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Ref: Hawaiian Electric Schedule B Initial SOP, Exhibit D, Attachment 1, Page 20.

At page 20, the Brattle Group discusses the statistical results related to the decoupling variable in its regressions. Please respond to the following questions.

- a. In prior decoupling/cost of capital studies (e.g., 2011 discussion paper published by Brattle, "The Impact of Decoupling on the Cost of Capital, An Empirical Investigation.") the statistical results of the regressions were reported, not with p-values, but with confidence intervals. Please explain why confidence intervals for each of the variables in each of the four regressions was not reported in this study.
- b. Please provide 95% confidence intervals for each of the variables in each of the four regressions in this study (including the dummy variables and the constant). If Brattle is unable to comply with this request, please explain why.
- c. Please provide the p-values for each of the variables in the regression (including the two dummy variables and the constant).

The Brattle Group Response:

- a. The reason that the confidence intervals were not reported comes from the discussion in Exhibit D, Attachment 1, Section VI, An Empirical Test of the Effect of Decoupling on the Cost of Capital, page 20 of 23.

"The coefficient of interest for testing our hypothesis is B1, the coefficient on the Decoupling Index. We consider a null hypothesis that decoupling does not lower the cost of capital." [Emphasis added.]

For this coefficient, we are thus using a one-sided test of significance, so the upper bound of the confidence interval would be positive infinity, which could be confusing to many readers and is not standard. Framed as a one-tail test, the null or neutral hypothesis is easier to disprove because the confidence level, 1% or 5%, is concentrated on just the negative side. But in all four equations, the decoupling index coefficients fail both the 0.01 (1%) and 0.05 (5%) *p*-value tests. The base case and 2 of the other 3 coefficients fail the 0.10 (10%) test.

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b. All other variables, which are the monthly dummy variables over the 32 month study period, the Company dummy variables, and the constant term, totaling 45, do not come with any presumption about the sign, so a two-tailed test is reasonable. For all of the 45 independent variables (excluding the decoupling index) in each of the four equations, 7 columns with appropriate headings show:

1. variable names
2. coefficients
3. robust standard errors
4. t-value
5. $P > |t|$
6. and 7. Pairs of values showing the two-tails of the 95% confidence interval.

These are shown in Attachment 1 of this response. These are outputs of the STATA regression runs.

c. The p -values are shown in column 5 listed above in answer b. These p -values are for the two-tailed test. Symbols p and P mean the same thing here.

Regression 1: Base Case

Linear regression Number of obs = 2

> 91

F(12, 13) =

> .

Prob > F =

> .

R-squared = 0.67

> 85

Root MSE = .010

> 11

(Std. Err. adjusted for 14 clusters in Compan

> y)

> --

	Coef.	Std. Err.	t	P> t	[95% Conf. Interva
CostOfCapi~1					

> --

DecoupIndex	-.0040791	.0036172	-1.13	0.280	-.0118936 .00373
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> 53

_IDate_181	-.0015273	.0013712	-1.11	0.286	-.0044895 .00143
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> 49

_IDate_182	.0007793	.0017185	0.45	0.658	-.0029333 .0044
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> 92

_IDate_183	.0080544	.0058435	1.38	0.191	-.0045698 .02067
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> 85

_IDate_184	.0069093	.0033656	2.05	0.061	-.0003616 .01418
------------	----------	----------	------	-------	------------------

> 03

_IDate_185	.0099434	.0052187	1.91	0.079	-.0013309 .02121
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> 78

_IDate_186	.0107383	.0051998	2.07	0.059	-.0004951 .02197
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> 18

_IDate_187	.0063146	.004142	1.52	0.151	-.0026337 .01526
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> 28

_IDate_188	.0112572	.0053286	2.11	0.055	-.0002545 .02276
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> 89

