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JAPAN'S CORPORATE RETURNS ON
VALUE AND COST:
A COMPREHENSIVE LOOK
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A Comprehensive Look

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Abstract

The paper documents that for 1974-95 the Japanese non-financials' return on cost, a measure of return on (direct) investment, is consistently higher than their return on value (an estimate of the expected return or cost of capital). Against conventional wisdom, when translated into USD terms, the Japanese cost of capital is actually higher than the U.S. counterpart. The paper further shows that as of the 90s the main-bank centered keirestu firms, with their internally disciplined corporate governance system, lost their traditional advantage of lower cost of capital, compared to the non-keiretsu firms. Examining corporate earnings, investment, and forms of financing reveals that, in recent years, keiretsu firms have become more liquidity constrained than non-keiretsu firms. Their investment drops dramatically, and while (also much reduced) retained cash earnings provide most of the financing, debt financing is replaced by more expensive new equity as the major source of outside financing. Non-keiretsu firms are suffering as well, but to a lesser degree, and are still able to finance their investment even with substantial short-term debts. The main-bank system seems starting to crumble following an over-investment episode in late-80s.

Japan's Corporate Returns on Value and Cost: A Comprehensive Look

1. Introduction

An important issue in corporate finance is how firms perform under different systems of corporate governance and financing, and whether one governance system stands out as superior. Under the Anglo-American system, firms are disciplined at arm's length by the capital market, but in many countries the disciplining is done by banks, and in a much more hands-on way. Japan, for example, has a main-bank system in which reciprocal holdings among business firms and main banks enable disciplining within the group (see Aoki, Patrick, and Sheard, 1994, for a comprehensive review on the Japanese main bank system). In this introduction we briefly review the literature, and then outline the methodology and findings of the paper.

1.1. Pros and Cons of the Main-Bank system — the recent literature

The success of Japan's economy during most of the postwar period has greatly stimulated academic interest in the merits of its system, and many authors have related this success to Japan's bank-centered corporate-governance structure. For example, Hoshi, Kashyap, and Scharfstein (1990a,b, 1991) find that, thanks to their close relationships with the main banks, Japanese firms have been less constrained by their internal cash position, allowing them to continue their investments and growth even short of cash. Comparing firms from Japan and the US (whose governance system is a natural rival to Japan's), Prowse (1990) finds that reciprocal holdings among the Japanese firms and banks greatly mitigate the agency problems between shareholders and debtholders. Kaplan and Minton (1994) and Kang and Shivdsani (1997) likewise confirm the positive role of main bank in helping firms in financial difficulties. In a theoretical study, Berglof and Perotti (1994) argue that the cross holding in the Japanese corporate governance structure also makes internal discipline more sustainable over time.

In view of the Japan's economic slump and persistently low stock prices in the 1990s, the more recent literature has naturally become more critical towards the country's governance system (see Allen, 1996, for a review on this reversal of opinions). Kang and Stulz (1995)

document that, during the 1990-93 Japanese stock-market slump, firms whose bank debt represent a larger fraction of their total debt invested less and produced significantly lower stock returns.[1] Moreover, Weinstein and Yafeh (1998) find that, for 1977-86, main-bank firms exhibit lower profitability and growth as well as a higher cost of capital relative to unaffiliated firms. They interpret their findings as consistent with the hypothesis of rent-extracting or "holdup" behavior of banks that have information monopolies on client firms (Sharpe, 1990, Rajan, 1991, and Houston and James, 1996). Also, the monitoring role of the main banks seems to have been quite narrow in focus. Morck and Nakamura (1998) show that, for 1981-87, banker appointments in a firm's board of directors more often took place in response to poor concurrent liquidity, and less as a reaction to lagging share values.

Yet, the recent outcry against main banks is by no means unanimous. In sharp contrast to the findings by Houston and James (1996) for the US firms, Anderson and Makhija (1999) observe that Japanese firms with higher growth potential took on more bank debt in 1985-89 and continued to take on more bank debt in 1990, even though the 1989 deregulation of the bond market should have facilitated bond issues. They conclude that, for firms where arms'-length debt would imply high agency costs, banks do provide monitoring benefits and do not impose meaningful holdup cost. And while Gibson (1995) finds that, in 1991-92, some banks in Japan did harm their client firms by hindering investment, such behavior seemed to be restricted to "weak" banks. Since, at that time, most big banks were (viewed as) reasonably strong, Gibson still concludes that problems in the banking sector had no major impact on the Japanese economy. In short, the picture is by no means clear. In the next section we describe in more detail how we approach the issue.

1.2. Approach adopted in this paper

The lack of consensus about the pros and cons of the main-bank system and the mixed empirical results call for an examination that (i) is comprehensive, (ii) controls for the non-governance-related aspects of capital markets, and (iii) is based on an analytical framework that provides a robust measure of corporate health.

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[1] Kang and Stulz (1998) highlight the impact of the whole banking sector instead of the influence of the main-bank relationship on the Japanese firms during the economic slum and credit crunch. However, in the context of Japan, since the main-bank affiliated firms usually take more bank loans, they interpret their findings as an adverse effect of bank-centered corporate governance.

In this paper, we attain comprehensiveness by considering all listed non-financial firms in Japan and by studying this sample in a dynamic perspective over a 22-year period, 1974-1995. Also, we examine not only the cost of capital and the return on investment but also the fluctuations of corporate earnings, investment, and ways of financing.

The next item in our wish-list is the need for a *ceteris paribus* comparison. To study the costs and benefits of corporate-governance structures, one could have contrasted the performance of, say, the US and German firms. Obviously, however, such a comparison would have brought in a host of other determinants of performance other than corporate governance. To avoid such cross-country differences, we have chosen to compare two classes of firms from one single country, Japan. Prowse (1992), among others, stresses that the corporate governance system in Japan is far more heterogeneous than is often believed. Next to the (main-bank centered) keiretsu system, with significant shareholdings in business firms by banks, there also is a system closer to the Anglo-American tradition, with firms much more subject to the capital market discipline. This heterogeneity provides a well-controlled test ground for the two governance systems, in that it eliminates the possible effects of capital market segmentation as well as differences in accounting and tax rules and other institutional factors that would have hampered an international comparison. Thus, for most part of our analysis in the paper we separate the Japanese non-financial firms in two groups, keiretsu firms (that is, companies closely affiliated with the Big Six main-bank-centered industrial groups), and non-keiretsu firms (members that are very weakly affiliated, or not affiliated).

Lastly, regarding our analytical framework about corporate health, we follow a new approach suggested in Fama and French (1998) (hereafter FF). As explained in the next section, we first use the spread between the "IRR on cost" (or corporate return on investment) and the "IRR on value" (or cost of capital) at the corporate-sector level as our first-pass measure of corporate. If a system of corporate governance lowers the cost of capital, it will stimulate investments and profits. However, the spread (or value added) that we use as the first-pass measure of corporate profitability is subject to substantial estimation problems. To circumvent these, in a second stage we also look at the dynamics of corporate earnings, investment, and financial decisions, which help diagnose more accurately the state of health of Japan's corporate sector. In the next section, we summarize our main findings.

1.3. Contributions of the paper

One contribution of the paper is that we use the FF (1998) IRRs on cost and value as measures of the estimates of investment profitability and, particularly, the cost of capital. Other studies (McCauley and Zimmer, 1989, and Frankel, 1991, and others) have used as the cost of capital the traditional weighted average of cost of capital (WACC) with various (and sometimes rather ad hoc) inputs,[2] and their measures of corporate investment returns are largely accounting ratios.

Our use of the IRRs not just represents a new way of addressing the governance issue, but also provides an international comparison to FF's US results. Japan is a natural choice for a robustness check because it has the second largest stock market by capitalization in the world. We find that, in our 1974-95 sample period, the Japanese non-financial firms as a whole did add value. Like in FF (1998), this conclusion is not sensitive to whether or not the sample ends in a gloomy stock market, but when we move backward the termination date from 1995 to 1985, spreads between delivered and required return decline fast towards the end of the period. Interestingly, when we convert our Japanese returns into USD returns, the Japanese cost of capital becomes higher than the US one. Thus, the often-heard claim that Japan's cost of capital is much below the levels elsewhere in the world may be based more on a numeraire effect rather than anything real.

The main contribution of the paper, however, is that we provide a dynamically viewed and robust evaluation on the two governance structures: the main-bank system and the capital-market-disciplined system, over the period 1974-95, a period that contains drastic changes in Japan's financial environment following its financial deregulation. The current gloomy state of the Japanese economy suggests that the main-bank system may not have been up to its monitoring task. Perhaps the system has been eroded by the financial deregulation, but we also provide indications that it may have collapsed under the weight of its own past mistakes. From our analysis, the main-bank seemed to do well before 1990: consistently with traditional beliefs, the cost-of-capital gap between keiretsu and non-keiretsu firms remained in favor of the former. Since the early 90s, however, not only the keiretsu firms' advantage of a lower cost of has disappeared. In addition, over the entire period their

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[2] The methodology in Weinstein and Yafeh (1998) is markedly different from others. Their cost of capital gap between keiretsu and non-keiretsu is derived from their model. However, their model does rely on a discount rate of the WACC type.

realized corporate returns on investment have been lower than for non-keiretsu firms. In addition, we find that the keiretsu firms' benefit-cost spread has been consistently lower—and, as of 1990, declined faster—than the non-keiretsu value added.

