments of the National Telecommunications Cooperative Association before the Federal Communications Commission. May 23, 2007

internet transmission will give rural consumers more broadband coverage by allowing for a mix of technologies to be used in deployment.

In terms of economic efficiency, Compaine (2003) found that broadband wireless fixed access (BWFA) is more cost effective than cable or DSL in rural regions with low population densities.⁵⁷ In comparing the cost of BFWA in the 700 MHz band and DSL with population densities between 5-100 people per square mile, the cost difference is estimated to be around \$110.⁵⁸ However, it is important to note that cost difference significantly minimizes as population density increases. The cost of providing broadband wireless and DSL are relatively equal in communities with over 5000 residents per square mile.⁵⁹

Promote Competition: The 700 MHz spectrum will be divided based on geographic licensing blocks called Cellular Market Areas (CMAs), medium Economic Areas (EAs) and Regional Economic Areas Groupings (REAGs).⁶⁰ The auction of licenses according to CMAs, EAs and REAGs gives small firms a chance to bid for licensing blocks which will promote service to rural communities. Previous proposals to divide the spectrum into six Economic Area Groupings would have been too large to allow for the inclusion of small carriers in the bidding process.

In order to ensure the participation of small firms in the auction, the FCC should prohibit “package” bidding - the bid for numerous small licenses across the country.⁶¹ Current FCC rules for the auction allow for “package” bidding in

⁵⁷ Compaine, Benjamin, “Revisiting Cost and Affordability Assumptions for High Speed Data Services in Low Population Density Locations.” September 2003

⁵⁸ Compaine, Benjamin, “Revisiting Cost and Affordability Assumptions for High Speed Data Services in Low Population Density Locations.” September 2003

⁵⁹ Compaine, Benjamin, “Revisiting Cost and Affordability Assumptions for High Speed Data Services in Low Population Density Locations.” September 2003

⁶⁰ CMA – Cellular Market Area: CMAs consist of the following - (1)MSA Boundaries - Metropolitan Statistical Areas: A geographic area defined by the Office of Management and Budget and modified by the FCC. There are 306 MSAs, including New England County Metropolitan Areas and the Gulf of Mexico Service Area (water area of the Gulf of Mexico, border is the coastline). And (2) RSA Boundaries - Rural Service Areas: A geographic area used by the FCC to define coverage of spectrum licenses in certain services. There are 428 RSAs, which, when combined with 306 Metropolitan Statistical Areas (MSAs), comprise the 734 cellular geographic service areas.

EA – Economic Area: A geographic area established by the Bureau of Economic Analysis of the Department of Commerce and used by the FCC to define the coverage of spectrum licenses for certain services. There are 172 EAs, plus three EA-like areas, encompassing the Northern Mariana Islands, Guam, American Samoa, the United States Virgin Islands and Puerto Rico.

REAG – Regional Economic Area Groupings: A geographic area based on groupings of 172 Economic Areas (EAs) and 4 EA-like areas developed by the Bureau of Economic Analysis of the U.S. Department of Commerce, used to define the coverage of spectrum licenses for certain services.

This information provided by: <http://www.analygis.com/Products/telcodata.htm>

⁶¹ Summary Statement of President of Cellular South, Inc. April 19, 2007 Available at: http://energycommerce.house.gov/cmte_mtgs/110-ti-hrg.041907.Meena-testimony.pdf

the upper block C licenses.⁶² This block has been reserved for large area groupings so its impact on small carriers is estimated to be minimal.

Administrative Feasibility: The 700 MHz spectrum auction is scheduled to take place on January 28, 2008. Due to the immature status of the policy, it is difficult to assess the administrative feasibility of the program. The FCC's inability to be flexible in terms of performance measures will negatively impact the program's ability to achieve the first policy goal – minimize variance. Current rules state that, "If a licensee fail to meet the end-of-term buildout requirements, the FCC will automatically reclaim the unserved portions of the license area and make them available to other potential users."⁵⁹ While performance benchmarks were slightly modified for rural carriers, the requirement to provide service within a limited time period could further deter the efficient deployment of broadband to rural areas. Equipment manufacturers are more inclined to service high demanding vendors, such as license holders supporting large regions.⁶⁰ Unless specific mandates are in place that ensure that small rural carriers receive tower construction service and equipment assistance in a timely manner new carriers assuming the unserved portions of the license will face similar implementation problems, which will just further delay service.

Political Feasibility: From the available information, subsidized high speed internet capability has been popular in the affected areas. However, there is reason to think that continued and/or expanded subsidization might encounter some significant local resistance. At some point, high speed internet service might encourage residents to do more of their shopping online. Local retailers may oppose such actions. In order to better assess such a possibility, we think there is utility in surveying, on a limited basis, citizen attitudes toward high speed internet access. The questions in Appendix A and the statistical analysis in Appendix B help measure the value citizens place on high-speed internet access.