_IDate_189	.0195026	.0051224	3.81	0.002	.0084363 .03056
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> 88	_IDate_190	.0169648	.0042921	3.95	0.002	.0076923	.02623
> 72	_IDate_191	.024343	.0064672	3.76	0.002	.0103716	.03831
> 45	_IDate_192	.0208452	.0043574	4.78	0.000	.0114317	.03025
> 87	_IDate_193	.0246118	.0079516	3.10	0.009	.0074335	.04179
> 01	_IDate_194	.0220155	.0059581	3.70	0.003	.0091438	.03488
> 71	_IDate_195	.0241414	.0079369	3.04	0.009	.0069947	.04128
> 81	_IDate_196	.0240729	.008638	2.79	0.015	.0054117	.04273
> 41	_IDate_197	.0210664	.0074705	2.82	0.014	.0049273	.03720
> 54	_IDate_198	.0127822	.0058703	2.18	0.048	.0001001	.02546
> 43	_IDate_199	.0149499	.0080259	1.86	0.085	-.002389	.03228
> 87	_IDate_200	.0188546	.0076407	2.47	0.028	.0023478	.03536
> 14	_IDate_201	.0133375	.0075366	1.77	0.100	-.0029443	.02961
> 93	_IDate_202	.0123171	.0085639	1.44	0.174	-.0061841	.03081
> 84	_IDate_203	.0174943	.0073487	2.38	0.033	.0016185	.03337
> 01	_IDate_204	.0122034	.0062999	1.94	0.075	-.0014068	.02581
> 36	_IDate_205	.0142098	.0079895	1.78	0.099	-.0030504	.03147
> 01	_IDate_206	.0149262	.0083332	1.79	0.097	-.0030766	.0329
> 29	_IDate_207	.0131719	.0077566	1.70	0.113	-.0035853	.02992
> 91	_IDate_208	.0161536	.0108028	1.50	0.159	-.0071845	.03949
> 17	_IDate_209	.0084432	.0079707	1.06	0.309	-.0087763	.02566
> 28	_IDate_210	.0080092	.0071181	1.13	0.281	-.0073684	.02338

> 69
_IDate_211 | .0070064 .0066068 1.06 0.308 -.0072668 .02127
> 95
_ICompany_2 | -.0029593 .0013221 -2.24 0.043 -.0058155 -.00010
> 32
_ICompany_3 | .0058429 .000955 6.12 0.000 .0037797 .00790
> 61
_ICompany_4 | .0054955 .0012785 4.30 0.001 .0027335 .00825
> 75
_ICompany_5 | .0355339 .0038756 9.17 0.000 .027161 .04390
> 67
_ICompany_6 | .002133 .0020722 1.03 0.322 -.0023438 .00660
> 97
_ICompany_7 | .0224976 .001151 19.55 0.000 .0200111 .02498
> 41
_ICompany_8 | .0257421 .0004782 53.83 0.000 .0247089 .02677
> 52
_ICompany_9 | .0032733 .0024183 1.35 0.199 -.001951 .00849
> 76
_ICompany_10 | .0093099 .0007244 12.85 0.000 .007745 .01087
> 49
_ICompany_11 | .0151263 .0011635 13.00 0.000 .0126127 .01763
> 99
_ICompany_12 | .0092795 .0017819 5.21 0.000 .0054299 .01312
> 91
_ICompany_13 | .036135 .0005642 64.05 0.000 .0349162 .03735
> 37
_ICompany_14 | .0035378 .0028803 1.23 0.241 -.0026848 .00976
> 04
_cons | .0504366 .0051827 9.73 0.000 .0392401 .06163
> 31

Regression 2: One Quarter

Linear regression Number of obs = 2

> 91

F(12, 13) =

> .

Prob > F =

> .

R-squared = 0.67

> 93

Root MSE = .01

> 01

(Std. Err. adjusted for 14 clusters in Compan

> y)

> --

	Coef.	Std. Err.	t	P> t	[95% Conf. Interva	
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> l]

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DecoupIndex	-.0046502	.0037618	-1.24	0.238	-.0127771	.00347
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> 66

_IDate_181	-.0015273	.0013712	-1.11	0.286	-.0044895	.00143
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> 49

_IDate_182	.0007793	.0017185	0.45	0.658	-.0029333	.0044
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> 92

_IDate_183	.0080544	.0058435	1.38	0.191	-.0045698	.02067
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> 85

_IDate_184	.0069093	.0033656	2.05	0.061	-.0003616	.01418
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> 03

_IDate_185	.0098926	.0052083	1.90	0.080	-.0013592	.02114
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> 45

_IDate_186	.0106591	.0051766	2.06	0.060	-.0005242	.02184
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> 24

_IDate_187	.0067584	.0040844	1.65	0.122	-.0020653	.01558
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> 21

_IDate_188	.0112612	.0052826	2.13	0.053	-.0001512	.02267
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> 36

