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The Relationship between R&D Spending and the Earnings Management of Japanese Electronics Companies

-A case of earnings management through real management activity-

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ABSTRACT

Japanese companies have been prohibited from using accrual manipulation for R&D since 1999; however, many Japanese companies had not used accrual manipulation even before 1999. Many companies (more than 90%) had expensed all of R&D spending when it occurred because of tax benefits, despite the fact that they could have used accrual manipulation of R&D spending based on the existing accounting rules. Therefore, Japanese firms would seem to have, in general, used real manipulation to (A) increase or decrease R&D spending, and/or (B) to change the content of R&D to gain target results within the short-term.

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Using the financial data from 1980 to 2006 of Japanese electronics companies, this paper shows two kinds of evidence that managers adjusted the amount of R&D spending for all periods according to their expected income and that since 2000 they have tried to shorten the term in which the benefit of their R&D spending was realized to improve short-term performance.

To determine the amount and/or the content of R&D spending for the purpose of gaining a short-term benefit can result in the loss of opportunities to gain greater long-term benefits.

I Introduction

Japanese firms, in general, consistently increased their R&D spending from the end of World War II to 1991. Japanese managers stated, and believed, that increasing R&D investment was their obligation, regardless of the effect on the short-term performance of their firm. However, R&D decreased for the first time in 1992, just after the burst of the economic bubble in Japan. From that time until 1999, Japanese managers, according to Mande *et al.* [2000], made optimal allocations to R&D. As a result, even in 2005, the R&D spending of Japanese firms has been ranked number two in the world.

Japanese companies have been prohibited from using accrual manipulation for R&D since 1999. However, many Japanese companies had not used accrual manipulation even before 1999 because of tax benefits, despite the fact that they could have used it for R&D spending based on the existing accounting rules. Therefore, Japanese firms would seem to have generally used real manipulation: (A) increase or decrease R&D spending and/or (B) change the content of R&D to meet short-term target results.

This paper shows empirical evidence that Japanese electronics companies have used real manipulation, especially changes in the content of their investment, regardless of changes in the accounting rules.

Ⅱ R&D investment by Japanese electronics companies

Graph No.1 shows the time series change in R&D investment for the leading Japanese electronics companies. The historical change of R&D investment by the electronics industry in Japan is almost the same as that of Japanese firms in general. The amount of R&D spending grew continuously during the period between 1980 and 1991. After 1992, although the total amount of R&D spending of all electronics companies was growing, the time series change became erratic, depending on the firm. Moreover, companies can be divided into two groups based on their tendencies in R&D spending after 1997; some, such as Fujitsu and NEC, have decreased it and others, such as Panasonic and Sony, have increased it regardless of their performance. As graph 2 makes clear, the Japanese electronics industry, including Panasonic and Sony, fell into a critical situation from 2000 to 2001.

【Graph 1】

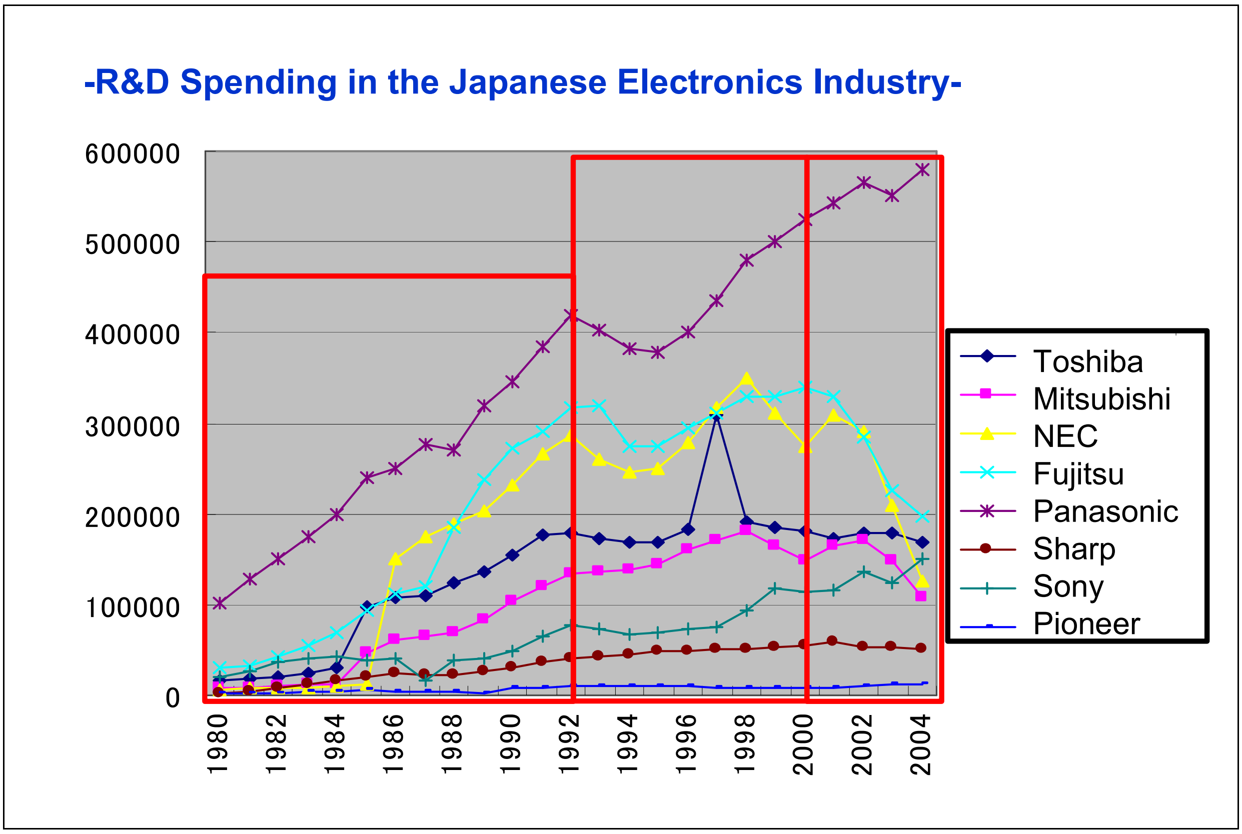


Table 1 shows that Japanese companies, except for those in the chemical and textile industries, increased R&D spending from 1991 and 2004,. Although the growth rate of R&D spending by the electronics industry decreased between 1991 and 2004, the actual amount of R&D spending by the electronics industry consistently increased.