⁵⁹ FCC Revises 700Mhz Rules to Advance Interoperable Public Safety Communications and Promote Wireless Broadband

⁶² The five spectrum blocks are divided as follows:

Block	Bandwidth/Pairing	Frequencies	Market Type/Size
Lower A Block	12 MHz/2 x 6 MHz	698-704 MHz/ 728-734 MHz	EA -Economic Area (larger than CMAs)
Lower B Block	12 MHz/2 x 6 MHz	704-710 MHz/ 734-740 MHz	CMA - Cellular Market Areas (smallest market size)
Lower E Block	6 MHz/Unpaired	722-728 MHz	Economic Area
Upper C Block (Open Access)	22 MHz/2 x 11 MHz	746-757 MHz/ 776-787 MHz	REAG – Large multi-state regions of US
Upper D Block (Public/Private)	10 MHz/2 x 5 MHz	758-763 MHz/ 788-793 MHz	Nationwide License

This Information Available at: <http://www.telecomlawblog.com/wireless-fcc-adopts-final-rules-for-700-mhz-auction.html>

Deployment. July 31, 2007. Available at: http://www.fcc.gov/073107/700mhz_news_release_073107.pdf

⁶⁰ Comments of the National Telecommunications Cooperative Association before the Federal Communications Commission. May 23, 2007

Appendix A
Survey Questionnaire on the Absolute and Relative
Value of High Speed Internet Access

Citizen attitudes can be important in trying to assess the likely impact of a policy. The purpose of the questions below is find out how citizens in rural communities (the beneficiaries of the E-Rate program) perceive both the potential benefits and costs of high speed internet access and how much they would be willing to pay for it.

Please circle the appropriate answer.

1. Which of the following best approximates your access to a computer and the internet?
 - A. Do not own a computer or use the internet.
 - B. Own a computer but do not have internet access.
 - C. Do not own a computer but use the internet (e.g., at work, at a library, at a friend's house, etc.).
 - D. Own a computer and have slow speed internet access (e.g., dialup).
 - E. Own a computer and have high speed internet access.

2. Which of the following most closely reflects how useful internet access at approximately 5 times the current speed would be to you?
 - A. Would be of little use to me because the internet is not important to me.
 - B. Would be of some use to me because increased speed would make me more likely to increase my use of the internet. However, since I enjoy other activities as much, or more than using the internet (e.g., reading, sports, exercise, television, video games, etc.), my internet usage would be unlikely to increase much even with much faster access.
 - C. For either business or personal reasons, I would use the internet much more if the speed with which I could access information from it were greatly increased.
 - D. I would use the internet much more than I currently do. The primary reason I do not use the internet as frequently as I might is the slow speed that is currently available in my area.

3. What is the maximum amount of money you would be willing to pay per month for internet service that is 5 times faster than the internet service currently available in your area?

- A. \$5
- B. \$10
- C. \$15
- D. \$20, or more

4. How important is each of the following policies for government to adopt?
Use a check mark to designate your rating for each option.

Policy	Very Important	Somewhat Important	Not Very Important
Reduce your taxes \$5 per month.			
Make high speed internet access much more widely available to businesses and individuals in your area.			
Increase Social Security payments \$5 per month per recipient.			
Increase spending to combat global warming by \$5 per person.			

Appendix B – Statistical Analysis

This term paper deals with proposals to increase broadband usage in rural America. Since most changes in public policy impact some citizens, interest groups and/or businesses it is frequently necessary for policymakers to take into account the degree of political support a policy can be expected to generate. Many studies of mass political behavior have found that a person's social economic status (e.g., education) is related to their policy preferences.

While a person's opinions about the desirability and willingness to pay for high speed internet service is not necessarily the same as their attitudes towards (and willingness to pay for) the provisions of the Kyoto Protocol on global warming, there is reason to think that an analysis of attitudes toward the Kyoto Protocol could be useful in understanding the attitudes of citizens toward high speed internet usage.

Most fundamentally, both policy areas involve knowledge of either scientific or technical questions that could be considered "futuristic." Since much of the impact of global warming is likely to occur in the future, a large part of the benefit of the Kyoto Protocol would occur in the future. Similarly, for a significant number of citizens, the internet is something they do not frequently use. For these citizens the benefits of high speed internet access may not be readily apparent. Additionally, many small business owners and employees may not conceive of their business as something that customers from distant places might want to shop if access times were shortened. Thus, an important part of the benefit of high speed internet access could be in the future. Finally, the form of the question concerning support, or opposition, to ratifying the Kyoto Protocol is especially interesting because respondents were told that ratification would result in higher gasoline prices (amount randomly chosen for each respondent). Therefore, respondents knew that ratification of the Kyoto Protocol would not be "costless."

The analysis immediately below uses a respondent's education (educ - higher scores indicate higher levels of education), income (higher scores indicate higher incomes), gender (female = 1, male = 0), opinion of the threat global warming poses (brink - higher scores indicate the respondent perceives a greater threat), whether the respondent had heard of the Kyoto Protocol at the time of the study (hear: 1 = yes, 0 = no) and the access the respondent has to a computer (comph: 1 = has a home computer, 0 = does not have access to a home computer; compo: 1 = has access to a computer outside the house, 0 = does not have access to a computer outside the house). Since the dependent variable is dichotomous, probit is used to estimate the results.

```

probit   kyoto educ income gender brink hear comph compo
Probit regression                               Number of obs   =    12409
                                                LR chi2(7)         =    2055.10
                                                Prob > chi2        =    0.0000
Log likelihood = -7463.2865                    Pseudo R2         =    0.1210