The disappearing cost-of-capital advantage and the dwindling benefit-minus-cost spread for keiretsu firms may indicate a weakening of the once-hallowed main-bank system. To pin down what went wrong, we examine the history of corporate earnings, investment, and ways of financing. We observe that, during 1991-95, both keiretsu and non-keiretsu firms reduced their investments and abandoned the Myers (1984) natural pecking order of external financing and issued large amounts of costly equity. Upon closer inspection, keiretsu firms tended to use the new funds to reduce short-term bank debt, while non-keiretsu firms continued to borrow short-term from banks. In addition, keiretsu firms went much further in cutting their investments, and relied almost exclusively on (also much reduced) retained cash earnings to finance the remaining investments. In contrast, non-keiretsu firms (which tend to be smaller and have higher growth) invested relatively more, and relied less on retained earnings and more on bank debt to finance their investments. Thus, the keiretsu firms' equity issues at a time of recession suggest difficulties in debt (re-)financing, that is, severe liquidity constraints that were caused probably by the past over-investment and a debt overhang. We indeed find that free cash flows were on average negative, even more before 1990s than after, and that keiretsu firms tend to suffer more from this than non-keiretsu firms. Thus, the bottom line is that keiretsu firms have faced higher financial costs because they were more liquidity constrained. This diagnosis is consistent with our results from the IRRs. It also contradicts the usual view that main-bank monitoring prevents over-investments and helps solving liquidity constraints. Lastly, the diagnosis provides no evidence that the rise of the cost of capital is due to rent-extraction by main banks: such hold-up behavior would have been even more natural with respect to the non-keiretsu firms which, being smaller, face higher costs of public financing.

The remainder of the paper is structured as follows. Section 2 describes FF's estimation method of the IRRs. Section 3 discusses the data and the sample issues concerning the Japanese firms. Section 4, estimates and explains the IRRs. Section 5 analyzes the Japanese corporate earnings, investment, and financing decisions, statically as well as dynamically. Section 6 concludes.

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2. The IRR on value and the IRR on cost

By definition, the IRRs are discount rates that make the total present value of cash flows into and out of a project equal to zero. FF (1998) suggest to calculate the IRRs of a corporate sector by treating the entire corporate sector as a single investment project. Technically, the IRRs on value and cost are the discount rates, r_v and r_c, that solve

$$IV_0 = \sum_{t=1}^{T(1995)} \frac{X_t - I_t}{(1+r_v)^t} + \sum_{t=1}^{T(1994)} \frac{FS_t - FBV_t}{(1+r_v)^t} + \frac{TV_{1995}}{(1+r_v)^t} \qquad (1)$$

and

$$IC_0 = \sum_{t=1}^{T(1995)} \frac{X_t - I_t}{(1+r_c)^t} + \sum_{t=1}^{T(1994)} \frac{FS_t - FBC_t}{(1+r_c)^t} + \frac{TV_{1995}}{(1+r_c)^t} \qquad (2)$$

All variables in (1) and (2) are defined as in FF (1998). IV_0 is the aggregate initial market value of firms that enter the sample at the beginning of the estimation period (that is, 1974). In (2), IC_0 is their aggregate initial book value. X_t is aggregate cash earnings (after-tax earnings before deduction of interest and depreciation) for year t for the firms that were in the sample in year t-1. I_t is the aggregate gross investment (net investment plus depreciation) of these firms. FS_t (firms sold during year t) is the terminal market value of firms that leave the sample in year t. FBV_t (firms bought at value) is the initial market value of firms that enter the sample in t, and FBC_t (firms bought at cost) is their book value. Lastly, TV_{1995} is the terminal market value of firms that still exist at the end of the sample period (1995).

As mentioned, we follow FF's (1998) definitions. This may cause problems in the case of cash balances, which are relatively large in Japan. In this study (as in other work), cash holdings are treated as part of assets, even though some of them are really compensatory balances (buzumi-ryodate deposits) rather than true working capital. We have not attempted remove the compensatory balances from working capital (at the asset side) and bank debt (at the liability side) because we see no reliable way to do so[3], and for comparability with most

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[3] In principle, we could have estimated the compensating-balance component of the cash holdings by regression of Cash on short- and long-term debt. The estimated compensating balances could then have been deducted from the amounts of debt, rather than being included into working capital. However, the data are, a priori, quite likely to be non-stationary, so that estimates from 19 yearly data points are statistically very suspect. In addition, the true compensatory balance coefficient changes across firms and over time. Lastly, the existence of compensatory balances also lowers the need of true working capital—that is, deducting compensatory balances

published research on Japanese corporations. Still, we have rerun all computations below by treating changes in cash as a separate source/use of funds rather than part of overall investment and so on. As most of the time we see little effect, these results are available on request rather than included in the text. In the one instance where the treatment of cash matters, we discuss these additional computations.

Since the "investment project" represents the entire corporate sector, individual firms enter and leave the "project" at different times. For the IRR on value in (1), the initial investment in a firm is its market value when it enters the sample (IV_0 or FBV_t). For the IRR on cost, the initial investment in a firm is the cost of the assets the firm brings in when it enters the sample (IC_0 or FBC_t). The remaining cash flows in (1) and (2) are the same for the two IRRs: the annual net cash flows ($X_t - I_t$), the terminal market values for firms (either FS_t, when they leave the sample early, or TV_{1995} at the end of the sample period).

The IRR on value is the return to an investor who (i) buys firms at market value (IV_0 or FBV_t) when they enter the sample, (ii) receives or provides their subsequent net out- or inflows ($X_t - I_t$), and (iii) ultimately sells them at the 1995 market value (FS_t or TV_{1995}). By the flow-of-funds identity, the firm's net intermediate cashflow ($X_t - I_t$) equals its net payout of dividends and interest ($Div_t + Int_t$) minus issues of new securities (NS_t). Thus, equation (1) can be rewritten as

$$IV_0 = \sum_{t=1}^{T(1995)} \frac{Div_t + Int_t - NS_t}{(1 + r_v)^t} + \sum_{t=1}^{T(1994)} \frac{FS_t - FBV_t}{(1 + r_v)^t} + \frac{TV_{1995}}{(1 + r_v)^T}. \tag{3}$$

Equation (3) interprets the IRR on value as the compound return on all securities of the aggregate firm that were outstanding during the IRR estimation period. All securities are purchased (at market value) when firms enter the sample (IV_0 or FBV_t). Later on in their life, firms either issue more securities ($NS_t > 0$) or retire securites ($NS_t < 0$), depending or whether or not cash earnings X_t are below the sum of investment outlays I_t plus dividend and interest payments, $Div_t + Int_t$. Being a long-term average, this realized return on all securities estimates the overall cost of capital for the aggregate firm.[4] If we measure the investments at cost instead of at market value, we obtain an estimate of the return on corporate investment.

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probably leads to a level of working capital that is lower than what it would have been if banks had not insisted on compensatory balances.

[4] The interpretation of IRR on value as the compound return on the aggregate firm should not be confused with the compound return (CR) on the value-weighted market portfolio. The CR measures the return from investing a dollar in the market portfolio at the beginning of the sample period, and then simply rolling over the investment

3. Data

Our Japanese data are retrieved from the Pacific-Basin Capital Markets (PACAP) databases developed by the Sandra Ann Morsilli Pacific-Basin Capital Markets Research Center at the University of Rhode Island. The annual data on balance sheets and financial statements cover the 22 fiscal years 1974 to 1995. Most Japanese firms have a fiscal year ending in March. Thus, fiscal year 1974 runs from April 1, 1974 to March 31, 1975, and so on.

We select all non-financial firms that have (annual) data on market and book value for at least two consecutive years. As in FF (1998), the capital stock of firms includes only debt that pays explicit interest (PACAP's long-term loans and debentures plus short-term loans in current liabilities). Non-interest-bearing liabilities, mainly accounts payable, are not added because most of them cancel out after consolidation into a industry- or economy-wide aggregate. Their simple sum, without taking into account the intra-industry A/P, would have grossly overestimated their net value.

Given their distinct main-bank-centered industry, we are particularly interested in the six major Japanese industrial groups, the so called keiretsu—the Mitsui, Mitsubishi, Sumitomo, Fuyo, Sanwa, and DKB groups. Keiretsu membership as a key feature of the Japanese economy is very stable over time. However, there is no unified classification of keiretsu membership in the literature. The keiretsu firms in our sample either meet the classification by Nakatani (1984), or are the closely-linked members (with the degree of the 2-, 3-, and 4-star inclination) to the six groups as classified in the 1992/93 edition of *Industrial Groupings in Japan – the Anatomy of the "keiretsu"*. On the other hand, our non-keiretsu firms are either the unaffiliated firms or the weakly related members (a 1-star affinity to the Six Groups).

Table 1 shows some summary statistics for the sample. Over the 22 years 1974-95, the average number of non-financial firms present per year is 1337, of which the keiretsu-affiliated firms account for 38.8 percent. This is an average; in fact, the keiretsu importance in terms of numbers has been dropping from 41.5 percent in the second half of 1970s to 36.1 percent in the first half of 1990s.

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into the new market portfolio as available in each subsequent year. In contrast, the IRR on value requires net new investment whenever cash earnings X_t are less than investment outlays I_t (see the more detailed explanation in FF, 1998).