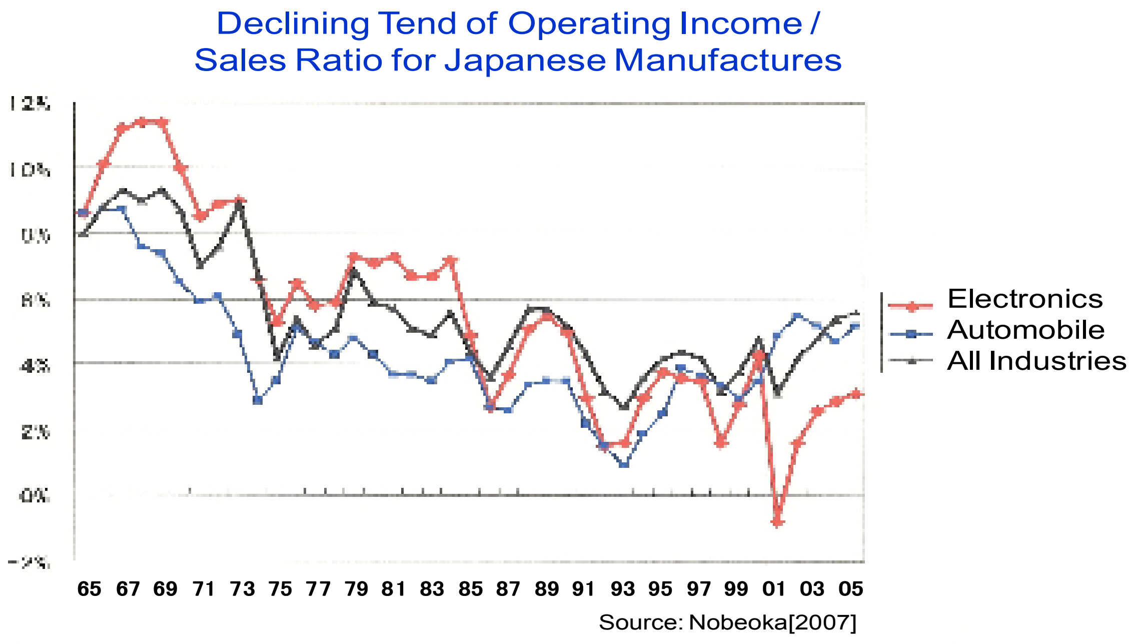
【Table 1】

Growth Rate of Industry-classified R&D

	1981-90	1991-00	2001-04	2005-06
Pharmaceutical (9.4)	8.6	3.5	6.0	12.5
Electronics (5.5)	12.4	1.7	0.8	5.1
Transportation Equipment (4.2)	9.4	0.2	6.6	11.3
Machinery (3.7)	9.5	2.9	3.9	8.3
Chemistry (3.7)	7.4	-0.5	-0.4	7.4
Textile (1.7)	8.0	-1.5	-15.2	11.8

Graph 2 shows the historical change of the operating income per sales ratio, after adjusting for inflation, of Japanese companies. The red line represents the electronics industry, the blue line represents the automobile industry, and the black line represents all industries. We can see that this ratio has been decreasing, by and large, despite a continuous increase of R&D spending, as

【Graph 2】



shown in table 1. Notably, the income of the electronics industry plunged from 2000 to 2001, which is very important to our research.

Ⅲ Previous Research and Hypothesis

1. Management Short-term decision-making and R&D Spending

Institutional investors (especially, mutual fund investors) reward short-term performance with large investment inflows. Fund managers facing strong performance-related flows have been shown to focus more on short horizon investments: The fund manager’s investment horizons are driven by the short horizons of their investors. Based on Suto et al. [2005], Japanese institutional investors in 2004 were much more myopic than their American counterparts. In Japan, about three fourths of the institutional investors planned to buy and sell within six months, compared to only one fourth in the US. Pressure from the capital market tends to make managers become myopic.

Notably, Bushee [1998] examined, in the U.S., whether or not institutional investors create or reduce incentives for corporate managers to reduce investment in R&D. He found that a large proportion of ownership by institutions significantly increased the probability that managers would reduce R&D to reverse an earnings decline. This was especially the case if they had high portfolio turnover and engaged in momentum trading,

2. Accrual and real manipulation

It is generally accepted that there are two kinds of manipulation, accrual and real. Accrual manipulation means "accrual-based earnings management"..."to change the timing of a presentation" (Shipper [1989]). Roychowdhury [2006] refers to it as “earnings management through accrual manipulation.” Real manipulation means "real earnings management"... "to change the timing of a transaction" (Shipper [1989]). Roychowdhury [2006] differently postulates it as “earnings management through real activities.” Shipper's conception is too narrow. Real manipulation should include not only changes in the timing of R&D spending but also the discontinuation of a planned transaction and/or the change of the content of a transaction to meet short-term earnings goals if the part done through a manager's real activity is important for its conception. Managers use both accrual and real manipulation to improve short-term performance.

Japanese firms have been prohibited from using R&D spending as a deferred asset since 1999. Even previous to 1999, they had not deferred R&D spending because of tax benefits. For example, only 5 of the 53 electronics firms had used R&D spending as a deferred asset before 1998. Thus, most Japanese firms may have used only real manipulation in their earnings management. To attain a short-term performance gain, a firm might adopt two methods, used alternatively or simultaneously, to meet their target performance; ① adjust (increase or decrease) R&D spending, or ② change the content of R&D.

Previous studies have documented that R&D spending is both an impetus for the growth of the firm and a source of competitive advantage (Ettlie [1998]; Lev and Sougiannis [1996]). However, managers may reduce R&D spending to opportunistically boost short-term performance (Bushee [1998]).

3. The Horizon and Myopia Problems

Past empirical research has presented evidence for the existence of a "Horizon Problem" and a "Myopia Problem" for R&D Investment.

Dechow and Sloan [1991] reported that opportunistic reductions in R&D spending become more likely when the CEO approaches retirement. This so called "Horizon Problem" is not covered in this paper.

The "Myopia Problem" is as follows; Opportunistic reductions in R&D spending become more likely when the firm faces a small earnings decline or a small loss. Mande et al. [2000] attempted to determine the relationship between income smoothing and the discretionary R&D expenditure of Japanese firms. They tested whether or not Japanese managers adjusted R&D based on short-term performance. Their results show that Japanese firms in several industries adjust their R&D budgets to smooth profits. Interestingly, adjustments to R&D are larger in expansion years. These results point to short-term decision making by Japanese managers that is similar to that documented for U.S. managers.

Based on the above discussion, our null hypotheses are as follows;

H1. Managers do not adjust R&D spending to improve short-term performance.

H2. Managers do not change the content of R&D spending to improve short-term performance.