```

	kyoto	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
educ		.0789208	.0104864	7.53	0.000	.0583678	.0994737
income		1.74e-06	3.51e-07	4.95	0.000	1.05e-06	2.43e-06
gender		.0251577	.024829	1.01	0.311	-.0235063	.0738216
brink		.2381675	.0058842	40.48	0.000	.2266348	.2497003
hear		-.0940281	.0332897	-2.82	0.005	-.1592748	-.0287814
comph		-.0332803	.0366544	-0.91	0.364	-.1051216	.0385609
compo		.1800847	.0265302	6.79	0.000	.1280865	.2320829
_cons		-1.727818	.0649327	-26.61	0.000	-1.855084	-1.600553

With the exception of gender and the respondent having a home computer, every independent variable is statistically significant at convention significance levels. Additionally, most all of the relationships are in the expected direction. For example, after removing the impact of all other independent variables, those with higher levels of education and income were more supportive of the Kyoto agreement than those from lower socioeconomic backgrounds. This suggests that the Kyoto Protocol, and similar environmental initiatives, will need to be explained in a manner more meaningful to those with less education and lower incomes. Particularly important for present purposes is the highly significant relationship between access to a computer outside the home and support for the Kyoto Protocol. This may indicate that even after removing socioeconomic influences, the exposure to the outside world that the internet can bring leads someone to be more aware of the need to combat global warming.

The most statistically significant independent variable in the preceding analysis was the degree of threat the respondent felt that global warming posed. Therefore, it is important to understand what impacts the respondent's view of the threat posed by global warming. To analyze this, we use the same model except that the respondent's open of the threat posed by global warming is the dependent variable. Once again, the role of both socioeconomic factors, especially education, is important. The higher the level of the respondent's education the greater the threat they felt global warming posed to society.

```

Probit regression                               Number of obs   =    22268
                                                LR chi2(6)         =    312.29
                                                Prob > chi2        =    0.0000
Log likelihood = -2411.513                    Pseudo R2         =    0.0608

```

	brink	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
educ		.0881137	.0165476	5.32	0.000	.0556809	.1205465
income		-1.88e-06	4.93e-07	-3.81	0.000	-2.85e-06	-9.11e-07
gender		.3251122	.0418852	7.76	0.000	.2430187	.4072058
hear		-.530802	.0416884	-12.73	0.000	-.6125098	-.4490943
comph		.0265497	.0659461	0.40	0.687	-.1027022	.1558016
compo		.0998202	.0415781	2.40	0.016	.0183286	.1813118
_cons		1.615958	.0904964	17.86	0.000	1.438589	1.793328

As previously, note that the exposure to a computer outside the home is a significant predictor of the respondent's view of the threat global warming poses. Thus, while the government must be careful about how the benefits of high speed internet access are explained to residents with lower socioeconomic status, these results suggest that the greater exposure to the outside world that high speed internet access is likely to bring will have an important impact on citizen attitudes on scientific and technical policy options.

The U.S. Tends to be Less Supportive of Economic Egalitarianism than Most other Wealth Democracies.

Statement: The government should provide a job for everyone who wants one.

Percent Responding “Strongly Agree” or “Agree”

U.S.	U.K.	France	W. Ger.	E. Ger.	Japan	Hungary	Poland	Sweden	Aust.
47%	56%	NA	66%	93%	NA	85%	89%	72%	39%

(Ladd and Bowman, p. 120)

1. Note greater support among former communist nations.

a. Australia is more rural, agricultural and, I believe, less unionized.

Question: Do you agree or disagree, it is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes.

Percent Responding “Strongly Agree” or “Agree”

U.S.	U.K.	France	W. Ger.	E. Ger.	Japan	Hungary	Poland	Sweden	Aust.
38%	66%	NA	66%	89%	NA	75%	77%	53%	43%

1. It is important to note that while the U.S. is “low” in support for government reduction of income differences, many of these other nations already have a more egalitarian distribution of income.

a. Put another way, it is highly likely that if income differences were as great in these other nations as in the U.S., the support for governmental income redistribution would be even higher than the above data indicate. (Ladd and Bowman, p. 120)

America's Greater Tolerance for Income Inequality
Extends to Elites as well as the Public

1. How Much Income Inequality Elites Perceive and What they Think is a
"Fair" Degree of Inequality (Verba, et., al., pp. 130-131)

The Following Data are in Ratios (averages by group)

