Internal Capital Markets of the Japanese Firms

Tokuo Iwaisako* and Gaku Kobayashi♣

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Correspondence: To Iwaisako at Institute of Economic Research, Hitotsubashi University, Naka, Kunitachi-city, Tokyo 186-8603, JAPAN.
E-mail: iwaisako@ier.hit-u.ac.jp

∗ Institute of Economic Research, Hitotsubashi University; and Institute of Policy and Planning Sciences, University of Tsukuba.

♣ Sumitomo-Mitsui Banking Corporation

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1 Introduction

Facing rapid business globalization, Japanese corporations today are trying to adjust their business standards to the international environment. On the financial side of management, globalization puts pressure on Japanese firms to disclose detailed business information in a more accessible and transparent way, to attract investors and business partners around the world. Internationalization of the Japanese accounting standard described is the part of this story. In this study, we exploit new data set recently became available because of internationalization of the Japanese accounting standard, to investigate the aspects of financial management of Japanese firms that we could not know before. More precisely, we use new segment-level accounting data to investigate the efficiency of internal capital markets of the Japanese firms. There exist many empirical studies on this subject using U.S. data, including Lamont (1997), Shin and Stultz (1998), Scharfstein (1997), and Rajan, Servaes, and Zingales (2000). But, our study is very first one with the Japanese data to our knowledge. We find the internal capital markets of the Japanese firms are not working perfectly and investments of segments tend to rely on segment-level own liquidity rather than the firms' total liquidity. We also find that the dependence to the segment level cash-flow is more pronounced when the agency problem between the management and shareholders are severe. Both findings match with what previous studies found for U.S. data. Finally, we examined if the segments of diversified firms are more in/efficient in making investment decisions than comparable stand-alone firms. Unlike U.S. result by Scharfstein (1997) who had found the segments of conglomerates are making inefficient investment decisions, we found weak evidence that the segments of Japanese firms are making more efficient decisions.

The remaining of the paper is organized as follows. In section 2, recent theoretical discussions about the efficiency of internal capital markets are briefly summarized. Section 3 discusses about the data and presents our main empirical results. Section 4 concludes the paper.

2 Theory

Today, understanding the work of internal capital markets of the Japanese firms is really gaining its importance. Because of the prolonged recession and the pressure of global competition, a number of mega-mergers involving major Japanese firms have been witnessed in recent years. This is exemplified by the fact that Japanese financial institutions rushed to form financial groups in last several years to survive stiff international competition. Also many Japanese companies have moved their important production basis to abroad in pursuing low manufacturing cost and new business chances. Some of the most well-known Japanese corporations like Honda and Sony are raising more than half of their profits abroad these days. After all, Japanese businesses today are well-diversified compared with ten or twenty years ago. It is a natural consequence of this increasing diversity their businesses that the Japanese accounting standard has been reformed and moved to consolidated basis, which is a better way to grasp big pictures of broadly diversified corporations and corporate groups.

In an ideal circumstance, the internal capital market of a diversified firm allow it to fund profitable projects that, because of information asymmetry and agency costs, the external capital market would not be able to finance. So the segments of diversified firms are supposed to be more efficient in their financial decisions compared with the equivalent stand-alone firms. However, such a naive view about the internal capital market has been questioned in recent empirical studies such as Lamont (1997), Shin and Stultz (1998), Scharfstein (1997), and Rajan, Servaes, and Zingales (2000). Our study follows these contributions, in particular Shin and Stultz (1998) and Scharfstein (1997), and asks following questions:

(1) *Are the internal capital markets of well-devitrified firms work as they are supposed to?*

(2) *If no, why? In particular, can agency problem be an important interpretation of such inefficiency?*

(3) *Are the segments of diversified firms making their investments more*

efficiently than the stand-alone firms in the same industries?

The first question can be answered by examining the effects of the segment's liquidity and the firm's total liquidity on segment-level investments. With the efficient internal capital market, internal funds will be collected and redistributed according to true profitability of segments. So what matters for segment investment should be total liquidity of the firm and not segment's own liquidity.

About the second question, according to Scharfstein and Stein (1996), there are two major sources of internal capital market inefficiency. One is discretionary and myopic rent-seeking behavior of the division-manager. The other source is the agency problem between management and shareholders. In this paper, we test the existence of the second source by looking at the effect of management' share holding on internal capital market in/efficiency.