It is well known that equity cross-holdings among business are widespread in Japan. From Table 1, the average cross-holdings in each year amounts to 20.1 percent of the total market equity of all non-financial firms, or 11.1 percent of their total market capital (book debt plus market equity). Since the start of deregulation of the financial markets in Japan in mid-70s, equity cross holdings have steadily decreased, from 21.5 percent of equity in 1974-79 to 16.6 percent in 1991-1995, indicating that the main-bank system is retreating (see e.g. Hoshi, Kashyap, and Scharfstein, 1990b, for a similar conclusion). The temporary increase of the alternative measure, cross holdings divided by total value, during the "bubble" years 1986-90 merely reflects the increase of equity values relative to debt values during that period.[5]

Cross holdings among business firms induce double-counting, and therefore exaggerate the value of the aggregate capital stock of the corporate. We purge the inflating effect of equity cross-holdings in the same way as French and Poterba (1991): aggregate market equity is multiplied by (1-K), where K is the ratio of aggregate cross holdings to-equity; and total market value is multiplied by (1-H), where H is the ratio of cross holdings to total value. For aggregate book values we correct for double-counting using the same ratios as for the market values. For the adjustments in the subgroups, like keiretsu and non-keiretsu, we use the average ratio because more accurate information is not available to us. While this somewhat overstates (understates) the capital stock of keiretsu (non-keiretsu) firms, the impact on our conclusions is probably minimal.

Table 1 also shows that the average market and book capital of all non-financial firms increases over the sample period. Their grand averages are 242.7 trillion Yen of market value and 139.0 trillion of book value. Keiretsu firms account for over half of the total market and book value before 1986, but their average market value drops below 50% afterwards, indicating again that the keiretsu dominance has been waning. The fact that, in terms of numbers, keiretsu firms represent considerably less than half of all firms while they provide roughly half of the value of the firms in the sample of course implies that keiretsu firms tend to be larger than non-keiretsu firms..

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[5] The Japanese stock market crash following the bubble years happened in 1990. Including that year in subperiod 1986-90 is merely a consideration of cutting the total sample into sub-samples of equal (five) years as FF (1998) did. In fact, as can seen also in the rest of the paper, the effect of the bubble years when we look at the averages for 1985-90 is not qualitatively influenced by the inclusion of 1990. Likewise, the results of averaging that hold for 1991-95 are also valid for 1990-95.

As mentioned before, the advantage of comparing keiretsu versus non-keiretsu is that it eliminates a host of other factors that would have obscured an international comparison—say, the US versus bank-centered Germany. Still, the observed differences between keiretsu and non-keiretsu could partly be due to industry effects. As we see from Table 2, however, there seems to be little sector bias. With the exception of the service industry (which accounts for little in terms of book or market capital anyway) and especially the regulated sectors (agriculture, utility, transportation, and communication), keiretsu always accounts for between 40 and 70 percent of the total in every industry. A closer look at the regulated sectors reveals that there is no keiretsu presence in the sub-sectors of utilities and communications, and that the communications sector is dominated by a single, gigantic, and quite atypical firm, NTT. To avoid a regulated-sector (and NTT) bias and obtain a fair comparison between keiretsu and non-keiretsu, we exclude the utility and communication sectors from our sample of non-keiretsu firms whenever we split up the total sample into keiretsu and non-keiretsu.[6].

4.   Estimation of IRRs

In this section, we use the joint measures of the IRRs on cost and value to gauge the Japanese corporate health over 1974-95 in general, and to find out whether (and as of when) corporate health has been evolving differently across keiretsu and non-keiretsu firms.

Panel A of Table 3 shows the estimates of IRR on value and cost, nominal and real, in Japanese Yen (JPY) and US dollar (USD), of all Japanese non-financials (keiretsu and non-keiretsu firms) for 1974-95. The annual values of the cash flows that underly the real IRRs of all non-financials, keiretsu and non-keiretsu firms are in Table 4. We do not face a multiple IRR problem, for the same reason as in FF (1998).When denominated in JPY, the estimate of IRR on nominal value of all non-financials is 8.01 percent and the estimate of IRR on nominal cost is 11.34 percent. Thus, on average the Japanese non-financial corporate sector has added value over the past two decades at a rate of 3.33 percent per year. Adjusting the cash flows in (1) and (2) for inflation only lowers both legs of the cost-benefit spread (to 4.95 versus 7.94

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[6] But not when we describe the sample as a whole (all non-financials). Thus, occasionally, the existence of a third group (utilities and communications) means that a number for the sample as a whole is not in between the corresponding numbers for keiretsu and non-keiretsu.

percent, respectively) and does not materially influence the spread itself (3 percent in real terms).

Panel A of Table 3 also shows estimates of IRR on value and cost of keiretsu and non-kereitsu firms. Over the entire period, non-keiretsu firms have added more percentage value than keiretsu firms. Both legs of the spread contribute positively to this result: non-keiretsu firms had not only a lower cost of capital (IRR on value: 8.61 versus 9.07 percent, and adjusted for inflation, 5.56 versus 5.71 percent) but also a higher return on corporate investment (IRR on cost: 11.74 versus 11.26, and after inflation, 8.42 versus 7.73 percent). This runs counter to the traditional perception that keiretsu firms, with their main-bank-centered corporate governance structure, enjoy lower agency cost in borrowing and hence a lower cost of capital. However, in our discussion, below, about the evolution over time we shall see that the 1974-1995 average is heavily influenced by the (rather atypical) slump years; the earlier periods do conform to the common perceptions. Before proceeding with the evolution over time, we address some issues regarding our IRR estimates: translation into USD; the link between IRR, cost of capital, and simple returns; and the sensitivity of the IRR estimates to each of the cash flow components .

4.1   Translating the IRRs into USD

To compare with FF's results and check the common perception that Japan's cost of capital is low by international standards, we need to translate the above JPY-based figures into USD. Thus, we translate all cash flows into USD at the contemporaneous spot rate, and then compute an USD-based IRR.[7] In Panel A of Table 3, when rotated into USD, the estimates of the IRR on value and on cost for all Japanese non-financials both increase by very similar amounts—roughly, the average per annum appreciation of JPY—to 13.24 and 16.89 respectively. The estimates in real terms are 7.63 and 10.86 percent. These estimates are

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[7]An implicit assumption of this translated-cash-flow approach is that capital markets are integrated, otherwise the buying and selling of Japanese assets at any desired date is impossible. In reality, however, the opening-up of Japan's capital market really started only in early 80s (and slowly so, at that). A second problem is the assumption that the long-term realized evolution of the exchange rate is close to the expectations. (This problem of course applies also for any other variable in this model, e.g. stock prices and CPI levels.) The latter problem is solved if, instead of valuing the project as such, we value the project hedged against exchange risk. Under this approach, the USD-based return on the hedged asset is, a priori, roughly equal to the JPY-based return plus the difference between the USD and JPY risk-free rates. While this second approach avoids the problem of estimating the expected exchange-rate change, we now run into the problem of how to identify "the" risk-free rate in a sample covering 22 years and having non-flat term structures at all dates. Thus, we have chosen the first approach.

larger than the US numbers in FF (1998).[8] It turns out that the conventional claim that Japan's cost of capital is much below that elsewhere in the world (for example, McCauley and Zimmer, 1989) is confounded by a numeraire effect.

4.2   Cost of Capital: IRR on Value, Average Simple and Compound Returns

How the true cost of capital is to be estimated depends on whether one is interested in the cost of capital per se or in the corresponding PV factor. An unbiased but noisy estimate of the expected return does not lead to an unbiased estimate of the present value because the latter is a non-linear function of the expected return (Fama, 1994). As a result, estimates of cost of capital that produce unbiased estimates of present values tend to be geometric average returns, with weights that are either equal or are related to the maturity of the future cash flows to be discounted (Blume, 1974, and Cooper, 1994).

We briefly relate and compare the competing measures. We start from the simple (gross) return for year t,

$$R_t = [(X_t - I_t) + (V_t - V_{t-1})] / V_{t-1}, \qquad (4)$$

where V_{t-1} and V_t are the market values of the same firms for the end year t-1 and t, and $X_t - I_t$ is the net cash flow The equally-weighted arithmetic mean of the simple year-by-year returns provides an unbiased estimate of the expected annual return. In contrast, if the purpose is to obtain an unbiased estimate of the present value, $1/E(R)^n$, one naturally turns to the equally-weighted geometric mean of all year-by-year simple returns. The IRR on value, lastly, is also a geometric average but uses unequal weights, namely,

$$r_v = \sum_{t=1}^{T} \left[\frac{V_{t-1}}{(1+r_v)^{t-1}} R_t \right] / \sum_{t=1}^{T} \frac{V_{t-1}}{(1+r_v)^{t-1}} . \qquad (5)$$

That is, the weight for the year-t return is the invested wealth at the beginning of the year, V_{t-1}, discounted to the beginning of the sample period at the IRR on value. Thus, a negative return between times t–1 and t tends to obtain a larger weight than a subsequent positive return because V_{t-1} is smaller than V_t, so that a fortiori $PV(V_{t-1})$ is smaller than $PV(V_t)$. As a

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[8] They find that, for the US non-financials, the nominal and real IRRs on value are 11.78 and 5.57 percent and

result, an IRR tends to be smaller than an unweighted compound return (which, being a geometric mean, is smaller than the arithmetic average).