_IDate_189	.0196406	.0050524	3.89	0.002	.0087255	.03055
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_IDate_190	.0170883	.0042383	4.03	0.001	.0079319	.02624
> 47						
_IDate_191	.0247863	.0062793	3.95	0.002	.0112206	.03835
> 19						
_IDate_192	.020974	.0042607	4.92	0.000	.0117693	.03017
> 88						
_IDate_193	.0247273	.0078643	3.14	0.008	.0077374	.04171
> 71						
_IDate_194	.0221073	.0058685	3.77	0.002	.0094292	.03478
> 55						
_IDate_195	.024618	.0079248	3.11	0.008	.0074974	.04173
> 86						
_IDate_196	.0242141	.0084984	2.85	0.014	.0058545	.04257
> 37						
_IDate_197	.0212718	.0073929	2.88	0.013	.0053005	.03724
> 32						
_IDate_198	.0133797	.0058966	2.27	0.041	.000641	.02611
> 85						
_IDate_199	.015441	.0078758	1.96	0.072	-.0015737	.03245
> 57						
_IDate_200	.0191014	.0074978	2.55	0.024	.0029034	.03529
> 93						
_IDate_201	.0137712	.0076683	1.80	0.096	-.0027951	.03033
> 76						
_IDate_202	.0125893	.0085389	1.47	0.164	-.005858	.03103
> 65						
_IDate_203	.0177818	.0072071	2.47	0.028	.0022118	.03335
> 17						
_IDate_204	.01247	.0061844	2.02	0.065	-.0008906	.02583
> 06						
_IDate_205	.0144784	.0078571	1.84	0.088	-.0024958	.03145
> 27						
_IDate_206	.0151935	.0082085	1.85	0.087	-.0025398	.03292
> 68						
_IDate_207	.0134298	.007652	1.76	0.103	-.0031014	.02996
> 09						
_IDate_208	.0165824	.0106865	1.55	0.145	-.0065043	.03966
> 91						
_IDate_209	.0087328	.0078205	1.12	0.284	-.0081624	.0256
> 28						
_IDate_210	.0082162	.006958	1.18	0.259	-.0068156	.0232
> 48						

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_IDate_211	.0072161	.0064482	1.12	0.283	-.0067144	.02114
> 65						
_ICompany_2	-.0025369	.0014078	-1.80	0.095	-.0055784	.00050
> 46						
_ICompany_3	.0059906	.0009943	6.03	0.000	.0038426	.00813
> 86						
_ICompany_4	.0053669	.0012981	4.13	0.001	.0025624	.00817
> 13						
_ICompany_5	.0356558	.0037898	9.41	0.000	.0274684	.04384
> 31						
_ICompany_6	.0025603	.0022361	1.14	0.273	-.0022705	.00739
> 12						
_ICompany_7	.0225712	.0011547	19.55	0.000	.0200766	.02506
> 59						
_ICompany_8	.0258431	.0005202	49.68	0.000	.0247194	.02696
> 68						
_ICompany_9	.0037468	.0025891	1.45	0.172	-.0018466	.00934
> 03						
_ICompany_10	.0092706	.0006997	13.25	0.000	.0077591	.01078
> 22						
_ICompany_11	.0152548	.0012482	12.22	0.000	.0125582	.01795
> 15						
_ICompany_12	.0096909	.0020077	4.83	0.000	.0053536	.01402
> 82						
_ICompany_13	.0361919	.0005572	64.96	0.000	.0349882	.03739
> 56						
_ICompany_14	.0037541	.002968	1.26	0.228	-.0026579	.0101
> 66						
_cons	.0502755	.0050931	9.87	0.000	.0392724	.06127
> 85						

Regression 3: Two Quarters

Linear regression Number of obs = 2

> 91

F(12, 13) =

> .

Prob > F =

> .

R-squared = 0.67

> 96

Root MSE = .010

> 09

(Std. Err. adjusted for 14 clusters in Compan

> y)

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CostOfCapit	Coef.	Std. Err.	t	P> t	[95% Conf. Interva]]

> --

DecoupIndex	-.0048665	.0032967	-1.48	0.164	-.0119885	.00225
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> 56

_IDate_181	-.0015273	.0013712	-1.11	0.286	-.0044895	.00143
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> 49

_IDate_182	.0007793	.0017185	0.45	0.658	-.0029333	.0044
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> 92

_IDate_183	.0080544	.0058435	1.38	0.191	-.0045698	.02067
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> 85

_IDate_184	.0069093	.0033656	2.05	0.061	-.0003616	.01418
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> 03

_IDate_185	.0098643	.0051854	1.90	0.080	-.0013381	.02106
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> 67