Finally, the diversified firms might actually do worse in making their financial decisions. For example, even if the segment's new investment project is likely to result in negative profits, the headquarter might decide to fund it for some reason. For example, some Japanese banks and department stores had opened foreign branches during the bubble years, only to shut it down after the burst of bubble. Such business decisions involved, at least some, empire-building motivation of management. This is a variation of the "free-cash-flow" hypothesis of Jensen (1986). Here, following Scharfstein (1997), we examine the hypothesis that large diversified firms will practice a kind of "socialism" in capital budgeting — underinvesting in divisions with relatively good investment opportunities and overinvesting in divisions with relatively poor investment opportunities. This third question will be investigated by looking at the difference in investment sensitivities to the potential profitability of investment (measured by Tobin's q) between the segments of diversified firms and corresponding stand-alone firms.

3 Empirical Results

3.1 Data

In June 1997, the Corporate Accounting Council[1] suggested that Japanese corporations should adopt to consolidated basis settlements of account (Renketsu Kessan) and disclose more precise segment-level accounting information. The first financial statement under new accounting standard was published as of March 2000[2]. This means that for fiscal years ending after March 1999, all Japanese firms have to disclose the segment-level accounting information. This is the part of ongoing reforms with the Japanese accounting system toward its globalization described in Table 1. However, the consolidated statement has an "aggregation" problem: while it is an easier way to grasp complicated businesses as a whole, the detailed segment information that are useful for investors will be harder to obtain. For this reason, the disclosure of segment-level information were also mandated at the same time (see, Ito 2000). The disclosed segment-level data includes, *sales*, *costs*, *profits*, *assets*, *depreciations*, and *capital expenditures (= investments)*. In our empirical analysis, we defined a "segment" of the diversified firm as a sector either one of whose *sales*, *profits*, or *assets* exceeds 10% of firm's total.

Preparing for the start of official requirement in 1999, most of Japanese corporations had begun to release the segment level data prior to 1999. In fact we can construct the two-year data using 1998 and 1999 observations. However, to calculate sales growth from the previous year as the variable controls for investment opportunities, we decided to drop the 1998 data. As a result, the data we used here is the cross-section of firms in 1999[3]. All the segment data were collected manually at the Tokyo Stock Exchange and at Innovation Center of Hitotsubashi University. We constructed approximating Tobin's q for each segment by taking medians of comparable stand-alone firms' q that belong to the same industries. Data of stand-alone firms were

[1] "Kigyou-kaikei Shingi-kai." Official releases of the Council are available from the following web site (but, only in Japanese): http://www.mof.go.jp/singikai/kaikei/top.htm.

[2] Of course, there are firms that report financial statements on fiscal year basis, hence in September. Our sample excludes these firms. But, the majority reports financial statement in March.

[3] As it was suggested by Prof.Monden to us, perhaps we will be able to trace back our data several years earlier. The extention of our data set is an important subject of future research.

taken from Nikkei NEEDS files.

To examine the effect of business concentration/diversification on investment efficiency, we group the observations by the number of segments in the same firms, two versus more. Then we picked the smallest and largest segments in the firms to investigate the relative size of segments on investment efficiency. Such grouping gives us four categories of firms: small-concentrated, large-concentrated, small-diversified, and large-diversified. The basic statistics of each firm groups are presented in Table 2.

3.2 Estimated models and Interpretations (1)

First, we examine question (1) — in/efficiency of internal capital markets — following the empirical strategy of Shin and Stultz (1998). First, we estimated the following investment equation for the i th segment of firm j.

$$I_{i,j} = \alpha + X_{i,j}\beta + \gamma_1 \cdot cash_{i,j} + \varepsilon_{i,j} \qquad (1)$$

where

$I_{i,j}$ = the gross investment of i th segment of firm j during year 1999.

$X_{i,j}$ = the vector of variables control for investment opportunities of i th segment of firm j during year 1999.

$cash_{i,j}$ = the cash flow of i th segment of firm j during year 1999.