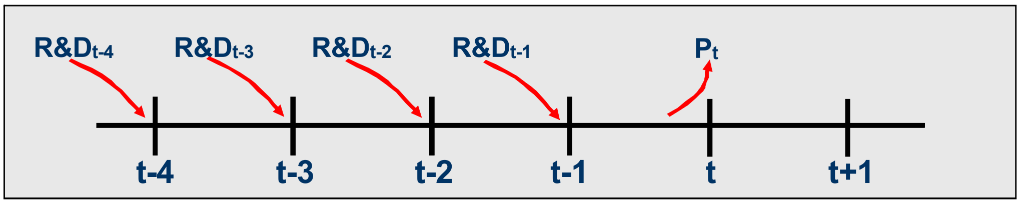
Ⅳ Analytical Method

Previous research dealt with the regressional relationship between R&D investment and sales or operating income without considering a time lag or with a fixed time lag. Therefore, we attempted to determine whether or not an increase or decrease of R&D investment causes an increase or decrease of operating income by incorporating a flexible time lag. More concretely, we determined the relationship between current performance and investment in

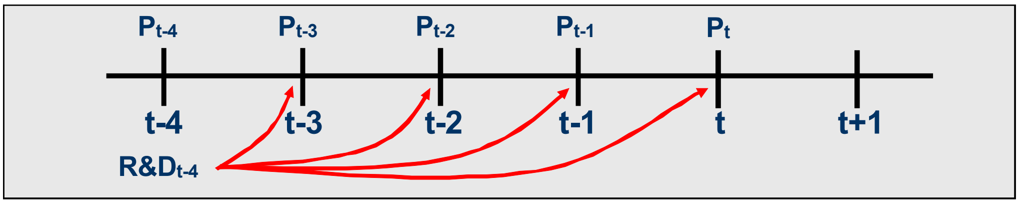
R&D at t-1, then worked backwards for each successive year until the relationship lost statistical significance. We then repeated the same process in regards to the performance of each year, proceeding from t-1 backwards.

$$OI_t = ß_0\ RD_t + ß_1\ RD_{t-1} + ß_2\ RD_{t-2} + \cdots\cdots + ß_k\ RD_{t-k} + u_t$$

(1) P_t vs. $R\&D_{t-1}$, $R\&D_{t-2}$, $R\&D_{t-3}$, $R\&D_{t-4}$ · · · · ·



(2) $R\&D_{t-4}$ vs. P_{t-3}, P_{t-2}, P_{t-1}, · · · · ·



Pt may be the result of the R&D of t-1,t-2, t-3, and so on. To the contrary, R&D t-4 may have an influence on the P of t-3, t-2, t-1, and so on.

The problem with the estimation of this equation is that because of the high correlations between RDt and its lagged values, we do not get reliable estimates of the parameter $ß_i$, the so-called multicolinearity problem. Irving Fisher [1937] assumed the $ß_i$ to decline arithmetically and S. Almon [1965] generalized this to the case where the $ß_i$ follow a polynomial of degree r in i.

This is known as the Almon lag or the Polynomial lag (Madala [2001], pp. 412-415).

Because we have to decide the shape of the equation in this model, we assumed that the effect of R&D investment would follow the shape of a quadratic equation based on the declining curve of the accumulated value in the patent right.

Moreover, we chose capital expenditure, advertisement expense and R&D expense as the determinants of the operating income, according to Lev & Sougiannis [1996], because variables other than R&D investment can also have an effect on operating income. The adjusted operating income per sales is assumed to be proportional to the sum of the capital expenditure with a one-year time lag, R&D with a flexible time lag, and advertisement cost per sales with a one-year time lag, according to Lev & Sougiannis [1996].

$$(OI/S)_{i,t} = \alpha_0 + \alpha_1 (TA/S)_{i,t-1} + \sum_k \alpha_{2,k} (RD/S)_{i,t-k} + \alpha_3 (AD/S)_{i,t-1} \quad \cdots (1)$$

Where	$OI_{i,t}$	:Adjusted Operating Income
	$S_{i,t-k}$	:Sales
	TA_{it-1}	:Tangible Assets (Capital Expenditure)

RDi, t-k :R&D Spending

ADi, t-1 :Advertisement Expense

To verify Hypothesis 1, reverse regression of the multiple regression equation (1) is needed, as follows;

$$(RD/S)_{i,t} = \alpha_0 + \alpha_1 (TA/S)_{i,t-1} + \sum_k \alpha_{2,k} (OI/S)_{i,t-k} + \alpha_3 (AD/S)_{i,t-1} \quad \cdots (2)$$

Where OIi, t :Adjusted Operating Income

Si, t-k :Sales

TAi, t-1 :Tangible Assets (Capital Expenditure)

RDi, t-k :R&D Spending

ADi, t-1 :Advertisement Expense

To verify Hypothesis 2, multiple regression equation (1) was used.

Ⅵ Analysis and Results

1. Sample

Although the number of Japanese electronics companies listed on the First Section of the Tokyo Stock Exchange has varied from 140 to 150, the number of companies for which a complete data set was available for the period from

1980 to 2005 was 53[3] in the AMSUS data base (Nikkei Quick Co.)[4].

2. Results

H1. Managers do not adjust R&D spending to improve short-term performance.

H2. Managers do not change the content of R&D spending to improve short-term performance.

For Hypothesis 1, we determined the relationship between the R&D investment of each previous year and the adjusted operating income of each year using multiple regression equation (2), while controlling for the effects of capital expenditure and advertisement activity. Concerning Hypothesis 1, the result of the Polynomial regression is as follows;

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[3] The names of the companies and their descriptive statistics are shown at the end of the paper. All 53 companies have been listed on the first section of Tokyo Stock Exchange. 53 is a sufficient sample size for our multiple regressions.

[4] AMSUS is a financial data base which Nikkei Quick Co. provides. http://corporate.quick.co.jp/service/product/amsus_market.html

【table 2.】 **(See the result of the analysis 1 at the end of this paper)**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Time Lag	1	1	2	2	2	1	1	1	2	2	2	2	2	2	3
Significance Level	0.002	0.009	0.003	0.006	0.003	0.000	0.003	0.008	0.001	0.002	0.003	0.001	0.002	0.007	0.001
AIC	3.158	2.645	3.017	2.797	3.087	3.874	3.077	2.698	3.346	3.177	3.034	3.329	3.249	2.734	3.494

AIC represents Akaike Information Criteria[5].

Investment in R&D was shown to be strongly influenced by the operating income through all periods analyzed, at a significance level less than 1 %. The length of the time lag was one (current period) or two years (one year previously), except for 2005.

Next, we analyzed the relationship between the adjusted operating income of each year and the R&D investment of each previous year using multiple regression equation (1), while controlling for the effects of capital expenditure and advertisement activity, Concerning Hypothesis 2, the result of the Polynomial regression is as follows;

[5] Two criteria are often used to reflect the closeness of fit and the number of parameters estimated. One is the Akaike information criterion (AIC), and the other is the Bayesian information criterion (BIC). AIC is a more general criterion that can be applied to any model that can be estimated by the method of maximum likelihood. See Maddala [2005], pp. 485, 488, 525.

【table 3.】(See the result of the analysis 2 at the end of this paper)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Time Lag	2	3	3	4	4	3	4	4	4	1	1	1	1	1	1
Significance Level	0.005	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000
AIC	4.801	3.747	2.831	8.436	9.866	3.910	8.389	7.027	5.523	2.648	3.611	4.025	4.278	3.895	3.722
Duration of Effect (year)	5	3	3	3	3	4	2	2	1	4	4	4	4	4	4

The result of investment in R&D was found to be reflected in the operating income after a time lag through all periods, at a significance level of less than 1 %. The length of the time lag was three or four years before 1999, but it decreased to one year after 2000 and continued as such until 2005.