The choice between the two compound returns depends on the purpose of the application. FF (1998) argue that the geometric mean of simple returns, which treats all years in the same way, is probably a better choice for a cost of capital than is the IRR on value. On the other hand, the IRR on value takes into account the size of the interim in- and outflows, and therefore is a more accurate estimate of the realized return on all wealth allocated over time to the corporate sector as a whole. Since our main purpose in this section is to obtain a measure of corporate health rather than an unbiased estimate of present value, we follow FF and chose the IRR on value as our main yardstick (jointly with the IRR on cost, which is a measure of the merits of projects). Still, it is interesting to know to what extent the results are affected by the choice of the averaging process.

Panel B of Table 3 shows estimates of the average simple and compound returns (in nominal or real, JPY or USD) for all non-financials, and for keiretsu and non-keiretsu firms separately. The simple averages are, predictably, greater than the geometric means. For example, the simple average returns in nominal JPY are 8.96 (all non-financials), 9.44 (keiretsu), and 9.75 percent (non-keiretsu), all of which are 0.5 to 1 percent higher than the corresponding geometric means, 8.51, 8.97, and 9.14 percent. The IRRs on value, in turn, are again lower than the geometric means, although the difference is smaller. For example, our estimates of the IRR on value in real JPY are 4.95 (all non-financials), 5.71 (keiretsu), and 5.56 percent (non-keiretsu), and these numbers are less than 0.5 percent lower than the corresponding geometric means, which are 5.38, 5.83, and 5.99 percent.

Disturbingly, according to both simple and geometric means the keiretsu cost of capital is lower than the non-keiretsu cost of capital (recall that the the IRR on value suggested otherwise). Equally disturbingly, the numbers are heavily dependent on the initial market-to-book and the final market value, as we shall see in the next section. In short, there is a serious estimation problem here. We do not have a sampling error variance for the compound returns, so we follow FF (1998) and use the variance for simple returns as a proxy. Panel B of Table 3 shows the standard errors of the simple average over 22 years (1994-95). The standard errors of the average of simple nominal JPY returns for all non-

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the nominal and real IRRs on cost are 13.97 and 7.52 percent for 1973-96.

financial, keiretsu, and non-keiretsu firms are 2.20, 2.27, and 2.56 percent, very close to the standard errors of the average of simple real JPY returns, which are 2.27, 2.37, and 2.60 percent.[9] In view of this, it seems prudent to take all IRR-based inferences as indicative, and to look at other evidence for confirmation.

4.3   Relative Importance of the Various Cash Flows That Determine the IRRs

Initial asset values, earnings, investment outlays, securities issued or redeemed, and terminal values jointly determine the IRRs on value and cost. We want to assess the relative importance of the initial, terminal, and intermediate cash flows as determinants of the IIRs. Table 5 reports the weights of these intermediate inflows and outflows by cumulating them to the terminal year 1995 at each of the four IRRs (nominal or real, on value or cost) and expressing them as a percentage of TV_{1995}.

As could already be guessed from Table 4, Table 5 shows that firms make heavy post-entry investments. For example, capitalized at the nominal IRR on cost for 1974-95, the cumulative value of annual post-entry investment for non-financials is 2.15 times TV_{1995}. Much of this investment is, however, offset by annual cash earnings, whose capitalized value is 2.55 times of TV_{1995}. As a result, the capitalized value of annual net cash flows from operations, $X_t - I_t$, amounts to just 39 percent of TV_{1995}. The weight of cumulative value of annual assets sold at either cost or value is tiny (around 2 percent of TV_{1995}) because only a very small number of firms left our sample. Lastly, the impact of the initial assets at cost is relatively large: its cumulative final value amounts to 1.41 times TV_{1995}.

As can be verified from Table 4, also in real terms and for each of the subgroups (keiretsu and non-keiretsu) the relative importance of cash inflows and outflows always follows a similar pattern as the one we described. The most important cash flow that contributes to the IRRs always is initial assets. The terminal value of assets in 1995 comes second, and the 22-year stream of net cash flows from operations, $X_t - I_t$, is a distant third. Table 4 shows that the market value of entering firms (IV_0 or FBV_t) is always higher than their cost (IC_0 or FBC_t). Given the large weight of initial assets in the total picture, the result

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[9] On the bright side, the similarity of the nominal- and real-term standard deviations indicates that variation in inflation contributes little to the variation in the Japanese corporate nominal returns over the past 22 years, and that the conclusions in this paper do not depend on whether we use nominal and real returns.

that the IRR on cost is in all cases greater than the IRR on value stems largely from the market-to-book ratio of initial assets.

While the market value of initial assets is subject to little dispute, one might have more misgivings about our measure of cost of initial assets. A downward bias is likely here, for two reasons, First, we estimate the cost of an entering firm by its book value, which in an inflationary environment tends to be underestimate the replacement cost. Second, the post-entry investments in R&D, advertisement, and human capital are expensed; thus, pre-entry investments in these intangible assets do not show up in book assets.

The question is how large the measurement error in cost can be without overturning our conclusion that Japan's corporate return on cost exceeds cost of capital. The IRRs on value and cost would become equal if our estimated book value of entering firms would understate replacement cost by 62 percent for all non-financial (including the service and regulated sectors), by 37 percent for keiretsu firms, and by 56 percent for non-kereitsu firms (and for real cash flows, 59, 37, and 53 percent, respectively). Comparing with FF, the lowest "tolerance margin" (the 37 percent for keiretsu firms) here is even bigger than the US counterpart of 35 percent because the US spread between the IRRs on cost and on value is smaller. At any rate, it is unlikely that the underestimation of the cost of assets would come anywhere near the levels needed to invalidate the conclusions.

After this discussion of the measurement issues regarding the average IRRs, we now turn to their evolution over time.

4.4   The Evolution of the IRRs

As we saw in the previous section, the terminal value is the second most important determinant in the estimates of IRRs. Thus, we want to see the IRRs on value and cost in JPY for different termination dates. To that end, we compute IRRs for termination year 1985 using the data of 1974-85, and we obtain similar estimates for each of the years 1986 to 1995 by sequentially adding back more data years at the end. Figure 1.A depicts the evolution of estimates of both nominal and real IRRs for all non-financial firms from termination years 1985 to 1995.

The IRRs are highest in 1987-88 and lowest in 1990s, reflecting the trend of the Japanese stock prices. In real term, the plots just shift down in an almost-parallel fashion. The evolution of IRRs is predictably smooth because each estimate shares at least 90 percent

of the data with the adjacent years. The spread between IRR on cost and value, whether nominal or real, remains positive, but slowly declines over time (Figure 1.C). Nevertheless, our conclusion that the firms have been adding value is not qualitatively sensitive to the termination date. The reason for this result is the initial market-to-book ratio, as discussed in Section 3.3.

Figure 1.B compares keiretsu and non-keiretsu firms after adjusting for inflation. The general pattern is similar to that for all firms in Figure 1.A. One interesting observation here, which also holds for the unreported nominal IRRs, is that early 90s seem to mark a watershed in the fate of keiretsu firms. Before the early 90s, the cost of capital for keiretsu firms had always stayed comfortably below the cost of capital for non-keiretsu firms. But in 1991, the IRR on value for keiretsu firms (5.86 percent) approaches the IRR on value for non-keiretsu firms (6.04 percent), and stays very close for two more years. As of 1994, lastly, the IRR on value (cost of capital) for keiretsu firms exceed the IRR on value for non-keiretsu firms.

While the non-keiretsu firms seem to have dominated in terms of cost of capital only if we include the most recent years into the sample, their return on investment has systematically been higher than that for keiretsu firms (Figure 1.B). To provide a clearer picture, Figure 1.C plots the real value added, that is, the spread between the IRR on real cost and value, for both keiretsu and non keiretsu firms. Unlike the hump-shaped evolution of either the IRR on cost or on value in Figure 1.B, both keiretsu and non-keiretsu benefit-cost spreads have been shrinking as of 1985. However, the rate of decline of the two diverged in early 90s, with the keiretsu value added dropping markedly faster than the non-keiretsu one for subsequent years.The above results on the spread may suggest that the non-keiretsu firms were, on average (and especially in recent years) financially healthier than keiretsu ones, but also that both weakened after 1990. However, as emphasized by Merton (1980) and FF (1997a) the estimation of expected cost of capital (and especially, the expected return on equity) is notoriously inaccurate. Thus, it is prudent to look also at other evidence before making any firm inferences on Japan's corporate health.

5. Analysis of Corporate Earnings, Investment and Financial Decisions

Managers are expected to make financial decisions so as to maximize the firm's value or, given the cash flows from projects and the business risk, minimize its cost of capital by avoiding agency costs. The traditional view (see, e.g., Hoshi, Kashyap, and Scharfstein, 1991) is that

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the keiretsu firms are less liquidity constrained. Specifically, their investment is less sensitive to availability of internal funds because the main-bank relationship reduces information asymmetries (see Myers and Majluf, 1984). As a result, keiretsu firms are able to take on more debt and avoid agency costs (see Jensen and Meckling, 1976, for the agency theory). If this traditional view is correct, their cost of capital must be lower than that of non-keiretsu firms. The results of the previous sections do not unambiguously confirm this conjecture: we found that in all samples terminating between 1991 and 1995 the keiretsu cost of capital is, at best, little different from the non-keiretsu one. Of course, the differences between the two groups' cost of capital may primarily reflect business risk rather than agency costs. In addition, the above puzzle may be due to estimation errors in the IRRs. A related puzzle is that also in terms of the value added keiretsu firms seemed to be in worse shape relative to non-keiretsu for the recent period. All this warrants further scrutiny. In this section, we look at the capital structure, investment, and, particularly, financial decisions of the Japanese firms, to see whether they provide evidence that corroborates the preliminary conclusions from the IRRs.