Equation (1) is a conventional investment equation following the line of previous researches such as Fazzari, Hubbard and Petersen (1988) and Hoshi, Kashyap and Scharfstein (1991)[4]. As usual, investment ($I_{i,j}$) and cash flows ($cash_{i,j}$) were normalized for the scale of the firms by dividing them with the amount of firms' total assets. For the variables that control for firms' investment opportunities, we included both Tobin's q and the growth rate of sales.

[4]Recently, the use of cash flow as the proxy for luquidity is critisized by Kaplan and Zingales (1999). If the results here is valunerble to their criticism should be examined in future version of the paper.

Shin and Stultz (1998) suggested that if there exists internal cpaital markets, the smaller segments of well-diversified firms will be most benefited so that their investment will not. Following them, we sorted the data in two different ways and grouped segments into four categories. First, we sorted them by the relative size of segments. We picked only smalles and largest segments in their own firms. Then we grouped them by the number of segments, two vs more. So we have four groups — small segments in concentrated firms (Group1), small segments in diversified firms (Group2), large segments in concentrated firms (Group3), and large segments in diversified firms (Group4). The existence of internal capital markets implies γ_1 is larger for larger segments, Group3 > Group1 and Group4 > Group2. It also implies γ_1 is smaller for segments in more diversified firms: Group1 > Group2 and Group3 > Group4. Shin and Stultz (1998) reported no significant difference of coefficient estimates among different groups so that theoretical implications regarding the segment size and the degree of diversification do not hold in practice according to U.S. data.

Table 3 reports our first primary result. To disappointment, neither Tobin's q nor sales growth are successful in explaining firms' investments. Perhaps this is not very surprising since our data is the cross-section and does not include time variation of variables. It should be also noted that 1999 is not an ordinary year for the Japanese economy: the Japanese economy was still in the prolonged recession and the light of recovery seemed very far. In particular, Japan experienced the failures of several large financial institutions and sharp contraction of credit in late 1997. Our sample year is not right after these financial troubles, but it is very likely that financial environments surrounding Japanese business was rather unusual in 1999.

The point estimations of γ_1 show rather mixed results. In the order from largets to smallest, they are Group3 > Group2 >> Group1 > Group4, while theory suggests the order of Group3 > Group1 = Group4 >Group 2. In Panel B of Table 3, we are testing if the estimated γ_1s are really different from one group to another. Out of four cases, two give expected results that are statistically significant. Other two have wrong ordering and one of them is statistically significant.

Next we include the total cash flows of other segments in the same firms, $CASH_{-i,j}$, into the investment equation:

$$I_{i,j} = \alpha + X_{i,j}\beta + \gamma_1 \cdot cash_{i,j} + \gamma_2 \cdot CASH_{-i,j} + \varepsilon_{i,j} \qquad (2)$$

If the internal capital markets working perfectly, the investments of segments should depend on the firm's total liquidity, but not on segments' liquidity alone. So the coefficient of the segment cash flow γ_1 and the total of other segments cash flows γ_2 can be either significant or insignificant, but if they are in fact significant, γ_1 should be larger than γ_2 and more significant with larger segments in less diversified firms. On the other hand, γ_2 should be more significant and take larger values with smaller segments in well-diversified firms.

The results are reported in Table 4. Cash flows of segments themselves ($cash_{i,j}$) are strongly significant in all estimated equations. Total cash flows of other segments in the firms ($CASH_{-i,j}$), on the other hand, are not very significant. If the internal capital market works perfectly, only the cash flow of the firm as whole matters and segment's cash flow should not matter. So the result suggests internal capital markets of the Japanese firms are working only imperfectly. This result is consistent with the previous studies found about U.S. firms internal capital markets. In addition, the ordering of γ_1 does not change from Table 3 to Table 4 responding to the inclusion of $CASH_{-i,j}$. Also, in Table 4, the estimates of γ_2 are negative and insignificant for Group 2 and Group 4, while they are positively significant for Group 1 and Group 3. Theory implies that total cash flow will matter in smaller and more diversified firms. So that the coefficient of $CASH_{-i,j}$ should be positive and bigger for Group 2 than Group 1, and Group 4 than Group 3. If we take the estimated coefficients of $CASH_{-i,j}$ by different firm groups seriously, our empirical results are suggesting that internal capital markets work more efficiently with the segments in less diversified firms. So the part of our evidence apparently goes against what theory suggests.