3. Implications

Firstly, Hypothesis 1 "Managers do not adjust R&D spending to improve short-term performance" was statistically rejected. This shows that managers engaged in earnings management that included adjustments to R&D spending.

Secondly, Hypothesis 2 "Managers do not change the content of R&D spending to improve short-term performance" was also statistically rejected. This indicates the possibility that corporate managers changed the content of

R&D spending after the crisis in the Japanese electronics industry to create short-term performance improvements.

Thirdly, we found empirical evidence that corporate managers have adopted two kinds of real R&D spending manipulation. Corporate managers have adjusted R&D spending and at the same time may have changed the content of R&D spending to improve short-term performance.

4. Limitations

A problem may exist concerning the second hypothesis. We cannot conclude without a doubt that the decrease in the period of the time lag was due solely to the myopic decisions of management because there is the possibility that the decrease was due to reduced product life cycles brought about by rapid technological innovation. However, there is collateral evidence indicating that Japanese electronics companies pulled the trigger and made strategic changes in the content of R&D when the electronics industry fell into a critical situation from 2000 to 2001.

Ⅵ Conclusion

Japanese companies have been prohibited from using accrual manipulation for R&D since 1999; however, many Japanese companies had not used accrual manipulation even before 1999 because of tax benefits, despite the fact that they could have used it for R&D spending based on the existing accounting rules. This indicates that Japanese firms generally used real manipulation by (A) increasing or decreasing R&D spending and/or by (B) changing the content of R&D to meet their short-term target results. This paper shows empirical evidence that Japanese electronics companies have used real manipulation regardless of changes in the accounting rules.

Firstly, R&D investment was both an impetus for growth and a source of competitive advantage, as shown by the statistically meaningful relationship between R&D spending and adjusted operating income during the period of our analysis (see Table 3). This result coincides with the results of previous studies by Ettlie [1998] and Lev and Sougiannis [1996].

Secondly, R&D investment was adjusted (increased or decreased) by the current or past adjusted operating income, as shown by the statistically meaningful relationship concerning the influence from operating income on R&D spending during the period of our analysis (see Table 2). Our results show that adjustment of R&D spending has been a means of real earnings management by Japanese Electronics companies.

Thirdly, there is empirical evidence that corporate managers might have adopted another method of real manipulation, changing the content of R&D spending, to improve short-term performance: The length of the time lag was three or four years before 1999, but it decreased to one year after 2000 and continued as such until 2005, although there may be other reasons for this phenomenon, such as technological innovation from analog to digital or productive innovation.

Company Names

IBIDEN CO., LTD	NEC Corporation
KONICA MINOLTA HOLDINGS, INC.	FUJITSU LIMITED
Minebea Co., Ltd.	IWATSU ELECTRIC CO.,LTD.
TOSHIBA CORPORATION	NEC Infrontia Corporation
Mitsubishi Electric Corporation	Sanken Electric Co., Ltd.
TOYO DENKI SEIZO K.K. (TOYO ELECTRIC MFG. CO. LTD.)	EPSON TOYOCOM CORPORATION
YASKAWA Electric Corporation	Kyosan Electric Mfg. Co., Ltd.
Shinko Electric Co., Ltd.	NOHMI BOSAI LTD.
MEIDENSHA CORPORATION	Japan Radio Co., Ltd.
Origin ELECTRIC CO.,LTD.	Matsushita Electric Industrial Co., Ltd.
TOSHIBA TEC CORPORATION	SHARP CORPORATION
TAKAOKA ELECTRIC MFG.CO.,LTD.	Hitachi Kokusai Electric Inc.
OSAKI ELECTRIC CO.,LTD.	Sony Corporation
OMRON Corporation	NEC TOKIN Corporation
TEIKOKU TSUSHIN KOGYO CO.,LTD.	CHINO CORPORATION
MITSUMI ELECTRIC CO., LTD.	TokoElectric.co

TAMURA Corporation	IWASAKI ELECTRIC CO., LTD.
IKEGAMI TSUSHINKI CO.,LTD.	Ushio Inc.
PIONEER CORPORATION	Shin-Kobe Electric Machinery Co. ,Ltd.
Victor Company of Japan, Limited (JVC)	CASIO COMPUTER CO.,LTD.
Foster Electric Company, Limited	Nihon Inter Electronics Corporation
Clarion Co., Ltd.	Nippon Chemi-Con Corporation.
TOKO,INC.	ICHIKOH INDUSTRIES,LTD.
Hoshiden Corporation	KOITO MANUFACTURING CO., LTD.
HIROSE ELECTRIC CO.,LTD.	DAINIPPON SCREEN MFG. CO., LTD.
Japan Aviation Electronics Industry, Limited	Canon Inc.
Hitachi Maxell, Ltd.	Ricoh Company, Ltd.
Shindengen Electric Manufacturing Co., Ltd.	NIDEC SANKYO CORPORATION