_IDate_186	.011228	.0049961	2.25	0.043	.0004345	.02202
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> 15

_IDate_187	.0067406	.0040452	1.67	0.120	-.0019985	.01547
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> 97

_IDate_188	.0113683	.0051582	2.20	0.046	.0002247	.02251
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> 18

_IDate_189	.0197113	.0050292	3.92	0.002	.0088464	.03057
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> 62

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_IDate_190	.0174916	.0038873	4.50	0.001	.0090935	.02588
> 96						
_IDate_191	.0248349	.006148	4.04	0.001	.011553	.03811
> 67						
_IDate_192	.0210429	.0041646	5.05	0.000	.0120458	.03003
> 99						
_IDate_193	.0247422	.0077056	3.21	0.007	.0080952	.04138
> 91						
_IDate_194	.0226088	.0058698	3.85	0.002	.0099279	.03528
> 98						
_IDate_195	.0247503	.0077364	3.20	0.007	.0080368	.04146
> 38						
_IDate_196	.0243074	.0081915	2.97	0.011	.0066108	.0420
> 04						
_IDate_197	.021732	.0071564	3.04	0.010	.0062716	.03719
> 24						
_IDate_198	.013761	.005416	2.54	0.025	.0020604	.02546
> 15						
_IDate_199	.0155148	.0073962	2.10	0.056	-.0004637	.03149
> 32						
_IDate_200	.0193906	.0073069	2.65	0.020	.003605	.03517
> 62						
_IDate_201	.013851	.0073557	1.88	0.082	-.00204	.02974
> 21						
_IDate_202	.0126625	.0082191	1.54	0.147	-.0050939	.03041
> 89						
_IDate_203	.0178452	.006718	2.66	0.020	.0033319	.03235
> 86						
_IDate_204	.0125466	.0057206	2.19	0.047	.0001881	.02490
> 51						
_IDate_205	.0145578	.0074495	1.95	0.073	-.0015358	.03065
> 14						
_IDate_206	.0152723	.0078314	1.95	0.073	-.0016465	.03219
> 11						
_IDate_207	.0136776	.0072828	1.88	0.083	-.002056	.02941
> 12						
_IDate_208	.0166665	.0102147	1.63	0.127	-.0054011	.03873
> 41						
_IDate_209	.0088201	.0073578	1.20	0.252	-.0070756	.02471
> 57						
_IDate_210	.0082565	.0065778	1.26	0.231	-.005954	.02246
> 71						

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_IDate_211	.0072667	.0061486	1.18	0.258	-.0060166	.020
> 55						
_ICompany_2	-.0021758	.0016806	-1.29	0.218	-.0058064	.00145
> 49						
_ICompany_3	.0060935	.0009089	6.70	0.000	.00413	.00805
> 71						
_ICompany_4	.0052499	.0012649	4.15	0.001	.0025172	.00798
> 25						
_ICompany_5	.035675	.0035534	10.04	0.000	.0279983	.04335
> 17						
_ICompany_6	.0027915	.0020291	1.38	0.192	-.0015922	.00717
> 51						
_ICompany_7	.0226493	.0010978	20.63	0.000	.0202777	.02502
> 08						
_ICompany_8	.0259215	.0004814	53.85	0.000	.0248815	.02696
> 15						
_ICompany_9	.0039927	.0023347	1.71	0.111	-.0010512	.00903
> 66						
_ICompany_10	.0092155	.0006615	13.93	0.000	.0077865	.01064
> 45						
_ICompany_11	.0153351	.0013469	11.39	0.000	.0124253	.01824
> 49						
_ICompany_12	.0099415	.0020508	4.85	0.000	.0055111	.01437
> 19						
_ICompany_13	.0362461	.0005361	67.61	0.000	.0350879	.03740
> 43						
_ICompany_14	.0038684	.0031307	1.24	0.238	-.002895	.01063
> 18						
_cons	.0501909	.0048937	10.26	0.000	.0396187	.06076
> 31						

Regression 4: Three Quarters

Linear regression Number of obs = 2

> 91

F(12, 13) =

> .

Prob > F =

> .