5.1   Capital Structure

Table 6 describes aggregate capital structure for all non-financial companies as well as for keiretsu firms and non-keiretsu firms separately. We first look at the total sample, and then compare keiretsu to non-keiretsu firms.

5.1.1. All Non-financials: levels and dynamics

In Table 6, Panel A, we present average data on capital structure across all years 1974-95. For the entire sample, 52.3 percent of total market capital of all firms in the sample is common equity, 27.0 percent is the long-term debt, and 20.7 percent is short-term debt. Note that, at 47.7 percent, the share of all debt in total value for Japan is much higher than the 31.5-percent figure that FF report over a comparable period (1974-96) for all non-financial US firms. This difference in the degree of leverage is in line with common perceptions. But also the composition of debt—short versus long debt, and bank debt versus bonds—differs across the two countries. As a fraction of total firm value, long-term debt is about equally important in both countries (27.0 percent in Japan, 25.0 in the US); thus, in terms of term to maturity the differences are mainly found in short-term debt (20.7 percent of total value in Japan, 6.5 in the US). Our Japanese data also provides information on the type of lender. Japanese firms

use more long-term bank loans than bonds: on average, the 27.0 percent long-term debt in the sample consists for 16.9 percent of long-term bank loans, 8.0 percent of straight bonds, and 2.1 percent of convertible bonds.

The above figures are averages over the entire period. Over time, the capital structure has become more "American", in terms of the composition of debt as well as the degree of leverage (see similar patterns in Campbell and Hamao, 1994, with less recent data). First consider the structure of debt. Over time, bonds have become more important (rising from 7.0 percent in 1974-80 to 11.0 percent in 1991-95), and particularly so convertible bonds (from 1.5 percent to 3.2 percent). This reflects the effect of financial market deregulation in Japan since the mid-70s, which enabled firms to shift some of their debt financing from banks to the capital markets. The decreased importance of bank debt shows up in both short- and long-term bank debts. A second area of change is the decline in total leverage: over 1974-95, equity financing has become increasingly important. The average share of equity in the total market value for all non-financial Japanese firms rose from 38.4 percent for 1974-80 to 57.6 percent for 1991-95. The peak, 68.3 percent for 1986-90, is obviously due to the equity-market bubble in that period.

5.1.2. Keiretsu versus non-keiretsu

It is generally believed that keiretsu firms are able to take on more debt because of their close relationships with main banks. This is borne out by the comparison of Panels B (keiretsu) and C (non-keiretsu) in Table 6. Panel B shows that, for 1974-95, the keiretsu equity, long-term debt, and short-term debt amount to, respectively, 50.5, 26.7, and 22.8 percent of total market value. In contrast, from Panel C, the corresponding numbers for non-keiretsu firms are 58.6, 20.5, and 20.9 percent of total market value. The keiretsu firms' heavier reliance on debt financing (49.5 percent) relative to non-keiretsu firms (41.5 percent) also holds in each and every subperiod, as shown in Table 6. We also see that most of the difference comes from the more intensive use of long-term debt financing by keiretsu firms. All this confirms the role of long-standing relationships with the main bank.

As non-keiretsu firms lack close relationship with main banks, one would expect them to rely more on the arm's-length financial markets than keiretsu firms do. Thus, bonds should be more important in the non-keiretsu capital structure. However, Table 6, Panel B and C show that the non-keiretsu firms actually use less straight bonds (4.2 percent) than the keiretsu firms do (6.9 percent). One explanation is that bonds are debentures and the main

banks usually provide guarantees for bonds issued through them. Thus, even when it comes to bond issues, relationships with banks still play a major role. Interestingly, convertible bonds are not less important in non-keiretsu firms (2.4 percent) than in keiretsu firms (2.2 percent). This is probably due to the fact that non-keiretsu firms are smaller, more risky, and higher-growth firms.[10] There is also a discrepancy between keiretsu and non-keiretsu firms regarding the choice between short- and long-term debt (26.7 percent long-term and 22.8 percent short-term for keiretsu, versus 20.5 and 20.9 percent for non-keiretsu). On average, the small and growth-oriented non-keiretsu firms use far less long-term than short-term debt relative to the keiretsu firms. This is consistent with Titman and Wessels' (1988) findings for the US, where small and growth firms tend to use more short-term debt than long-term debt.

5.1.3. Capital Structure: a Summary

We sum up as follows. First, Japanese firms take on more debt than do US firms. However, since the start of deregulation of the Japanese financial markets in mid-70s, we witness two major changes in the capital structure of the Japanese firms. First, the role of equity financing and in Japan has increased considerably. Second, bonds and convertible bonds—that is, debt financing from the market—have increased their weights in total debt (without, however, overtaking bank loans). There are also interesting differences in debt financing among the two groups of Japanese firms. Keiretsu firms, with their close relationships with main banks, are more highly leveraged than non-keiretsu firms, and especially so in terms of long-term bank debt and straight bonds (which are likely to be issued through, and guaranteed by, main banks). However, non-keiretsu firms rely on convertible bonds relatively more than keiretsu firms do.

5.2. Earnings, Investment, and Financial Decisions

The changes in capital structure revealed by Table 6 may be an optimal response to changing cash in- and outflows caused, in turn, by fluctuating operating and investment conditions. For a better understanding of how and why firms change their capital structures, we examine in this section the components of cash inflows and outflows. The cash constraint is as follows:

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[10] Such firms have a higher variance risk and bigger information asymmetries and hence greater agency costs. Thus, these firms have a more incentive to issue hybrid financial instruments such as convertible bonds to ease investors' concerns about information asymmetries and agency problems (see Mikkelson, 1980, 1981, and Brennan and Schwartz, 1988).

$$Y_t + Dp_t + dS_t + dLTD_t + dSTD_t = I_t + Div_t + Int_t .   \tag{6}$$

The aggregate annual inflows are cash earnings (earnings before interest but after taxes, Y_t, plus depreciation, Dp_t), net issues or repurchases of stocks (dS_t), and the issues or redemption of long- and short-term debt ($dLTD_t$ and $dSTD_t$). The outflows are gross investment (change in book capital from t-1 to t, plus depreciation, I_t), dividends (Div_t), and interest (Int_t). For most of this section, cash flows are expressed as proportions of the beginning-of-the year book capital of the firms. However, in the last subsection, where we investigate the possible impact of liquidity constraints of firms' investment, we yearly investment as the scaling variable.

5.2.1. Statics of Cash In- and Outflows

Panel A in Table 7 shows that, for 1974-95, annual gross investment (I_t) of all non-financials is on average 12.22 percent of the beginning-of-the-year book capital. Annual internally generated funds of the Japanese non-financials—that is, cash earnings $X_t = Y_t + Dp_t$—average 14.34 percent. Compared to the US firms' 13.12 percent and 15.11 percent for investment and cash earnings in FF (1998) for 1951-96, internal funds exceed investment outlays by a similar margin here (2.12 percent) as in the US (1.99 percent). However, relative to the US firms, the Japanese firms pay out far more: the low dividends (1.23 percent of initial value) are more than compensated by higher interest payments (5.62 percent). As the combined cash pay out of dividends and interest consume a big chunk of cash earnings, firms cannot finance all of their investments by retained cash earnings (RCE):

$$RCE_t = (Y_t + Dp_t) - (Div_t + Int_t) .   \tag{7}$$

From Table 7, annual retained cash earnings are on average 7.48 percent of total book capital (less than in the US case, 9.12 percent). Obviously, the gap relative to the 12.22 percent required for investments must be filled by outside financing—equity and debt issues, which together amount to 4.74 percent. Almost half of this is fresh long-term debt (2.43 percent), followed by short-term debt (1.45 percent) and new equity (less than one percent). In contrast, new equity takes the second place in the US firms (FF, 1998). The closer relationship with banks in Japan makes it relatively easy to roll over short-term loans, and hence short-term debt seems to have a quasi-permanent nature. The more recent period 1991-

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95, however, marks a break in that tradition, as we see when we discuss the dynamics in the next section.

Distinguishing between keiretsu and non-keiretsu, Panel B and C in Table 7 show that non-keiretsu firms invest on average more than keiretsu firms (12.28 percent per year of initial book capital for keiretsu, versus 11.47 percent for non-keiretsu firms). Simultaneously, non-keiretsu firms also pay out less: the total pay-out of dividends and interests takes 6.41 percent of the beginning-of-the-year book capital, compared to 7.50 percent for the keiretsu firms. The difference in the non-investment outlays between keiretsu and non-keiretsu firms is almost entirely due to a higher burden of interest expenses by keiretsu firms (5.90 percent) relative to non-keiretsu firms (5.08 percent). This, in turn, obviously reflects the keiretsu firms' higher leverage, as already documented in Table 6.

In many ways, the financing is similar across the two groups. To finance cash outflows, non-keiretsu firms draw marginally more from retained cash earnings, RCE_t, (7.29 versus 6.99), although these non-keiretsu firms have somewhat lower cash earnings, X_t, (13.70 versus 14.04 percent). Neither group can fully cover its investments (I_t) by internal financing (RCE_t); the shortfall is 4.99 and 4.48 percent for non-keiretsu and keiretsu, respectively. In filling this gap, the pecking order of external funding instruments is similar: long-term debt comes first, then short-term debt, and lastly equity. However, there are noticeable differences in the relative importance of the components of outside financing. Specifically, new issues of the keiretsu long-term debt are relatively more important (2.25 versus 1.94 percent), while the fresh equity is less important for keiretsu firms (0.82 versus 1.37 percent).