Descriptive Statistics

		Capital Expenditure	Total Assets	Total Liabilities	Sales	Operating Income	Net Income before tax	Advertisement	Depreciation	R&D
1980	Ave	41898.24528	145846.3585	103627.9811	164737.9245	13164.67925	10324.45283	2193.90566	579.2264151	2424.90566
	Median	11656	31681	22579	41638	3153	2365	205	102	519
	SD	78444.66938	298594.516	239997.6779	306069.9974	24966.05822	16759.92709	4228.646639	1432.180313	5740.025008
1981	Ave	50641.24528	170357.6981	115819.3774	188002.8679	14800.03774	12376.84906	2518.207547	682.4528302	3352.735849
	Median	13218	36269	23819	44202	3753	2890	203	122	675
	SD	96817.19797	343360.5725	264774.3677	346487.8936	27570.01552	20515.91875	4783.831898	1559.524503	7657.639482
1982	Ave	58997.86792	185395.9434	122412.6981	201275	14450.30189	12088.62264	2748.867925	839.8867925	4211.792453
	Median	13862	39228	24859	48189	3178	2525	199	131	763
	SD	111684.0095	370134.4197	281687.3949	370656.0325	27475.26815	19877.5806	5058.354791	1930.443798	9993.466603
1983	Ave	68182.64151	217011.0189	143989.8113	228051.4151	15547.39623	13340.83019	2909.075472	968.5849057	5186.150943
	Median	16706	55086	32229	67072	4049	3626	242	135	760
	SD	131481.3699	430398.1307	328037.911	421286.6515	31211.60504	21819.85765	5192.602304	2340.594323	12185.60504
1984	Ave	81807.0566	248710.1132	164303.8302	275322.1321	18967.20755	18612.60377	3463.811321	1224.981132	8188.849057
	Median	19024	61632	38311	77524	5027	4452	255	168	842
	SD	160136.3637	487369.4179	367998.9065	521727.4721	37212.58836	33595.01777	6281.253182	3154.431117	20316.2053
1985	Ave	94845.26415	258386.283	165351.0755	284605.5472	12385.77358	13078.88679	3727.943396	1547.830189	11989.81132
	Median	19905	60329	34801	80253	3803	3884	323	206	955
	SD	182505.474	488115.1842	353638.7849	534654.0747	22051.34449	22620.93192	6818.655974	4062.752642	30458.00694
1986	Ave	98512.37736	270366.0189	171527.5472	271609.6038	6332.415094	6800.320755	3044.716981	1720.584906	12491.71698
	Median	20405	64504	36539	66295	1637	2239	347	240	1170
	SD	185286.9763	508429.4991	364644.9971	531743.4235	13419.63471	11051.22545	5593.361207	4585.327316	33511.77457
1987	Ave	110035.3962	295113.6226	182294.566	301538.2264	10174.49057	10824.50943	3380.981132	1523.056604	14932.62264
	Median	21779	75210	38937	80026	2970	2958	335	227	1031
	SD	204108.6119	547041.7132	374351.4385	586390.7726	20148.47855	18760.77289	6313.304253	3293.152625	40452.12793
1988	Ave	121845.3774	333021.7736	202232.7925	328865.4906	17078.20755	16563.71698	3875.622642	1498.830189	16760.84906
	Median	26134	82787	40853	90604	3817	4075	463	263	1182
	SD	227121.7223	620545.7744	421419.3883	657585.5707	36522.55936	31250.34086	7363.342581	3262.575904	47394.85645
1989	Ave	142523.0566	392717.5472	237100.3962	370097.8491	21940.60377	21396.37736	4928.886792	1762.188679	19672.49057
	Median	28912	88547	45670	99665	3705	4523	523	298	1453
	SD	272226.3443	737438.2276	494744.7595	706883.1104	46598.52698	40389.47593	9239.365706	3813.099653	54452.82027
1990	Ave	170797.1887	430795.5094	262266.8491	404277.7547	20789.84906	21516.01887	5325.45283	2031.377358	22277.28302
	Median	33977	90354	52358	96211	4012	3912	514	339	1283
	SD	335610.9763	808579.6382	541541.9889	767778.4929	40044.82196	39026.48258	9995.764187	4230.17472	60696.84324
1991	Ave	184492.5283	451180.2264	278286.3396	417762.4906	11621.20755	11647.03774	5342.264151	2211.584906	24122.4717
	Median	37107	89146	58887	113759	3317	2946	450	371	1372
	SD	361938.6414	847258.6943	576143.0829	782430.979	22861.43466	20555.06752	10283.82793	4468.151913	65536.2723
1992	Ave	191556.8679	446340.0189	273431.2264	400715.9623	5377.45283	6067.471698	4364.716981	2332.320755	23554.86792
	Median	37786	97214	57080	103642	2233	1513	309	339	1355
	SD	373403.5391	844892.2448	575599.8706	755915.0769	14899.19048	17247.29989	8406.72628	4582.919492	63618.0783
1993	Ave	189774.9623	436992.0377	263891.5472	387913.0189	4945.622642	5703.339623	3710.641509	2346.679245	22293.11321
	Median	38658	95583	51776	88047	2226	1314	335	356	1257
	SD	372306.1936	821564.2313	546699.8702	744096.5932	12981.04898	14099.14893	7062.061853	4799.925427	58618.40103
1994	Ave	196423.0566	446921.1698	269365.1321	406347.9811	11210.75472	9605.283019	3767.264151	2168.54717	23064.37736
	Median	39932	98605	54196	96781	2175	1719	235	341	1221
	SD	393015.571	840239.9848	560401.5047	773024.4028	22962.69197	19314.1922	7144.834937	4825.045582	60010.69088
1995	Ave	205714.4906	467008.283	284054.9057	443269.5849	15874.5283	13397.20755	3938.018868	2096.264151	24754.22642
	Median	40096	98725	60072	94478	2748	2130	335	354	1264
	SD	414310.1741	886447.538	599206.8315	863663.423	35548.29019	28577.06949	7499.746361	4769.010191	65098.38338
1996	Ave	215120.7736	480261.9434	288709.9434	482391	17366.35849	14937.67925	4257.132075	2167.056604	29014.88679
	Median	38347	113899	58924	107815	4037	4079	255	265	1280
	SD	431119.8228	907741.2023	606467.6426	954714.5064	34630.66449	27808.68847	8143.657915	5271.893513	77922.82817
1997	Ave	234609.1887	499162.9245	299150.6981	495663.0943	15358.43396	13165.22642	4198.301887	2262.792453	28917.75472
	Median	39289	109355	66054	108769	4474	3278	331	295	1322
	SD	485939.2908	957831.7015	642304.797	962759.7769	31216.02368	29698.56423	7924.959902	5633.9017	76396.35402
1998	Ave	242864.434	501246.5283	302897.1698	471044.4151	7340.90566	−4898.622642	3615	2317.943396	28491.09434
	Median	37478	107548	64596	108957	1818	802	315	286	1286
	SD	501398.6516	970576.9338	661654.345	916002.9423	21798.55022	46116.43985	6633.661528	6188.367569	73521.16291
1999	Ave	253708.6038	500071.0755	297557.6981	478606.8868	11263.45283	−2968.773585	3307.433962	2334.90566	27949.13208
	Median	38634	117790	63915	108452	2021	1224	241	297	1544
	SD	532272.7043	956723.5321	637621.7562	934934.6817	24761.623	60552.80674	6340.14208	6669.549291	71081.82451
2000	Ave	270776.2642	519355.8302	306683.0377	517663.6981	20391.32075	11510.11321	3664.716981	2381.584906	29157.32075
	Median	44351	129211	64007	127667	4097	2885	282	300	1413
	SD	559453.7683	986848.7968	645509.2131	1009863.711	42148.3266	25701.59334	7124.501965	6884.842547	73313.20506
2001	Ave	278386.3962	489795.8868	300765.0377	457176.8302	−2766.830189	−32806.81132	3385.226415	2674.132075	28983.13208
	Median	45971	118154	58719	108448	534	−2900	266	302	1604
	SD	580794.6824	931146.3152	643933.4889	884361.0228	43066.93334	110005.9124	6428.645661	7385.297218	70434.27932
2002	Ave	268505.6792	465892.6604	280413.4717	442737.6415	7938.45283	3336.09434	3130.09434	2720.264151	25850.92453
	Median	43227	117849	55623	104985	1766	769	218	276	1623
	SD	563034.6301	867324.9839	580069.6311	827780.5671	39702.99599	50217.06648	5961.735893	7798.843852	60620.65399
2003	Ave	270790.434	474280.6038	272325.7358	437401.5094	10879.54717	12532.77358	3282.886792	2898.320755	23158.50943
	Median	43476	118086	61593	95591	2312	2184	234	328	1566
	SD	562797.3062	868595.6665	543878.2783	811703.946	50314.40857	57389.46604	6806.400225	8029.342338	55566.13241
2004	Ave	268272.8302	476009.3585	262899.5849	438819.1698	14971.37736	19053.28302	3160.09434	2647.150943	22937.88679
	Median	42393	124733	62248	97154	2970	2673	256	285	1527
	SD	544522.6924	870654.461	517961.1266	821414.4194	56178.48879	57378.12466	7503.065354	7529.217416	56172.10042
2005	Ave	268281.4528	476048.4717	262917.5849	438908.283	14985.20755	19074.28302	3160.056604	2647.433962	22942.58491
	Median	42393	124733	62248	97154	2970	2673	256	285	1527
	SD	544518.533	870633.8978	517952.4042	821368.8932	56175.11792	57371.623	7503.081373	7529.11739	56170.19174