	Executive vs. Auto Worker		Executive vs. Elevator Operator	
	Perceived Income	Fair Income	Perceived Income	Fair Income
<u>United States</u>				
Business	15.1/1	15.6/1	27.9/1	26.9/1
Farm	11.1/1	7.9/1	19.4/1	11.7/1
Labor	14.8/1	7.2/1	24.9/1	10.6/1
Republicans	13.2/1	11.3/1	23.6/1	18.0/1
Democrats	15.4/1	8.2/1	26.0/1	12.1/1
Youth	13.4/1	6.0/1	22.6/1	8.9/1
<u>Japan</u>				
Business	9.1/1	8.6/1	23.9/1	22.9/1
Farm	7.4/1	5.7/1	18.6/1	14.0/1
Labor	10.1/1	4.1/1	24.0/1	8.9/1
Liberal Dem.	7.1/1	5.4/1	16.5/1	12.8/1
Center Parties	9.1/1	4.9/1	21.7/1	11.4/1
Left Parties	10.3/1	3.7/1	24.2/1	8.9/1
Students	11.0/1	5.5/1	19.7/1	9.8/1
<u>Sweden</u>				
Nat. Bus.	2.4/1	3.5/1	3.0/1	4.2/1
Local Bus.	2.1/1	2.9/1	2.6/1	3.5/1
Farm	2.2/1	2.7/1	2.9/1	3.2/1
Blue-Collar				
Union	3.2/1	1.9/1	4.1/1	2.0/1
Wh.-Coll. Un.	2.6/1	2.1/1	3.4/1	2.4/1
Professional				
Union	2.3/1	2.7/1	2.9/1	3.2/1
Social Dem.	3.2/1	1.9/1	4.1/1	2.1/1
Center	2.2/1	2.1/1	2.8/1	2.4/1
Liberals	2.2/1	2.2/1	3.0/1	2.7/1
Conservatives	2.1/1	2.9/1	2.6/1	3.5/1

Explanations for Economic Inequality

"Next, we'd like to know WHY you think it is, that in America today, some people have BETTER [WORSE] JOBS and HIGHER [LOWER] INCOMES than others do. I'm going to read you some possible explanations, and I want you to tell me how IMPORTANT you think each is - VERY important, SOMEWHAT important, or NOT IMPORTANT AT ALL."

	Very important (+1)	Somewhat important (+.5)	Not important (0)	Mean {Std Dev}
Some people don't get a chance to get a good education	54.6%	34.9%	9.3%	.724 {.332}
Some people just don't work as hard	44.6%	41.8%	12.7%	.658 {.345}
Some people have more in-born ability to learn	33.0%	43.0%	23.4%	.546 {.373}
Discrimination holds some people back	25.7%	50.3%	23.0%	.511 {.349}
Government policies have helped high-income workers more	24.8%	38.6%	34.5%	.446 {.382}
Some people just choose low-paying jobs	18.9%	38.4%	40.6%	.386 {.370}
God made people different from one another	22.2%	26.1%	49.1%	.359 {.400}

Source: 2002 National Election Study. N = 1427 (Pre/Post-election).

Table 1
Summary Statistics for the United States and Europe

	<u>Europe</u>				<u>United States</u>			
	Mean	St. Dev.	Min.	Max	Mean	St. Dev.	Min.	Max
Income Inequality ¹	.303	.044	.229	.430	.337	.031	.271	.446
Unemployment Rate	.083	.042	.002	.220	.067	.023	.033	.119

¹Gini Coefficient: 0 = perfect equality, 1 = perfect inequality (i.e., one household has all the income)

Table 2 - Happiness in Europe

Reported Life Satisfaction	All		Unemployed		Marital Status	
					Married	Divorced
Very satisfied	26.46		15.21		28.79	18.61
Fairly satisfied	53.96		44.21		54.04	51.00
Not very / Not at all satisfied	19.59		40.59		17.17	30.39

Reported Life Satisfaction	Partisan		Support		Income		Quartiles	
	Left	Right	Right	Left	1st (Lowest)	2 nd	3rd	4th (Highest)
Very satisfied	21.98	34.88	34.88	21.98	21.90	24.36	26.81	32.58
Fairly satisfied	54.15	50.97	50.97	54.15	49.52	54.54	56.71	54.96
Not very / Not at all satisfied	23.87	14.16	14.16	23.87	28.58	21.10	16.48	12.47

Table 3 - Happiness in the United States

Reported Happiness	All		Unemployed		Marital Status	
					Married	Divorced
Very Happy	31.29		18.85		39.06	19.39
Pretty Happy	57.36		52.35		53.90	62.84
Not too Happy	11.35		28.80		7.04	17.77

Reported Life Satisfaction	Partisan		Support		Income		Quartiles	
	Left	Right	Right	Left	1 st (Lowest)	2 nd	3rd	4 th (Highest)
Very Happy	28.53	36.02	36.02	28.53	22.20	28.73	33.11	40.48
Pretty Happy	58.60	55.69	55.69	58.60	57.91	59.30	58.74	53.72
Not too Happy	12.87	8.29	8.29	12.87	19.89	11.97	8.15	5.80

**Self-Interest, Political Values and Support for Repealing
the Estate Tax**

	"Estate tax" wording	"Death tax" wording	Pooled
<i>Own Tax Burden</i> (-1 to +1)	.278 (.151)	.307 (.149)	.324 (.104)
<i>Rich Tax Burden</i> (-1 to +1)	.038 (.105)	.029 (.113)	.033 (.076)
<i>Poor Tax Burden</i> (-1 to +1)	-.104 (.181)	.091 (.183)	-.022 (.129)
<i>Government Spending Preferences</i> (-1 to +1)	.467 (.231)	.157 (.302)	.348 (.183)
<i>Conservative Ideology</i> (-1 to +1)	.174 (.189)	.402 (.223)	.292 (.144)
<i>Republican Party Identification</i> (-1 to +1)	.296 (.137)	.229 (.149)	.267 (.101)
<i>Family Income</i> (in \$1000s)	.00072 (.00120)	-.00030 (.00106)	.00025 (.00079)
"Death tax" wording	---	---	.031 (.042)
Intercept	.125 (.106)	.210 (.133)	.125 (.080)
R-squared	.04	.09	.06
N	670	676	1346