5.2.2. Dynamics of Investment and Forms of Financing

Table 7 also shows how these cash flows have evolved over time. For the first half of our sample period, 1975-85, in Panel A, investments in the Japanese firms were quite stable (12.41 percent in 1975-80 and 12.33 percent in 1981-85). On the other hand, new long-term debt financing lost importance, dropping from 3.15 percent to 1.77 percent. With negligible changes in new issues of equity and short-term debt, the shortfall was mainly filled by increased retained cash earnings, which rose from 7.09 percent in 1975-80 to 8.26 percent in 1981-85.

During the second half of our sample, 1986-95 (roughly the boom-and-bust years), there were more pronounced and profound changes. During the bubble years for 1986-90, investments soared to 15.71 percent, with a sharp increase in long-term debt (up to 3.85 percent) on the financing side. The reverse happened during the bust years for 1991-95: long-term debt issues dropped to an all-time low of 0.81 percent, mirroring a severe contraction of corporate investment to 8.39 percent of book value. In the slump years, corporate cash flow (either side of equation 6) deviates substantially from its grand average: for 1991-95 the cash flow shrunk to 12.37 percent of book capital, way below the grand average of 19.07 percent.

For a better perspective on the relations between investments and financing for the past 22 years, we follow FF (1998) and compute the correlation between annual corporate investment, I_t, and each of the forms of financing, all deflated by initial book value. The correlation of investment with the volume of new equity issues (dS_t) is 0.35, which is almost twice the figure observed for the US firms (FF, 1998). FF explain the weak correlation in the US by the fact that new stocks are often used to finance mergers. As mergers do not change the aggregate capital stock and are only weakly related with other forms of investment, they obscure the relation between equity issues and regular investments. In view of the paucity of mergers in Japan, the evidence here is consistent with FF's explanation. The correlation between investment (I_t) and other forms of financing is stronger: it amounts to 0.63 for cash earnings (RCE_t) or short-term debt ($dSTD_t$), and to an impressive 0.84 for long-term debt ($dLTD_t$). Consistent with FF's US findings, long-term debt seems to be the prime marginal financing vehicle of corporate investment.

Comparing keiretsu with non-keiretsu, the difference in the correlations between investment and forms of financing is generally small. If there is any noticeable difference, it appears in the link between new issue of equity (dS_t) and investments (I), where the correlation is far stronger for non-keiretsu companies (0.51, versus 0.35 for keiretsu). Thus, equity financing tends to play a more important role in accommodating year-by-year variation in investment in non-keiretsu firms than in keiretsu firms. The difference between keiretsu and non-keiretsu regarding the pecking order of financing becomes more pronounced when we directly express forms of finance as percents of investments (instead of book capital), as we do in the last subsection (5.2.4). Before that, we address free cash flows and dividends.

5.2.3. Free Cash Flows and Dividend Policy

Forms of financing also have to do with dividend policy. One source of funds for dividend payments is free cash flows, FCF_t, defined as

$$FCF_t = Y_t + Dp_t - Int_t - I_t. \tag{8a}$$

$$= Div_t - dS_t - dLTD_t - dSTD_t. \tag{8b}$$

While, as a stock variable, cash balances have been rather high, the last column in Table 7 shows that the Japanese firms do not hoard free cash flows. To the contrary, free cash flows of all non-financials are on average negative (−3.51 percent of book capital, from Panel A). The free cash flows in themselves provide, however, ambiguous information about the state of corporate health. Jensen (1986) defines free cash flow in the same way as (8), except that investment (I_t) is defined normatively as including just the positive-NPV projects. He argues that positive free cash flows reflect a lack of investment opportunities and increase agency cost due to the conflict of management and shareholders. Thus, if one is willing to assume that all actual investments were optimal, Japan's negative average annual free cash indicates profitable investment opportunities and low agency costs. In the same vein, the partial reversal of this phenomenon towards the end of the period (when free case flows rose from −5.63 percent for 1986-90 to −1.67 percent for 1991-95) would then reflect a worsening investment environment. Alternatively, one may also argue that the Japanese management was overinvesting during 1986-90, which, if true, probably is more damaging to firms than high agency costs. This view would be consistent with the argument by Kester (1991) that the hidden cost of the Japanese success would be the poor use of the free cash flow by the Japanese management.

Given the negative free cash flows, any dividend pay out must be covered by outside financing. The correlation of annual aggregate dividends (Div_t) and annual free cash flows (FCF_t) as percentages of book capital of all non-financials is −0.39. Thus, dividend pay out is not a "swing" variable set so as to minimize the firm's need for external funds. Rather, years with high net financing requirements (that is, unusually negative FCFs) also tend to be years with high dividends. We conclude that dividend pay out has its own momentum, and on average actually exacerbates rather than mitigates the need to attract funds from outside. Of course, this can only happen if sufficient outside financing is available, as (8b) shows. On a

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closer inspection, dividend pay out turns out to co-vary mostly with short-term debt financing, and tends to drop when new stock is issued. For all non-financials, the correlations between dividend paid out and, respectively, fresh short-term debt ($dSTD_t$), long-term debt ($dLTD_t$) and equity are 0.70, 0.43, and -0.34, respectively. Combining this with the evidence on investments, we see that short-term debt is more related to dividends than to investments, while the opposite is true for long-term debt.

From Table 7, Panel B and C, we also see that, as of 1981-85, the free cash flows for non-keiretsu firms have been somewhat more negative than for keiretsu companies. This holds true also for the grand average, -3.65 versus -3.33 percent of total book capital, as would be expected in view of the difference between their investments. Recall that non-keiretsu firms always invested more, relative to book value, than keiretsu firms. We also see that the keiretsu firms are largely responsible for the phenomenon that dividends are financed by (especially short-term) debt and decline when new stock is issued. Specifically, for keiretsu firms the correlations with dividend pay out are stronger (0.81 for short-term debt, 0.40 for long-term debt, and -0.37 for equity) than those for non-keiretsus firms (0.41, 0.36, and -0.01, respectively).

We have noted that, to some extent, dividend payout has its own momentum. The fact that firms maintain a relatively stable dividend policy (Lintner, 1956) indicates that they are reluctant to cut dividends because the market may take it as a bad signal.[11] This argument should be more powerful for firms that depend more on market financing and especially on equity. Thus, keiretsu firms should have less fears in cutting their dividends because they can better communicate with their main banks (see the argument by Woolridge and Ghosh, 1985). Consistently with this, Dewenter and Warther (1998) do find that non-keiretsu firms for 1982-93 are more reluctant to cut dividends than are keiretsu firms. All this has implications for the average level of the pay out ratio: non-keiretsu firms should prefer a low pay-out policy since this reduces the risk of having to cut the dividend. In addition, a low pay-out policy economizes on the costs of issuing new equity, which is an important source of funds for non-keiretsu firms.

Indeed, Table 8 shows that the non-keiretsu dividends, 1.56 percent of the year's initial aggregate book value, is on average lower than the keiretsus' dividend ratio (1.69

percent). This is also true in every sub-period.[12] If we scale dividends by earnings rather than by initial book value, we get the same picture: the non-keiretsu firms, on average, paid out marginally less dividends (39 percent of earnings) than the keiretsu firms did (41 percent). We also see that the non-keiretsu dividend pay out tends to be more stable than the keiretsu dividend pay out. Interestingly, unlike dividend yields (Div/Price) that show a downward trend since mid-70s, the dividend pay-out ratios (Div/Earnings) of Japanese firms, both keiretsu or non-keiretsu, tend to be mean-reverting.[13] Like the earlier findings by Dewenter and Warther (1998) for 194 Japanese firms, and Fama and Babiak (1968) and FF (1997b) for US firms, our findings is another manifestation of the dividend target pay-out model by Lintner (1956).

5.2.4. Forms of Financing relative to Investment, and Liquidity Constraints

The evidence that the Japanese dividend pay-out has its own momentum contradicts the strict version of Myers' (1984) pecking order model, which says firms resort to outside funds for investment only after exhausting internal funds. However, dividends also act as signaling devices that mitigate information asymmetries and hence lower the costs of outside financing. Taking into account this argument in favor of a stable dividend policy, a weaker form of the pecking order model can be advanced, saying that returned earnings should be the major source of funds for investment.

If the firm faces severe agency costs, the pecking order model implies that investment should be highly sensitive to cash flow, after controlling for future investment opportunities (see e.g. Fazzari, Hubbard, and Petersen, 1988, and Hoshi, Kashyap, ans Scharfstein, 1991). Contradicting this conjecture, however, Kaplan and Zingales (1997) and Cleary (1998) find that firms that are classified on exogenous grounds as less liquidity-constrained, have the highest investment-cashflow sensitivity. Thus, it seems there is no agreed method of detecting

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[11] See e.g., Bhattacharya (1979), Miller and Rock (1985), among others for the dividend signaling model, and Kumar (1988) for the "coarse signaling" theory, which explains the rationale of a stable dividend polity.