Result of the Analysis 1

$$(RD/S)_{i,t} = \alpha_0 + \alpha_1 (TA/S)_{i,t-1} + \sum_k \alpha_{2,k} (OI/S)_{i,t-k} + \alpha_3 (AD/S)_{i,t-1}$$

2005		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.013058	Coefficien	0.01264	0.015903	0.01816	0.019411	0.019656	0.018895	0.017128	0.014355	0.010576	5.79E-03
ad r^2	0.217012	Error	0.015195	9.36E-03	5.20E-03	4.01E-03	5.36E-03	6.78E-03	7.42E-03	7.10E-03	5.78E-03	3.41E-03
aic	-321.689	t-statistic	0.831853	1.69827	3.49389	4.84514	3.66512	2.78875	2.30885	2.02045	1.83065	1.697
		P-value	[.407]	[.093]	[.001]	[.000]	[.000]	[.006]	[.023]	[.046]	[.070]	[.093]

2004		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.017333	Coefficien	0.029688	0.02804	0.026098	0.023863	0.021334	0.018512	0.015397	0.011988	8.29E-03	4.29E-03
ad r^2	0.295219	Error	0.016237	0.010257	6.08E-03	4.82E-03	5.97E-03	7.28E-03	7.87E-03	7.49E-03	6.07E-03	3.58E-03
aic	-306.677	t-statistic	1.82842	2.73375	4.2899	4.94716	3.57643	2.54337	1.95743	1.6007	1.36477	1.19832
		P-value	[.070]	[.007]	[.000]	[.000]	[.001]	[.012]	[.053]	[.113]	[.175]	[.234]

2003		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.021615	Coefficien	0.047616	0.038546	0.030434	0.023279	0.017082	0.011841	7.56E-03	4.23E-03	1.86E-03	4.54E-04
ad r^2	0.272294	Error	0.018665	0.011864	7.00E-03	5.27E-03	6.41E-03	7.89E-03	8.59E-03	8.22E-03	6.69E-03	3.95E-03
aic	-294.977	t-statistic	2.55103	3.24896	4.34811	4.41608	2.66335	1.50023	0.879579	0.514783	0.278785	0.114752
		P-value	[.012]	[.002]	[.000]	[.000]	[.009]	[.137]	[.381]	[.608]	[.781]	[.909]

2002		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.024805	Coefficien	0.059118	0.045675	0.033906	0.02381	0.015388	8.64E-03	3.56E-03	1.63E-04	-1.57E-03	-1.62E-03
ad r^2	0.269315	Error	0.021622	0.013721	7.90E-03	5.55E-03	6.80E-03	8.57E-03	9.46E-03	9.13E-03	7.46E-03	4.43E-03
aic	-287.68	t-statistic	2.73416	3.32892	4.29186	4.29188	2.26419	1.00772	0.376574	0.01782	-0.209736	-0.365904
		P-value	[.007]	[.001]	[.000]	[.000]	[.026]	[.316]	[.707]	[.986]	[.834]	[.715]

2001		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.028896	Coefficien	0.061497	0.049435	0.038686	0.029252	0.021131	0.014324	8.83E-03	4.65E-03	1.79E-03	2.37E-04
ad r^2	0.298357	Error	0.025849	0.016294	9.07E-03	5.87E-03	7.42E-03	9.71E-03	0.010897	0.0106	8.71E-03	5.18E-03
aic	-279.59	t-statistic	2.37906	3.03393	4.26678	4.98643	2.84618	1.47528	0.810429	0.438939	0.205306	0.045727
		P-value	[.019]	[.003]	[.000]	[.000]	[.005]	[.143]	[.420]	[.662]	[.838]	[.964]

2000		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.033202	Coefficien	0.078056	0.062781	0.049165	0.03721	0.026914	0.018279	0.011303	5.99E-03	2.33E-03	3.36E-04
ad r^2	0.335568	Error	0.031529	0.019761	0.010586	5.99E-03	7.96E-03	0.011001	0.012631	0.012424	0.010272	6.14E-03
aic	-272.227	t-statistic	2.47571	3.17703	4.64427	6.21643	3.38003	1.6615	0.894891	0.481929	0.226994	0.05474
		P-value	[.015]	[.002]	[.000]	[.000]	[.001]	[.100]	[.373]	[.631]	[.821]	[.956]

1999		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.033732	Coefficien	0.089215	0.07321	0.058779	0.045922	0.034639	0.024931	0.016796	0.010236	5.25E-03	1.84E-03
ad r^2	0.402652	Error	0.034915	0.021882	0.011551	5.90E-03	8.02E-03	0.011529	0.013445	0.013326	0.011066	6.63E-03
aic	-271.388	t-statistic	2.55522	3.34563	5.08877	7.7865	4.31868	2.16253	1.24928	0.768132	0.474396	0.277212
		P-value	[.012]	[.001]	[.000]	[.000]	[.000]	[.033]	[.214]	[.444]	[.636]	[.782]

1998		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.033162	Coefficien	0.091394	0.075873	0.06177	0.049085	0.037818	0.02797	0.019539	0.012527	6.93E-03	2.76E-03
ad r^2	0.441129	Error	0.033872	0.021407	0.011478	5.76E-03	7.37E-03	0.010678	0.01254	0.012482	0.010394	6.24E-03
aic	-272.291	t-statistic	2.69822	3.54428	5.38155	8.52869	5.12939	2.61946	1.55821	1.00362	0.667009	0.441962
		P-value	[.008]	[.001]	[.000]	[.000]	[.000]	[.010]	[.122]	[.318]	[.506]	[.659]

1997		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.034514	Coefficien	0.105932	0.084866	0.066127	0.049715	0.035631	0.023874	0.014445	7.34E-03	2.57E-03	1.20E-04
ad r^2	0.431212	Error	0.03443	0.021909	0.01191	5.96E-03	7.23E-03	0.010489	0.012372	0.012352	0.010306	6.19E-03
aic	-270.174	t-statistic	3.07672	3.87358	5.55232	8.33791	4.92537	2.27612	1.16752	0.594448	0.249127	0.01939
		P-value	[.003]	[.000]	[.000]	[.000]	[.000]	[.025]	[.246]	[.554]	[.804]	[.985]