Note: Estimated standard errors are in parentheses. In the "Estate tax" column, the dependent variable is the respondent's answer to the following question: There has been a lot of talk recently about doing away with the tax on large inheritances, the so-called "estate tax." Do you favor or oppose doing away with the estate tax? Possible answers: 1 - strongly oppose; 2 - oppose somewhat; 3 - favor somewhat; 4 - strongly favor. Half the respondents were asked the preceding question about the estate tax, while the other half were asked the same question but replacing estate tax with "death tax." In the "Pooled" column, the results are based on all respondents. Many of the independent variables use a -1 to +1 coding scheme. Minus 1 is always the response most opposite the trait mentioned and plus 1 the closest. For example, a respondent who scored -1 on "own tax burden" would say that they paid less in taxes than they should, 0 indicates they felt they paid the right amount while a score of +1 indicates they felt they paid too much in taxes. The other two tax burden questions are coded the same way. The other -1 to +1 scales are as follows: Government Spending Preferences -1 = prefer less government spending, 0 = about right, +1 = prefer greater government spending; Conservative Ideology -1 = liberal, 0 = moderate, +1 = conservative; Republican Party Identification -1 = Democrat, 0 = Independent, +1 = Republican. A family income of \$30,000 is read as "30."

Obtuse Support for Repealing the Estate Tax

	Favor Repeal	Oppose Repeal	N
<i>Total sample</i>	69.5%	25.2%	1346
<i>Among those who . . .</i>			
have family incomes < \$50,000 <i>(less than \$50,000)</i>	66.2%	26.4%	650 (48%)
want more spending on government programs	68.1%	26.3%	1232 (92%)
say income gap is larger <i>and</i> that is a bad thing	66.1%	30.3%	594 (44%)
say government policy contributes to differences in income	67.0%	27.5%	844 (63%)
say rich people pay less than they should in federal income taxes	68.2%	27.4%	722 (54%)
<i>All</i> of the above	65.8%	29.2%	146 (11%)

Source: 2002 National Election Study. N = 1346 (Post-election).

Political Information and Support for Repealing the Estate Tax

	Full sample	Respondents who say income gap is larger <i>and</i> that is a bad thing	Respondents who say income gap is not larger <i>or</i> larger gap is not bad
<i>Political Information</i> (0 to 1)	.043 (.233)	-.828 (.356)	.820 (.353)
<i>Republican Party</i> <i>Identification</i> (-1 to +1)	.390 (.048)	.355 (.089)	.339 (.065)
<i>Family Income</i> (in \$1000s)	.00066 (.00083)	.00052 (.00120)	.00037 (.00117)
"Death tax" wording	.049 (.039)	-.001 (.065)	.068 (.051)
Intercept	.345 (.097)	.786 (.176)	.037 (.133)
R-squared	.07	.05	.08
N	1346	594	752

See the previous page on variable coding. The closer the respondent's score is to "1" the more political information they have. In the first column of results, the dependent variable is the respondent's degree of support for repealing the estate tax (see coding scheme on previous page). In the second column, the dependent variable is the same but the analysis is only done on those respondents who say the income gap between the poor and rich has become larger in recent years and that this is a bad thing. The third column has the same dependent variable, but the analysis is only performed on those respondents meeting the conditions specified at the top of the column.

Political Information and Perceptions of Economic Inequality

	Income gap is larger (-1 to +1)	Larger gap is a bad thing (-1 to +1)	Poor don't get a fair trial (-1 to +1)
<i>Political Information</i> (0 to 1)	.468 (.170)	.937 (.240)	.542 (.237)
<i>Republican Party Identification</i> (-1 to +1)	-.105 (.035)	-.187 (.050)	-.194 (.048)
<i>Family Income</i> (in \$1000s)	.00005 (.00063)	.00088 (.00087)	.00022 (.00088)
Intercept	.281 (.074)	-.059 (.105)	.331 (.103)
R-squared	.01	.05	.03
N	1346	1006	1346

For the independent variables, the coding scheme is the same as discussed over the past two pages. In the first column the dependent variable is the respondent's view of the income gap between the poor and rich today as opposed to 20 years ago. The coding scheme is as follows: smaller today than 20 years ago = -1, same as 20 years ago = 0, larger today = +1. In the second column the dependent variable, asked only for those who thought the income gap is larger today than 20 years, is how desirable they think this larger income gap is. The coding scheme is as follows: -1 = a good thing, 0 = haven't thought about it, +1 = a bad thing. In the third column the dependent variable is the respondent's position on the notion that a poor person has the same chance of receiving a fair trial as a wealthy person. The coding scheme is as follows: -1 = thinks the poor have the same chance, 0 = neutral, +1 = the poor have less of a chance of receiving a fair trial than the wealthy.

HOME

September 9 2009

The Bread and Peace Model Applied to the 2008 US Presidential Election

The 2008 Presidential Election Popular Vote Result: The official final vote count released on January 22 2009 by the Federal Election Commission gives John McCain 59,934,814 votes out of 129,391,711 votes cast for McCain and Barack Obama. McCain's 2-party vote share is therefore **46.3%** and Obama's margin of victory is **7.4 percentage points**.