Next we turn our attention to question (2) — the cause of the imperfection of internal capital markets of the Japanese firms. Here, we ask the question that if agency problem between the manager and stakeholders can

be an explanation for the inefficiency of the internal capital markets[5]. We estimated the following regression including the cross term between the segment's cash flow and equity holding by management:

$$I_{i,j} = \alpha + X_{i,j}\beta + \gamma_1 \cdot cash_{i,j} + \gamma_3 \cdot (cash_{i,j} \times equity_j) + \varepsilon_{i,j} \quad (3)$$

where

$equity_j$ = the ratio of equity holding by management to total equity outstanding of firm j

If management is a large shareholder, hence $equity_j$ is larger, there will be less conflict of interests between management and shareholders. So we expect the coefficient of the cross term γ_3 has the negative sign if the agency problem explains the part of internal capital market inefficiency.

Table 5 reports the estimation of equation (3). As we conjectured, the estimated coefficients of the cross-term have negative signs for all groups and statistically significant for Group 3. Overall, the values of γ_3 are more significant and lager in absolute value for larger segments, Group 3 than Group 1, and Group 4 than Group 2. So the agency problem is more likely to matter with larger segments regardless the degree of diversification.

3.3 Estimated models and Interpretations (2)

Finally, we examine question (3) — if the investment decision by the segment of a diversified-firm is more/less efficient than stand-alone firms in the same industry. This question is answered by examining the sensitivity of the segment's investment to Tobin's q relative to the average of stand-alone firms' sensitivity after controlled for the difference in financial constraints. In particular, following Scharfstein (1998), we estimated the following regression:

$$I_{i,j} - \bar{I}_i = \alpha + \delta_1 \cdot (q_{i,j} - \bar{q}_i) + \delta_2 \cdot (cash_{i,j} - \bar{CASH}_i) + \varepsilon_{i,j} \quad (4)$$

where $\bar{x}_i$ denotes the median of the variable x in the industry to which the segment i belongs. Hence we are regressing the excess investment of the

[5]So it does not exlude the possibility that some other fator(s) also contribute to generating inefficiency.

segment over the industry median on Tobin's q and the excess cash from over the median cash flow of the industry. Equation (4) implies that if δ_1 is positive and significant, investment decisions by segments are more sensitive to Tobin's q, the measure of investment opportunities. It means their investments are more efficient than that of the stand-alone firms. If δ_1 is negative and significant, the segments' investments are less efficient than stand-alone firms. Table 8 reports the estimation of equation (4). Results in Table 6 indicate that there is no conclusive evidence. Estimated δ_1s are consistently positive, although they are not statistically significant. So there is a weak evidence that the segments of diversified-firms are more efficient in making investment than stand-alone firms. Scharfstein (1997) is reporting negative and statistically significant parameter estimates about δ_1. It means the investments of the diversified U.S. firms' segments are less efficient than stand-alone U.S. firms in the same industry.

There can be some alternative explanations why our result shows quite opposite result to Scharfstein's. First, Scharfstein's data is of manufacturing conglomerates in 1979. Our data is cross-section of all manufacturing firms in 1999. Perhaps we should concentrate to larger firms or the firms belong to six major corporate groups (Keiretsu). Also, as we noted in the previous subsection, Japan in 1999 is quite a special sample. By increasing our sample period, we might get to some different conclusion. Finally, indeed, the segments of Japanese firms could be more efficient in making investments than stand-alone firms. However, if so, it requires the explanation why the segments are making more efficient financial decisions in Japan and not in the U.S.

4 Conclusion

In this paper, we examined the efficiency of internal capital markets of the Japanese firms using new accounting data reporting precise segment information. We find the internal capital markets of Japanese firms are not fully efficient in the sense that segment investment is constrained by segment liquidity. We also find that part of this inefficiency will be explained by

the agency problem between managers and stakeholders. Finally, we examined if the segments of diversified firms are more in/efficient in making investment decisions than comparable stand-alone firms. Unlike U.S. result by Scharfstein (1997) who had found the segments of conglomerates are making inefficient investment decisions, we found weak evidence that the segments of Japanese firms are making more efficient decisions.

In past, empirical analysis of Japanese firms' financial management of were so hard because of limited information disclosure. Thanks to recent reforms of accounting standard and to pressure of business globalization, more precise micro-level data about Japanese firms has become available. This study would be one of the very first attempts, but economists should explore further details of financial management of Japanese firms.