1996		Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
ssr	0.026142	Coefficien	0.142006	0.113813	0.08873	0.066756	0.047891	0.032136	0.01949	9.95E-03	3.53E-03	2.08E-04
ad r^2	0.568321	Error	0.036658	0.023415	0.012835	6.47E-03	7.62E-03	0.011003	0.012992	0.012984	0.010843	6.52E-03
aic	-252.793	t-statistic	3.87374	4.86071	6.91294	10.3132	6.2879	2.92061	1.5001	0.766565	0.325218	0.031962
		P-value	[.000]	[.000]	[.000]	[.000]	[.000]	[.004]	[.137]	[.445]	[.746]	[.975]

1995			Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
	ssr	0.040034	Coefficien	0.100631	0.08062	0.06282	0.047231	0.033852	0.022683	0.013725	6.98E-03	2.44E-03	1.15E-04
	ad r^2	0.394007	Error	0.041701	0.026116	0.013583	6.17E-03	8.70E-03	0.013099	0.01552	0.015495	0.01292	7.76E-03
	aic	-262.31	t-statistic	2.41313	3.08701	4.62496	7.65299	3.88955	1.73172	0.884377	0.450348	0.188969	0.014879
			P-value	[.018]	[.003]	[.000]	[.000]	[.000]	[.086]	[.379]	[.653]	[.850]	[.988]

1994			Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
	ssr	0.044809	Coefficien	0.097568	0.078382	0.061291	0.046295	0.033395	0.02259	0.013881	7.27E-03	2.75E-03	3.27E-04
	ad r^2	0.364159	Error	0.045116	0.02802	0.014282	6.41E-03	9.76E-03	0.01467	0.01731	0.017235	0.014344	8.60E-03
	aic	-256.338	t-statistic	2.16259	2.79734	4.29144	7.22547	3.42241	1.53992	0.801912	0.421693	0.191698	0.038018
			P-value	[.033]	[.006]	[.000]	[.000]	[.001]	[.127]	[.424]	[.674]	[.848]	[.970]

1993			Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
	ssr	0.046998	Coefficien	0.099196	0.079417	0.06183	0.046433	0.033227	0.022212	0.013388	6.75E-03	2.31E-03	6.07E-05
	ad r^2	0.378901	Error	0.042426	0.02632	0.013384	6.02E-03	9.25E-03	0.013877	0.016359	0.016278	0.013543	8.12E-03
	aic	-253.81	t-statistic	2.33811	3.01742	4.61971	7.71314	3.59399	1.60063	0.818395	0.41495	0.170732	7.47E-03
			P-value	[.021]	[.003]	[.000]	[.000]	[.001]	[.113]	[.415]	[.679]	[.865]	[.994]

1992			Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
	ssr	0.046626	Coefficien	0.096783	0.078042	0.061314	0.046601	0.033901	0.023216	0.014545	7.89E-03	3.24E-03	6.15E-04
	ad r^2	0.399835	Error	0.036596	0.022736	0.011697	5.69E-03	8.38E-03	0.012257	0.01433	0.014207	0.011796	7.06E-03
	aic	-254.231	t-statistic	2.64468	3.43259	5.24178	8.18598	4.04412	1.89403	1.01496	0.555168	0.275021	0.087054
			P-value	[.009]	[.001]	[.000]	[.000]	[.000]	[.061]	[.313]	[.580]	[.784]	[.931]

1991			Variable	OPIS2A	OPIS2A(-1)	OPIS2A(-2)	OPIS2A(-3)	OPIS2A(-4)	OPIS2A(-5)	OPIS2A(-6)	OPIS2A(-7)	OPIS2A(-8)	OPIS2A(-9)
	ssr	0.043005	Coefficien	0.100554	0.080342	0.062388	0.04669	0.03325	0.022066	0.013139	6.47E-03	2.06E-03	-1.01E-04
	ad r^2	0.417192	Error	0.031841	0.019952	0.01059	5.65E-03	7.61E-03	0.01076	0.012466	0.012317	0.01021	6.11E-03
	aic	-258.516	t-statistic	3.15801	4.02671	5.89137	8.26841	4.36692	2.05075	1.05397	0.525214	0.20135	-0.016463
			P-value	[.002]	[.000]	[.000]	[.000]	[.000]	[.043]	[.294]	[.601]	[.841]	[.987]

Result of the Analysis 2

$$(OI/S)_{i,t} = \alpha_0 + \alpha_1 (TA/S)_{i,t-1} + \sum_k \alpha_{2,k} (RD/S)_{i,t-k} + \alpha_3 (AD/S)_{i,t-1}$$

2005		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.137698	Coefficient	0.643684	0.446057	0.278043	0.139642	0.030854	-0.048321	-0.097883	-0.117832	-0.108168	-0.06889
ad r^2	0.380582	Error	0.17294	0.112231	0.062866	0.029554	0.029226	0.044569	0.054407	0.055349	0.046716	0.028295
aic	-196.838	t-statistic	3.72201	3.97445	4.42281	4.72492	1.0557	-1.0842	-1.79908	-2.12889	-2.31543	-2.43468
		P-value	[.000]	[.000]	[.000]	[.000]	[.294]	[.281]	[.075]	[.036]	[.023]	[.017]

2004		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.158205	Coefficient	0.670821	0.467129	0.293794	0.150818	0.038199	-0.044062	-0.095965	-0.11751	-0.108698	-0.069528
ad r^2	0.430665	Error	0.172225	0.111571	0.062382	0.029692	0.030145	0.04543	0.055126	0.055913	0.047111	0.028503
aic	-189.48	t-statistic	3.89502	4.18684	4.70961	5.07939	1.26718	-0.969889	-1.74083	-2.10166	-2.30727	-2.43931
		P-value	[.000]	[.000]	[.000]	[.000]	[.208]	[.334]	[.085]	[.038]	[.023]	[.016]

2003		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.170282	Coefficient	0.774964	0.532291	0.326324	0.157063	0.024507	-0.071342	-0.130485	-0.152923	-0.138654	-0.08768
ad r^2	0.412686	Error	0.18117	0.116457	0.063797	0.02861	0.031041	0.048419	0.059024	0.059899	0.050458	0.030518
aic	-185.581	t-statistic	4.27756	4.57072	5.11507	5.48986	0.789513	-1.47342	-2.21072	-2.55302	-2.74789	-2.8731
		P-value	[.000]	[.000]	[.000]	[.000]	[.432]	[.144]	[.029]	[.012]	[.007]	[.005]

2002		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.164582	Coefficient	0.775525	0.523837	0.310846	0.136551	9.54E-04	-0.095947	-0.154151	-0.173659	-0.154469	-0.096583
ad r^2	0.351217	Error	0.192677	0.121913	0.064078	0.025465	0.03326	0.054	0.065844	0.066658	0.056031	0.033829
aic	-187.385	t-statistic	4.025	4.2968	4.85108	5.36228	0.028677	-1.77681	-2.34116	-2.6052	-2.75686	-2.85499
		P-value	[.000]	[.000]	[.000]	[.000]	[.977]	[.079]	[.021]	[.011]	[.007]	[.005]