R-squared = 0.67

> 90

Root MSE = .01

> 01

(Std. Err. adjusted for 14 clusters in Compan

> y)

> --

	Coef.	Std. Err.	t	P> t	[95% Conf. Interva	l]
CostOfCapit~1						

> --

DecoupIndex	-.0045867	.0035306	-1.30	0.216	-.012214	.00304
> 06						
_IDate_181	-.0015273	.0013712	-1.11	0.286	-.0044895	.00143
> 49						
_IDate_182	.0007793	.0017185	0.45	0.658	-.0029333	.0044
> 92						
_IDate_183	.0080544	.0058435	1.38	0.191	-.0045698	.02067
> 85						
_IDate_184	.0069093	.0033656	2.05	0.061	-.0003616	.01418
> 03						
_IDate_185	.0105478	.0051865	2.03	0.063	-.0006569	.02175
> 25						
_IDate_186	.0112001	.0050166	2.23	0.044	.0003623	.0220
> 38						
_IDate_187	.0068364	.0039973	1.71	0.111	-.0017993	.01547
> 21						
_IDate_188	.0113894	.0051729	2.20	0.046	.000214	.02256
> 49						
_IDate_189	.0201036	.0047337	4.25	0.001	.009877	.03033
> 02						

_IDate_190	.0174325	.0039094	4.46	0.001	.0089868	.02587
> 82						
_IDate_191	.0247941	.0060635	4.09	0.001	.0116948	.03789
> 34						
_IDate_192	.0209732	.0041732	5.03	0.000	.0119575	.02998
> 88						
_IDate_193	.0250061	.0075957	3.29	0.006	.0085966	.04141
> 56						
_IDate_194	.0225931	.0058453	3.87	0.002	.009965	.03522
> 12						
_IDate_195	.0246838	.0075594	3.27	0.006	.0083526	.0410
> 15						
_IDate_196	.0246286	.0079523	3.10	0.008	.0074486	.04180
> 86						
_IDate_197	.0218615	.0070751	3.09	0.009	.0065767	.03714
> 63						
_IDate_198	.0135937	.0055183	2.46	0.028	.0016722	.02551
> 51						
_IDate_199	.0155355	.0072764	2.14	0.052	-.0001841	.03125
> 52						
_IDate_200	.0192077	.0070924	2.71	0.018	.0038854	.03452
> 99						
_IDate_201	.0137119	.0072083	1.90	0.080	-.0018607	.02928
> 46						
_IDate_202	.0124734	.0080675	1.55	0.146	-.0049555	.02990
> 23						
_IDate_203	.0176151	.0064231	2.74	0.017	.0037388	.03149
> 14						
_IDate_204	.0123753	.0054289	2.28	0.040	.0006467	.02410
> 38						
_IDate_205	.0143873	.0070658	2.04	0.063	-.0008775	.02965
> 21						
_IDate_206	.0151968	.0075111	2.02	0.064	-.00103	.03142
> 36						
_IDate_207	.0134972	.0071206	1.90	0.080	-.001886	.02888
> 04						
_IDate_208	.0164837	.0097668	1.69	0.115	-.0046162	.03758
> 36						
_IDate_209	.0086393	.0068792	1.26	0.231	-.0062224	.0235
> 01						
_IDate_210	.0080819	.0062262	1.30	0.217	-.0053689	.02153
> 27						

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ATTACHMENT 1
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_IDate_211	.0071057	.0058159	1.22	0.243	-.0054589	.01967
> 02						
_ICompany_2	-.0019645	.0021316	-0.92	0.374	-.0065695	.00264
> 06						
_ICompany_3	.0061217	.0008254	7.42	0.000	.0043386	.00790
> 49						
_ICompany_4	.0052345	.0012684	4.13	0.001	.0024942	.00797
> 48						
_ICompany_5	.0355507	.0033572	10.59	0.000	.0282979	.04280
> 36						
_ICompany_6	.0027284	.0022571	1.21	0.248	-.0021477	.00760
> 46						
_ICompany_7	.0226326	.0009977	22.69	0.000	.0204772	.02478
> 79						
_ICompany_8	.0259228	.0005452	47.55	0.000	.0247449	.02710
> 07						
_ICompany_9	.0038969	.0025791	1.51	0.155	-.001675	.00946
> 88						
_ICompany_10	.0091921	.0006329	14.52	0.000	.0078247	.01055
> 94						
_ICompany_11	.0153132	.0015494	9.88	0.000	.011966	.01866
> 04						
_ICompany_12	.009929	.0024646	4.03	0.001	.0046045	.01525
> 35						
_ICompany_13	.0362802	.000685	52.97	0.000	.0348004	.03775
> 99						
_ICompany_14	.0038368	.0035575	1.08	0.300	-.0038486	.01152
> 22						
_cons	.0502212	.0047809	10.50	0.000	.0398927	.06054
> 98						