On June 7 2008 I posted the essay "The Implications of the 'Bread and Peace' Model for the 2008 US presidential election outcome." At the time I predicted a Republican 2-party vote share centered on **48.2%** which implied that the odds of the Democrats taking the presidency were better than 3 to 1. The June 7 essay was published in the October 2008 issue of Public Choice.

A shorter, more casual essay discussing the Bread and Peace model's predictions "Why Are the Democrats Likely to Win the 2008 US Presidential Election?" was published in translation to German as an op-ed piece in Welt am Sonntag on August 24 2008; "Das Brot-und-Frieden-Modell – Warum Obama gewinnt."

The preliminary estimates of 2008q3 national income data released on October 30 2008 by the Bureau of Economic Analysis indicated that the US economy had weakened so much since the preceding summer that I updated my June 7 2008 election forecast on October 31 2008. Based on those preliminary estimates the Bread and Peace model predicted a 2-party vote share for McCain of **46.25%**, implying Obama would win by a margin of **7.5 percentage points**. Although the Bread and Peace model is designed to explain votes for president in terms of just two fundamental political-economic factors rather than to forecast optimally election outcomes, the October 31 prediction was extremely accurate: "October 31 2008 update of Presidential Vote Forecast."

On August 28 2009 I re-estimated the Bread and Peace model including the 2008 election result (N=15 elections, 1952-2008) using the revised disposable personal income data for 2008 and earlier years released by the Bureau of Economic Analysis on August 27 2009. The coefficient estimates are nearly identical to those obtained for earlier samples:

$$Vote_i = \alpha + \beta_1 \left(\sum_{j=0}^{14} \lambda^j \Delta \ln R_{i-j} \left(\frac{1}{\sum_{j=0}^{14} \lambda^j} \right) \right) + \beta_2 \text{Fatalities}_i$$

Coefficient estimate:	$\alpha = 46.0$	$\lambda = .91$	$\beta_1 = 3.6$	$\beta_2 = -.052$	$Adj R^2 = .86$
(Std. error p-value):	(1.1 .00)	(0.05 .00)	(0.55 .00)	(0.01 .00)	$Root MSE = 2.19$

The graph below shows the strong association of aggregate votes for president to average per capita real income growth in combination with US military fatalities suffered in Korea, Vietnam and (the comparatively small number) in Iraq. Those two fundamental factors explain postwar votes for president remarkably well. Note that the allegedly "ideological" elections of 1964 (when Lyndon

during the presidential terms preceding the 1952, 1968, 1976 and 2004 elections. (Technical information about how KIA in Korea and Vietnam were determined to affect the 1952, 1968 and 1976 elections, but not the 1972 election, is given in the appendix to my *Public Choice* 2000 article.)

Note that the Bread and Peace model is designed to explain voting outcomes in terms of political-economic fundamentals rather than to predict elections using pre-election poll data on voter sentiments, preferences and the like. Such attitudinal variables are themselves generally affected by objective fundamentals and for that reason supply no insight into the ultimate causes of voting behavior.

Estimates, Fits and Predictions

Table 1 shows nonlinear-least-squares estimates of the Bread and Peace equation for presidential elections spanning 1952-2004. The model was fit using the latest (July 2006) data on personal incomes from the Bureau of Economic Analysis and consumer prices from the Department of Labor, and data on US military fatalities in Korea, Vietnam and Iraq originating with the Department of Defense. According to the coefficient estimates in Table 1 each percentage point of growth in per capita real disposable personal income sustained over the presidential term boosts the in-party candidate's vote share by 3.6 percentage points above a benchmark constant of approximately 46 percent. And hostile deployment of US armed forces in unprovoked, discretionary wars depresses the incumbent's vote share by about 0.3 percentage points per 1000 American military fatalities.

Table 1. Bread and Peace Equation Estimates

Incumbent Vote Share	1952 – 2004		N = 14 elections	Root MSE = 2.42
	R ² = .866			
	Coef. Estimate	Std. Error	t-ratio	
Constant (α)	46.2	1.24	37.3	
Real Income Growth (β ₁)	3.61	0.615	5.87	
Weighting parameter (λ)	0.914	0.058	15.9	
Cumulative KIA (β ₂)	-0.307	0.078	-3.95	