2001		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.16952	Coefficient	0.782264	0.52283	0.303665	0.124768	-0.013861	-0.112222	-0.170314	-0.188138	-0.165694	-0.102981
ad r^2	0.316384	Error	0.216491	0.135144	0.06842	0.023924	0.03846	0.063515	0.077203	0.077916	0.065343	0.039385
aic	-185.818	t-statistic	3.61337	3.8687	4.43826	5.21508	-0.360405	-1.76685	-2.20606	-2.41464	-2.53575	-2.61471
		P-value	[.000]	[.000]	[.000]	[.000]	[.719]	[.080]	[.030]	[.018]	[.013]	[.010]

2000		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.165476	Coefficient	0.647473	0.437419	0.259654	0.114181	9.98E-04	-0.079895	-0.128497	-0.144808	-0.128829	-0.08056
ad r^2	0.273068	Error	0.244513	0.151146	0.074256	0.022376	0.044184	0.073855	0.089629	0.090296	0.075624	0.045535
aic	-187.098	t-statistic	2.64801	2.89402	3.49676	5.10278	0.022586	-1.08177	-1.43365	-1.6037	-1.70356	-1.76917
		P-value	[.009]	[.005]	[.001]	[.000]	[.982]	[.282]	[.155]	[.112]	[.092]	[.080]

1999		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.138516	Coefficient	0.084401	0.09684	0.104639	0.107798	0.106317	0.100197	0.089437	0.074037	0.053998	0.029319
ad r^2	0.292461	Error	0.246698	0.151405	0.072765	0.019519	0.045748	0.076455	0.092504	0.093006	0.077788	0.046794
aic	-196.524	t-statistic	0.342124	0.639608	1.43803	5.52282	2.32395	1.31053	0.966841	0.796045	0.694162	0.626544
		P-value	[.733]	[.524]	[.154]	[.000]	[.022]	[.193]	[.336]	[.428]	[.489]	[.532]

1998		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.118046	Coefficient	-0.02071	0.040258	0.088136	0.122926	0.144629	0.153244	0.148771	0.13121	0.100561	0.056824
ad r^2	0.396221	Error	0.230858	0.141025	0.066915	0.017494	0.044247	0.073207	0.088201	0.088483	0.073904	0.044417
aic	-204.999	t-statistic	-0.0897	0.285466	1.31714	7.0268	3.2687	2.09328	1.68672	1.48288	1.36069	1.27934
		P-value	[.929]	[.776]	[.191]	[.000]	[.001]	[.039]	[.095]	[.141]	[.177]	[.204]

1997		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.102847	Coefficient	-0.04062	0.033219	0.091552	0.134379	0.1617	0.173515	0.169824	0.150627	0.115924	0.065715
ad r^2	0.487911	Error	0.218632	0.132996	0.06237	0.016019	0.043157	0.07076	0.084935	0.085038	0.070942	0.042602
aic	-212.304	t-statistic	-0.18579	0.249772	1.46789	8.38882	3.74678	2.45215	1.99947	1.77129	1.63408	1.54255
		P-value	[.853]	[.803]	[.145]	[.000]	[.000]	[.016]	[.048]	[.080]	[.105]	[.126]

1996		Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
ssr	0.034318	Coefficient	0.144408	0.147161	0.146093	0.141204	0.132495	0.119964	0.103613	0.083441	0.059448	0.031634
ad r^2	0.767395	Error	0.132956	0.08054	0.037365	9.83E-03	0.027203	0.044035	0.052611	0.052552	0.043778	0.026265
aic	-239.731	t-statistic	1.08613	1.82719	3.90986	14.3607	4.87053	2.72428	1.9694	1.58778	1.35793	1.20444
		P-value	[.280]	[.071]	[.000]	[.000]	[.000]	[.008]	[.052]	[.116]	[.178]	[.232]

1995			Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
	ssr	0.081447	Coefficient	-0.03427	0.037862	0.094724	0.13632	0.162647	0.173708	0.169501	0.150027	0.115285	0.065276
	ad r^2	0.556564	Error	0.174032	0.1051	0.048472	0.013817	0.036949	0.058905	0.070029	0.069782	0.05805	0.034795
	aic	-224.669	t-statistic	-0.19691	0.360246	1.9542	9.86622	4.40198	2.94896	2.42045	2.14994	1.98596	1.87603
			P-value	[.844]	[.719]	[.053]	[.000]	[.000]	[.004]	[.017]	[.034]	[.050]	[.064]
1994			Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
	ssr	0.109261	Coefficient	3.48E-03	0.059429	0.102868	0.133795	0.152213	0.15812	0.151516	0.132403	0.100779	0.056645
	ad r^2	0.458176	Error	0.174479	0.105402	0.048918	0.01586	0.03813	0.059822	0.070814	0.070433	0.058531	0.035061
	aic	-209.098	t-statistic	0.019951	0.563835	2.10285	8.43583	3.99196	2.64317	2.13963	1.87985	1.72179	1.6156
			P-value	[.984]	[.574]	[.038]	[.000]	[.000]	[.010]	[.035]	[.063]	[.088]	[.109]
1993			Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
	ssr	0.130886	Coefficient	0.093117	0.113241	0.126824	0.133866	0.134366	0.128325	0.115743	0.096619	0.070954	0.038748
	ad r^2	0.405186	Error	0.153723	0.093589	0.044799	0.017119	0.033941	0.052302	0.061739	0.061368	0.050992	0.030546
	aic	-199.526	t-statistic	0.605741	1.20998	2.83093	7.81962	3.95876	2.45356	1.8747	1.57442	1.39146	1.2685
			P-value	[.546]	[.229]	[.006]	[.000]	[.000]	[.016]	[.064]	[.119]	[.167]	[.208]
1992			Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
	ssr	0.142381	Coefficient	0.17473	0.165285	0.154056	0.141044	0.126247	0.109666	0.091301	0.071152	0.049219	0.025501
	ad r^2	0.416236	Error	0.132239	0.081765	0.041117	0.017856	0.028656	0.043396	0.051234	0.051	0.042433	0.025446
	aic	-195.065	t-statistic	1.32132	2.02147	3.74678	7.89884	4.40554	2.52712	1.78205	1.39514	1.1599	1.00216
			P-value	[.189]	[.046]	[.000]	[.000]	[.000]	[.013]	[.078]	[.166]	[.249]	[.319]
1991			Variable	RDS2	RDS2(-1)	RDS2(-2)	RDS2(-3)	RDS2(-4)	RDS2(-5)	RDS2(-6)	RDS2(-7)	RDS2(-8)	RDS2(-9)
	ssr	0.144673	Coefficient	0.238613	0.210092	0.182606	0.156156	0.130742	0.106363	0.083019	0.060711	0.039439	0.019202
	ad r^2	0.495159	Error	0.116106	0.072736	0.038039	0.018103	0.025138	0.037149	0.043752	0.043563	0.036269	0.021764
	aic	-194.218	t-statistic	2.05514	2.88844	4.80052	8.62593	5.20103	2.86312	1.89751	1.39365	1.08739	0.88228
			P-value	[.042]	[.005]	[.000]	[.000]	[.000]	[.005]	[.061]	[.166]	[.279]	[.380]

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