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Table 1
History of Accounting and Auditing System in Japan

1890	Commercial Code of Japan enacted.
1948	Securities and Exchange Law enacted. Certified Public Accountants Law enacted.
1949	Financial Accounting Standards for Business Enterprises issued. The Japanese Institute of Certified Public Accountants ("JICPA") established as a self-disciplinary association.
1950	Regulations Concerning the Terminology, Forms and Preparation Methods of Financial Statements issued. Auditing Standards and related rules issued.
1951	Audit by CPAs required under the Securities and Exchange Law.
1966	The JICPA reorganized as a special legal body according to the amended CPA Law, which requires all CPAs to join as members of the JICPA.
1967	The first audit corporation formed in accordance with the amended CPA Law.
1973	The International Accounting Standards Committee ("IASC") established with the JICPA as a founding member.
1974	Audit by CPAs required under the Commercial Code.
1975	Accounting Standards for Consolidated Financial Statements issued. Audit of banks and insurance companies by CPAs required.
1977	CPA audits of interim and consolidated financial statements began. The International Federation of Accountants ("IFAC") established with the JICPA as a founding council member.
1979	Accounting Standards for Foreign Currency Transactions issued.
1988	Disclosure requirements for segment information drastically revised. Disclosure requirements for related-party transactions and market value information for marketable securities amended.
1991	Auditing Standards and related rules drastically revised.
1992	The CPA Law relating to examinations and other issues amended.
1992	Commercial Code amended to strengthen shareholders' rights and statutory auditors' authority and to improve procedures for issuing debentures.
1995	Accounting Standards for Foreign Currency Transactions amended. Law to improve and enhance controls and management of financial institutions passed.
1999	Accounting Standards for Financial Instruments issued. Commercial Code amended to set forth New Stock Exchange and Transfer System. Accounting Standards for Foreign Currency Transactions amended.

Source: The Japanese Institute of Certified Public Accountants home page.
(http://www.jicpa.or.jp/n_eng/index.html)

Table 2: Summary Statistics

	No. of Segments: 2			No. of Segments: 3 to 5		
Smallest segments	Group1			Group2		
	Mean	Median	S.E.	Mean	Median	S.E.
Capital expenditure	2018	474	4373	2244	246	4574
Sales growth (%)	3.03	-0.76	0.23	3.52	-1.21	0.34
Tobin's q	1.47	1.40	0.31	1.41	1.34	0.18
CF of the segment	3990	1577	7198	3571	1361	5999
CF of other segments	13755	6008	22993	29115	8450	42484
Largest segments	Group3			Group4		
	Mean	Median	S.E.	Mean	Median	S.E.
Capital expenditure	6785	1838	11381	8217	2128	15614
Sales growth (%)	1.37	0.30	0.14	1.29	-0.65	0.15
Tobin's q	1.43	1.40	0.18	1.42	1.40	0.25
CF of the segment	13610	6622	21216	19582	6527	30608
CF of other segments	4135	868	9884	13104	3638	22225
No. of Observations	107			68		

Note: The sample are the segments of manufacturing firms in the first section of Tokyo stock exchange and reported their short financial statements (Kessan-tanshin) in March 1999. The following six items are reported as the segment information: sales, profits, costs, assets, depreciations, and capital expenditures. Capital expenditure and cash flows are reported in million yen. The definition of segment here is the part of the firm whose share of either one of sales, profits, or assets exceeds 10% of the firm's total value. The segment data of the firms have more than two segments are reported. The segment data is grouped into four categories based on the number of the segments in the same firm and the size of the segment. The data is collected manually from the original sources.