→ -0.307 from 1952-2004; 2008 model = -0.502

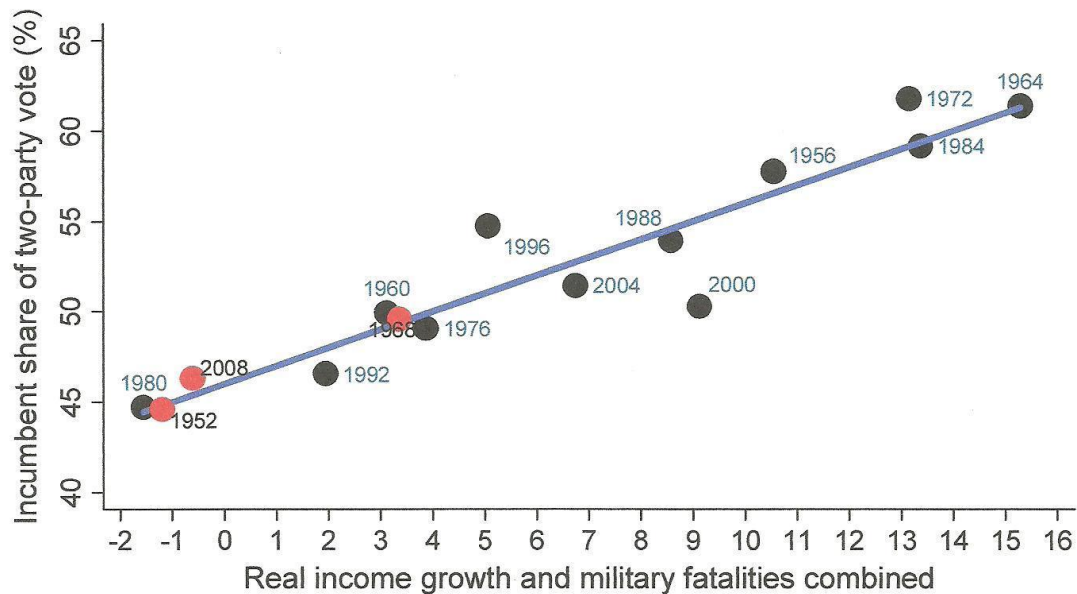
Expressed on an annual basis, the weighted average per capita real income growth rate during Bush's first term was 1.72%. US military fatalities in Iraq stood at 1.13 thousand at the end of October 2004. The within-sample prediction (regression fit) of Bush's two-party vote share from the Bread and Peace model is therefore 52.08%, which gives a prediction error of -0.84%: $46.2 + 3.61(1.72) - 0.307(1.13) = 52.08$; $51.24 - 52.08 = -0.84$. The model estimates indicate that the Iraq war made only a small dent in the vote for Bush – depressing his two-party share by around 1/3 of a percentage point. However, if casualties continue to mount all the way up to the next election, Iraq could have decisive effect on the 2008 outcome, particularly if on economic grounds alone the election would likely be close. But in 2004 economics dominated the fundamental sources of Bush's re-election.

The out-of-sample prediction of the 2004 election result is almost as good as the within-sample prediction/fit. Estimation over the sample range 1952-2000 yields coefficients nearly identical to the full sample estimates (

$\hat{\alpha} = 46.3$, $\hat{\beta}_1 = 3.59$, $\hat{\lambda} = 0.91$, $\hat{\beta}_2 = -0.309$) and yields an out-of-sample prediction of 52.16% for Bush's vote, implying a prediction error of -0.92%. George Bush's narrow 2004 victory is then very well accounted for by the political-economic fundamentals in the Bread and Peace model. Table 2 reports actual and predicted vote shares for all elections in the postwar sample generated by the estimates in Table 1, along with election period values of the real income growth and KIA independent variables. Contrary to the line of argument in William Nordhaus' June 2006 Quarterly Journal of Political Science article "Electoral Victory and Statistical Defeat? Economics,

Johnson trounced Barry Goldwater) and 1980 (when Jimmy Carter was routed by Ronald Reagan), which anchor the extremities of postwar election outcomes, are explained perfectly by the Bread and Peace objective fundamentals.

Bread and Peace Voting in US Presidential Elections 1952-2008



Combination of real growth and fatalities weights each variable by its estimated coefficient.
 Estimated fatalities effects: -0.7% 2008, -7.6% 1968, -9.9% 1952; negligible in 1964, 1976, 2004.
 Source: www.douglas-hibbs.com

Here are [Stata do](#) and [Stata dta](#) files for the regression and graph above.

Background Literature

I first proposed that an over-the-term weighted-average of per capita real disposable personal income growth rates was the best way to quantify how the economy affects aggregate votes for president in my 1982 article in the *American Politics Quarterly* "[President Reagan's Mandate From the 1980 Elections: A Shift to the Right?](#)". The same single-variable set-up was used in chapter 6 of my 1987 Harvard University Press book *The American Political Economy: Macroeconomics and Electoral Politics*.

The first published write-up of the Bread and Peace model was in my 2000 article in *Public Choice* "[Bread and Peace Voting in U.S. Presidential Elections](#)." Various properties of the model were also discussed in my 2007 paper "[The Economy, the War in Iraq and the 2004 Presidential Election](#)." The basic Bread and Peace equation was also used to generate presidential vote predictions in memos circulated or in web site documents posted prior to the [1992](#), [1996](#), [2000](#) and [2004](#) elections.

I reviewed the broader literature on macroeconomic conditions and voting behavior in my 2006 essay for the *Oxford Handbook of Political Economy* "[Voting and the Macroeconomy](#)."

Table 4. Robustness of the Bread and Peace model to additional variables (1952–1996 presidential elections).