[12] As percentages of total book capital (Panels B and C in Table 7), the average keiretsu dividends are actually smaller than the average non-keiretsu dividends. However, to investors the percentages relative to market value are the more relevant ones. It is well known that the Japanese dividend yield is low by international standards, and the all-firm average of dividend yield is merely 1.74 percent. The fact that this is somewhat higher than either the keiretsu or non-keiretsu figures is explained by the existence of a third, relatively high-yield subsample, the utilities and communication sectors.

[13] The fact that payout ratios in Table 9 increase markedly from 1986-90 to 1991-95 across board is in consistent to the conclusion by DeAngelo and DeAngelo (1990) that firms in financial distress are reluctant to cut their dividends. We know that the Japanese firms at large were suffering in 1990s.

whether firms with higher agency costs and greater information asymmetry do face a higher cost of capital.

In subsection 5.2.2, we have used the correlation of the investment-to-value and each of the sources of financing to describe the dynamic relation of investment and financial decisions. However, with only a small sample size (22 yearly observations), the estimated correlations are not very reliable. In this section, we have a closer look at the investment-financing relation by expressing the sources of financing as percentages of total investment instead of book capital. For this purpose, the convenient version of writing the flow-of-funds equation is

$$I_t = RCE_t + dS_t + dLTD_t + dSTD_t. \tag{9}$$

We first study the components of (9) for the total-sample level, once in terms of grand averages and then dynamically.

Panel A of Table 9 shows that annual retained cash earnings (RCE_t) average 66.27 percent of total investment in all non-financial firms. Thus, internal financing is the main source of funds for investment. Annual net cash inflow from long-term debt takes up, on average, 16.50 percent of investment, annual new short-term debt placements 10.66 percent, and fresh equity only accounts to 6.56 percent. In terms of the share in (annual) incremental investment, this is, on balance, in line with Myers' (1984) pecking order model.

While the pecking order story appears to hold on average, the results in Table 9, Panel A, also show also that the picture has changed over time, especially during the boom-and-bust years 1986-95. In the recession period, 1991-95, retained cash earnings (RCE_t) average 77.93 percent of investment, new issues of long- and short-term debt altogether provide a mere 6.84 percent, while new issues of equity soar to 15.23 percent. The drop of debt's share of financing suggests that Japanese firms can no longer borrow as easily as before. (The alternative explanation, namely that firms simply do not need to borrow as much as before, is contradicted by their higher reliance on costly equity.) While banks apparently still provide long-term loans, the falling role of debt is especially pronounced in new issues of bonds and short-term debt. New issues of straight bonds in this period have even become negative, averaging −1.49 percent of investment.

The next issue is whether keiretsu and non-keiretsu firms behave differently. Qualitatively, the grand averages for 1974-95 per subgroup shows that keiretsu and non-

keiretsu firms have been rather similar regarding the relation between investment and forms of financing. Panel B and C in Table 9 show that, on average, both follow the textbook pecking order: retained earnings for keiretsu (non-keiretsu) firms stand for 69.51 (67.12) percent of investment, debt for 23.91 (22.58) percent, and equity for 6.58 (10.30) percent. The main difference has to do with the maturity of debt financing, with the keiretsu firms relying more on long-term debt for (14.89 percent, against 9.56 for non-keiretsu firms) and less on short-term debt for (9.02 percent as opposed to 13.02). The relative strength of keiretsu firms in long-term debt financing is obviously due to their close ties with main banks.

In a dynamic perspective, however, the contrast of keiretsu with non-keiretsu becomes more obvious. Panel B and C in Table 9 show that, in 1991-95, keiretsu annual retained cash earnings soar to 88.82 percent of investment—way above non-keiretsus' 73.73 percent, and quite different from the 1986-90 period where the two groups had similar percentages (53.71 and 52.48). Since profitability did not exactly peak and dividends did not drop that much either, the rising RCE/I ratio means that investments were dropping even faster than retained cash earnings, and more so in the keiretsu firms. Based on the information on the high share of retained cash earnings in investment alone, it is not clear whether this reflects a more pronounced lack of profitable projects within the keiretsu groups, or instead a reversal of an earlier possible over-investment mistake. The latter scenario, compounded by the deteriorating state of the Japanese banking sector, would indicate tighter corporate liquidity-constraints that force firms (and particularly keiretsu ones) to forego positive NPV projects—a classic debt overhang or under-investment problem.[14],[15]

For the credit-crunch period 1991-95, keiretsu and non-keiretsu firms experience interestingly different ways of suffering, as shown in Panel B and C in Table 9. Keiretsu firms reduced short-term debt (dSTD = −11.02 percent of investment), and their new long-term debt capital comes almost entirely from banks (4.21 percent of investment). By contrast, new issues of short-term debt by non-keiretsu firms remained high, at 14.60 percent of

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[14] Debt financing is believed in the agency theory to be able to prevent management from over-investment, see, e.g., Jensen (1986), Stulz (1990), and Hart and Moore (1995). However, from the information asymmetry (adverse selection) theory, debt financing demonstrates a big disadvantage: debt overhang (see Myers, 1977), which is pronounced in difficult times.

[15] As mentioned, Hoshi, Kashyap, and Scharfstein (1991) find, however, keiretsu firms used to be less liquidity-constrained than non-keiretsu firms, but their data cover 1965-85, long before the 1990s, a period that was especially dismal to the main-bank centered keiretsu members. If we are willing to accept that a higher reliance on retained cash earnings means more liquidity constraints, *ceteris paribus*, we can find some of

investment, and on balance these firms retire long-term debt (dLTD = –4.55 percent of investment, mainly because of net withdrawals of straight bonds to the tune of –10.42 percent of investment).

This information on the relation of investment and outside financing corroborates the view that keiretsu firms faced more stringent liquidity constraints. Indeed, the international evidence shows that if firms face high cost of debt financing and hence are liquidity constrained, they do not issue short-term debt. Specifically, Guedes and Opler (1996) find that the US firms with good credit ratings issue debt at both the short-end and long-end of maturity while firms with speculative grade credit ratings borrow in the middle of the maturity spectrum. In this regard, keiretsu firms seem much more liquidity constrained in the 1991-95 period. To explain the non-keiretsu firms' massive retreat from the straight-bond market in favor of more short-term debt, we can invoke an information-asymmetry argument (see Barclay and Smith 1995). Specifically, for the relatively small-sized and growth-oriented non-keiretsu firms, asymmetry in information between firms and bond investors becomes severe in bad market conditions. Thus, non-keiretsu firms have more incentives to approach banks for funding; and banks, having become more careful in their credit evaluations, are more likely to grant loans to the less-afflicted non-keiretsu firms than to keiretsu ones.

5.2.5. Cash Balances

As mentioned in the introduction, in the above we have treated all cash holdings as part of working capital, even though part of them represents compensatory balances rather freely chosen assets. When we split up investments into changes in cash and non-cash assets (results available on request), we observe no major changes. As expected, changes in the cash position are positively correlated with stock and loan issues as well as with dividends (which are financed by issues of equity or debt, as we have seen), but the correlations of non-cash investments are quite similar to the ones for total investment.

Over time, there is one noticeable change towards the end of the period. Specifically, a nontrivial part of the drop in investments in the 90s can be traced to reduced cash balances, which go down by 1.35% of total book value for all firms. There is little difference, in this respect, between keiretsu versus non-keiretsu. The main conclusions, however, remain

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evidence in Table 9 to support their findings. For 1975-80, the keiretsu retained cash earnings average 66.07 percent of investment while the non-keiretsu retained cash earnings average higher 72.30 percent.

unaffected. Non-cash investment, still is markedly lower in the 90s, especially in keiretsu firms. Nor does the stock adjustment in the cash balances improve the free cash flows: at –3.02% of book value in the 90s (–2.69% keiretsu, –3.67% non-keiretsu), the free cash flows remain negative, and more so for non-keiretsu firms. When looking at the sources of financing of non-cash investment, the reliance on internal sources (redefined as retained earnings minus changes in cash balances) in the 90s becomes more marked. But this does of course not affect our findings that all firms issued more stock and reduced their debt, and that non-keiretsu firms continued to borrow short-term. Thus, the patterns observed in total investment and free cash flows are robust to our treatment of all cash balances

5.2.6. Investment, Pay Out, and Financing Decisions: a Summary

To sum up, when we add to the Myers' (1984) pecking order model a target dividend policy, Japan's corporate financing conforms to the model: retained cash earnings represent the major source of funds for investment by Japanese non-financial firms. New issues of debt come second in the financing of investment, with especially long-term debt issues that closely track the variations in investment. Keiretsu and non-keiretsu firms exhibit marked differences regarding their financial decisions. In their outside financing for investment, keiretsu firms rely more on long-term debt while non-keiretsu firms, which also invest more, tend to use more equity and short-term debt. Changes in dividends of keiretsu firms are very strongly related to new issues of short-term debt, while the relation between non-keiretsu dividends and forms of financing is weaker. Non-keiretsu firms have a marginally lower dividend yield, possibly explained by a desire for stable dividends and/or a desire to minimize costly equity issues.

More recently, however, keiretsu firms have acted somewhat out of character in that they seem to have become more liquidity constrained. Many of them may be in financial distress, as they avoid issuing—and even extensively retire—short-term debt, often a sign that not all is well. Non-keiretsu firms have suffered too, but less so. True, they have become largely cut off from the straight-bond market, but they are still able to approach banks for substantial amounts of new short-term debt, a sign that these firms are in relative good shape.[16] This is in line with the finding of Anderson and Makhija (1999) that the Japanese firms with growth opportunities took more bank debts in 1990. Still, corporate and bank

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behavior in 1990-95 was, as we have shown, rather different from the preceding period, so that general inferences about the presence or absence of hold-up behavior on behalf of banks remain tentative.