Table 3: Basic Investment Equation

Panel A: Investment Equation Estimated by Groups

Dependent variable: Capital expenditure of the segment

	Smallest segments		**Largest segments**	
	Group1 concentrated	Group2 diversified	Group3 concentrated	Group4 diversified
Sales growth (%)	-0.0016	-0.0011	0.0089	-0.0019
	(-0.57)	(-1.20)	(1.26)	(-0.13)
Tobin's q	0.0034	-0.0001	0.0047	0.0024
	(0.95)	(-0.04)	(0.79)	(0.59)
CF of the segment	0.1697	0.2855	0.3113	0.1143
	(3.17)**	(5.67)**	(4.65)**	(2.41)*
Constant	-0.0014	0.0011	-0.0005	0.0067
	(-0.28)	(0.48)	(-0.06)	(1.29)
$\overline{R^2}$	0.252	0.195	0.373	0.198
No. of Observations	105	66	105	66

Note: Heteroscedasticity corrected t-statistics are reported in parentheses. (*) and (**) denote the coefficients are significant at 5 % and 1 % respectively.

Panel B: Differences between the cash flow coefficients of groups

	Theoretical prediction	Empirical result	Statistical Test
Comparison by segment size			
Group1 vs Group3	$<$	$<$	Reject at 1%
Group2 vs Group4	$<$	$>$	Reject at 1%
Comparison by degree of diversification			
Group1 vs Group2	$>$	$<$	cannot reject
Group3 vs Group4	$>$	$>$	Reject at 1%

Note: The null hypothesis of Statistical Test is that the coefficients of cash flow are equal for two groups.

Table 4: Effects of other segments' liquidity

Dependent variable: Capital expenditure of the segment

	Smallest segments		**Largest segments**	
	Group1 concentrated	Group2 diversified	Group3 concentrated	Group4 diversified
Sales growth (%)	-0.0015	-0.0013	0.0037	-0.0045
	(-0.75)	(-1.65)	(0.45)	(-0.32)
Tobin's q	0.0032	0.0001	0.0026	0.0020
	(1.31)	(0.07)	(0.39)	(0.48)
CF of the segment	0.1693	0.2923	0.3814	0.1210
	(3.13)**	(6.45)**	(5.06)**	(2.78)**
Total of other	0.0452	-0.0080	0.1374	-0.0242
segments' CF	(2.56)*	(-0.57)	(2.16)*	(-0.50)
Constant	-0.0037	0.0012	-0.0024	0.0074
	(-0.99)	(0.50)	(-0.25)	(1.30)
$\overline{R^2}$	0.298	0.198	0.427	0.190
No. of Observations	105	66	105	66

Table 5: Agency Problem

Dependent variable: Capital expenditure of the segment

	Smallest segments		**Largest segments**	
	Group1 concentrated	Group2 diversified	Group3 concentrated	Group4 diversified
Sales growth (%)	-0.0019	-0.0012	0.0101	-0.0057
	(-0.68)	(-1.36)	(1.45)	(-0.37)
Tobin's q	0.0032	-0.0000	0.0029	-0.0008
	(1.03)	(-0.02)	(0.50)	(-0.14)
CF of the segment	0.2226	0.2969	0.3316	0.1524
	(4.09)**	(6.03)**	(4.85)**	(3.01)**
Cash flow ×	-0.0066	-0.0080	-0.0204	-0.0432
Managments' equity holding	(-0.49)	(-0.56)	(-2.22)*	(-0.77)
Constant	-0.0016	0.0011	0.0025	0.0116
	(-0.35)	(0.50)	(0.29)	(1.50)
$\overline{R^2}$	0.298	0.198	0.427	0.190
No. of Observations	105	66	105	66

Note: Heteroscedasticity corrected t-statistics are reported in parentheses. (*) and (**) denote the coefficients are significant at 5 % and 1 % respectively.

Table 6: Relative Investment Efficiency of Diversified Firms

Estimated Model: $I_{i,j} - \bar{I}_i = \gamma_0 + \gamma_1 \cdot \bar{q}_i + \gamma_2 \cdot (cash_{i,j} - \bar{CASH}_i) + \varepsilon_{i,j}$

$I_{i,j}$: Gross investment of firm j's segment, classified in industry i.

$\bar{I}_i$: Median investment of industry i.

$\bar{q}_i$: Median of Tobin'q in industry i.

$cash_{i,j}$: Cash flow of firm j's segment, classified in industry i.

$\bar{CASH}_i$: Median cash flow of industry i.

	Model 1	Model 2
$\bar{q}_i$	0.0157	0.0093
	(1.14)	(0.80)
$cash_{i,j} - \bar{CASH}_i$		0.1271
		(3.01)**
$\overline{R^2}$	0.006	0.066
No. of Observations	433	433