Model: $\text{Vote}_t = \beta_0 + \beta_1 \left(\sum_{j=0}^{14} \lambda^j \Delta \ln R_{t-j} \left(1 \sum_{j=0}^{14} \lambda^j \right) \right) + \beta_2 \text{CUM KLA}_t + \text{Test Variable(s)}$		
Test variable(s)	Test variable parameter estimates (t-ratio/ signif.level)	Signif. level for equivalence of $\hat{\beta}_0 \hat{\beta}_1 \hat{\beta}_2 \hat{\lambda}$ to benchmark estimates in Table 1, row 1
1. Incumbent party's vote share at last election (‘old’ news, unbounded retrospection)	-0.06 (-0.33/1.0)	1.0
2. Inflation $\left(\sum_j \lambda^j \Delta \ln \text{CPI}_{-j} \right)$	-0.18 (-0.54/.62)	.99
3. Inflation surprises $\left[\sum_j \lambda^j (\Delta \ln \text{CPI}_{-j} - E_{-j-1} \Delta \ln \text{CPI}_{-j}) \right]$	-0.73 (-0.66/.54)	.99
4. Unemployment rate $\left(\sum_j \lambda^j U_{-j} \right)$	-0.87 (-0.68/.52)	.95
5. Change in unemployment $\left(\sum_j \lambda^j \Delta U_{-j} \right)$	0.02 (0.00/.99)	1.0
6. Fair's economy:		
election yr. output growth, g3	0.26 (0.86/.43)	
inflation over the term, p15	-0.11 (-0.34/.74)	.77
number of high growth quarters, good-n	-0.51 (-1.2/0.29)	
7. Volatility (SD) of $\Delta \ln R$ over the term (15 quarters)	-0.23 (-0.46/.66)	.99
8. Pct. change in volatility (SD) of $\Delta \ln R$ from previous administration	0.07 (0.72/0.50)	.99
9. Gini ratio for family income quintile shares at the election year	22.5 (0.77/.47)	.96
10. Cumulative pct. Change over the term in Gini ratio for family income quintile shares	0.86 (0.82/.44)	.99
11. Cumulative pct. Change in real federal expenditures per capita over the term	-0.12 (-0.60/.57)	.99

Table 4. Continued.

Model: $\text{Vote}_t = \beta_0 + \beta_1 \left(\sum_{j=0}^{14} \lambda^j \Delta \ln R_{t-j} \left(1 \sum_{j=0}^{14} \lambda^j \right) \right) + \beta_2 \text{CUM KIA}_t + \text{Test Variable(s)}$		
Test variable(s)	Test variable parameter estimates (t-ratio/signif.level)	Signif. level for equivalence of $\hat{\beta}_0 \hat{\beta}_1 \hat{\beta}_2 \hat{\lambda}$ to benchmark estimates in Table 1, row 1
12. Cumulative pct. Change in federal expenditures in proportion to GNP over the term	-0.04 (-0.16/.87)	1.0
13. 'Extremism' of incumbent party's candidate relative to opponent	-0.76 (-0.72/.49)	.99
14. House vote share of incumbent party at the previous mid-term election	-0.10 (-.31/.77)	1.0
15. Policy voting and partisan voting $\left(\sum_j \lambda^j \Delta \ln R_{-j} \cdot \text{Dem} \right)$	-0.66 (-0.84/.44)	
$\left(\sum_j \lambda^j \Delta \text{CPL}_{-j} \right)$	-2.87 (-0.85/.44)	.73
$\left(\sum_j \lambda^j \Delta \ln \text{CPI}_{-j} \cdot \text{Dem} \right)$	2.80 (0.92/.40)	
16. Asymmetric response to positive and negative real income changes $\left(\sum_j \lambda^j \Delta \ln R_{-j}, \text{ for } \Delta \ln R_{-j} < 0 \right)$	3.35 (1.3/.23)	.76
17. Stock prices; percent change in DJIA from January to October of the election year	0.045 (0.054/.43)	1.0
18. Yield spread (10 yr. Tbond rate minus 3 mos. Tbill rate), 3rd quarter of the election year	-0.54 (-0.60/.57)	.99
19. Family financial situation today compared to a year ago (% "better" minus % "worse")	0.07 (0.63/.55)	.81

Table 4. Continued.

$$\text{Model: Vote}_t = \beta_0 + \beta_1 \left(\sum_{j=0}^{14} \lambda^j \Delta \ln R_{t-j} \left(1 \sum_{j=0}^{14} \lambda^j \right) \right) + \beta_2 \text{CUM KIA}_t + \text{Test Variable(s)}$$

Test variable(s)	Test variable parameter estimates (t-ratio/signif.level)	Signif. level for equivalence of $\hat{\beta}_0 \hat{\beta}_1 \hat{\beta}_2 \hat{\lambda}$ to benchmark estimates in Table 1, row 1.
Business conditions today compared to a year ago (% "better" minus % "worse")	0.03 (0.93/.39)	
20. Expected change in family financial situation over the next year (% "better" minus % "worse")	0.05 (0.43/.69)	.96
Expected change in business conditions over the next year (% "better" minus % "worse")	0.01 (0.09/.93)	.98
21. Expected change in business conditions over the next 5 years (% "better" minus % "worse")	0.03 (0.42/.69)	.98
22. Gallup pct. Presidential approval rating, 3rd quarter of election years	0.11 (1.4/.20)	.74

Notes. Due to lack of 1952 data on the test variables, regressions 19–21 are estimated for 1956–96 elections. As noted before, election quarter growth rates are weighed by 1/3: $\Delta \ln R_t = \ln \left[(R_t / R_{t-1})^{1/3} \right] \cdot 400$.