Although, by the standard pecking-order theory, equity is rated as a high-cost source of funds, in 1991-95 common stock suddenly becomes the second major source of funds for investment in Japanese firms, especially in keiretsu. According to the model of project delay by Choe, Masulis, and Nanda (1993), new equity issues in Japan should have decreased at times of economic contraction. Thus, the heavier reliance on expensive equity suggests that, in recent years, Japanese firms have had a hard time obtaining debt financing, which resulted in a rise of their cost of capital.[17] Since our evidence shows that the keiretsu firms had more new equity shares in the incremental investment relative to non-keiretsu firms, the keiretsu firms must face more difficulty in debt financing and hence more liquidity constrained. This confirms the results on IRRs in the previous section.

6. Concluding Remarks

In this paper, we first estimate the IRRs on value and cost for the Japanese non-financials for 1974-95. The real return on value, or cost of capital, is 4.95 percent and the real return on cost, or return on corporate investment, is 7.94 percent. Thus, Japanese firms have, on average, added value. These numbers are similar to the findings by FF (1998) for the US non-financials for a similar period. When translated into (real) USD, the Japanese estimates become larger, 7.63 and 10.86 percent, than the US counterparts. It seems that the popular notion of a low cost of capital in Japan is confounded by a numeraire effect.

The main issue of the paper is, however, a comparison between the (main-bank-affiliated) keiretsu firms and non-keiretsu firms. We show that the reciprocal holding among the Japanese business firms declines steadily over time, indicating that the internal-discipline-enhancing role by the main-bank system has been diminishing. Still, keiretsu and non-keiretsu

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[16] Flannery (1986) and Diamond (1991) argue that firms that anticipate improvement in credit ratings in the future have greater incentive to borrow short-term. James (1987) shows that investors tend to take firms' increase in (short-term) bank debt as a favorable signal.

[17] In effect, Kang and Stulz (1996) find in their Japanese sample for 1985-91 that, while prior to 1990 there were significantly positive abnormal returns after the equity issue announcements, the Japanese market appears to be more "American" by reacting negatively to equity issue as of 1990.

remain remarkably distinguishable in many ways. On balance, the keiretsu member firms take on more long-term debt while the non-keiretsu firms rely on more equity and convertible bonds. The non-keiretsu firms are relatively small-sized and growth-oriented, and seem to maintain a relatively stable dividend policy with lower dividend yield. In contrast, the relation between dividend payment and new issue of short-term debt is particularly strong for keiretsu firms.

The corporate sector in Japan has undergone painful changes in 1990s, with a credit crunch and a dramatic decrease in investment. As a result, we see changes in the corporate cost of capital and the return on corporate investment. Until the early 90s, the cost-of-capital gap between keiretsu firms and non-keiretsu firms used to be comfortably in favor of the main-bank centered keiretsu firms. This conforms with the traditional view. However, this financial advantage of the keiretsu firms was reversed afterwards. Our examination of the dynamics of corporate earnings, investment and the ways of financing helps pin down how the main-bank system went wrong. The keiretsu firms were clearly in a worse financial state during the period 1991-95. Retained earnings fell, and investment dropped even faster; new issues of equity soared and seem to be used to pay off short-term debt. Also the non-keiretsu firms, in this last period, abandon Myers' (1984) pecking order of external financing by issuing more equity relative to investment, but unlike keiretsu firms they continued to be able to place considerable amounts of short-term debt. Maybe the Japanese firms, and especially keiretsu ones, were short of positive-NPV projects; but, if so, why would they change the pecking order of financing with a substantial increase in new issues of costly equity? The more likely explanation is that past over-investments and a debt overhang resulted in liquidity constraints. In this regard, we show that keiretsu firms tended to have greater problems than non-keiretsu firms for 1991-95. These results from the analysis of investment and financing decisions tie in with the IRR estimates: the cost-of-capital gap between keiretsu and non-keiretsu closed in the early 90s, and the keiretsu value added has dropped markedly faster than the non-keiretsu one in subsequent years.

An in-depth discussion of the failure of the main-bank system as of 1990 is beyond the scope of this paper. Nevertheless, several possibilities can be thought of, or have already been suggested in literature. One is that, before early-90s, banks as well as management were overly optimistic about the returns on investment. Given the close relationships between bank and client, and the bubble economy, this explanation has some credibility. If true, the keiretsus' advantage of lower agency cost must have been more than offset by this over-

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investment mistake, which in turn suggests that, after all, banks/shareholders did not do a very good job in monitoring. Possibly, the monitoring effectiveness of the main banks deteriorated in the changing environment of financial deregulation.Another possible reason for the reversal of the keiretsu's cost of capital advantage may have been that main banks exploit their information monopolies on client firms and charge their captive client firms a higher cost of capital (Sharpe, 1990, and Rajan, 1992). Recall that existing empirical work is inconclusive. There is supporting empirical evidence by Houston and James (1996) and Weinstein and Yafeh (1998), which goes back to the glory times of the Japanese corporations. In contrast, Anderson and Makhija (1999) conclude that Japanese bank financing does not impose meaningful hold-up costs on firms that face high agency costs of arms-length debt. One problem with the latter evidence—that erstwhile constrained firms continued to take up more bank debt after their access to the bond market was enhanced—is that it bears only on 1990, the first year after the deregulation of the bond market. While we do not claim that our own evidence is conclusive, at least it bears on a longer post-liberalization period. What we observe is a continuation of what Anderson and Makhija (1999) already noted for 1990. Specifically, we find that non-keiretsu firms were able to increase substantially their bank debt as of the early 90s, even though these firms faced less legal constraints in issuing bonds than before, and even though the borrowers were small and growth-oriented and the economy was in a bad recession—circumstances that should increase the cost of market financing and facilitate hold-up behavior on behalf of banks. True, this evidence bears on non-keiretsu firms. But the recent reduction of bank borrowing by keiretsu firms likewise suggests that banks have been unable, or possibly even unwilling, to continue playing their role of privileged lenders to firms within the group.

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Table 1: Sample Descriptions

The table describes the sample in terms of the average of annual number of firms, cross-holding, book and market capital. The sample is based on PACAP's fiscal year-end data on the Japanese domestic non-financial firms (all Japanese Industry Code except 0501-0513 for financials) listed in the First and the Second Sections. We choose firms with annual data on market and book value of capital for at least two consecutive years. Keiretsu firms are close members (classified as 2-, 3-, or 4-star) of the Six Major Japanese Industrial Groups. Non-keiretsu firms are either the unaffiliated firms or the weak members (1-star) of the Groups, excluding Utilities (Code 0801) and Communications (0705). "Firms" refers to the number of firms in the sample at the end of each fiscal year. Book capital is the total end-of-year book value of long-term debt (PACAP's data items BAL14 and BAL15), short-term debt (BAL11), and equity for firms appearing in the corresponding fiscal year. Book equity is total assets (BAL9) minus total liabilities (BAL17). Market capital is the total end-of-year book value of short- and long-term debts plus the market value of equity [(MKTVAL or share price (MKT3) times shares outstanding (MKT5)] at the end of March, regardless whether firms have a fiscal year end in March. Data on the number of shares owned by the non-financial firms (JAF78) and the total number shares owned (JAF81) in each firm enables us to obtain two kinds of cross-holding adjustment factors: K= (JAF78*MKT3)/(JAF81*MKT3) and H=K * [Total Market Equity/total Market Capital]. To purge the inflating effect of cross-holdings, the figures for market equity, market and book capital we use are defined as market equity times (1-K), market capital times (1-H), and book capital times (1-H) in trillions of JPY.

Year	Firms		Cross-Holding		Book Capital		Market Capital	
	All	keiretsu (%)	K (%)	H (%)	All (in tril)	keiretsu (%)	All (in tril)	keiretsu (%)
1974-79	1168	41.45	21.46	8.73	68.25	58.64	93.72	58.01
1980-85	1296	39.52	21.16	11.36	104.93	55.83	165.30	55.82
1986-90	1415	37.35	20.52	14.69	167.09	52.14	383.68	49.09
1991-95	1512	36.13	16.63	9.89	236.70	50.91	373.56	48.81
1974-95	1337	38.78	20.07	11.07	139.00	54.64	242.74	53.30

Table 2: Distribution of keiretsu Members in Industries

The table shows how keiretsu members are spread in various industries in terms of the average of the annual number of firms, book capital and market capital (see definition in Table 1). We decompose the Japanese non-financial sector into 11 industries: Construction (Code 201), Manufacturing (301-315), which is further divided into Food&tex&pap (301-303), Chem&petr&rub (307-310), and Machine&equip (311-315), Wholesale&retail (401-402), Real estate (601), Service (901), Ag&ut&trans&com (101-103&701-705&801) with and without NTT.

Industry	Firms		Book Capital		Market Capital	
	All	Keiretsu (%)	All (in trillions)	Keiretsu (%)	All (in trillions)	Keiretsu (%)
Construction	113	21.37	8.57	42.18	13.99	42.84
Manufacturing	923	44.48	71.01	65.25	130.34	64.71
Food&tex&pap	166	44.00	9.48	61.61	17.17	63.30
Chem&petr&rub	174	54.12	13.40	66.52	25.81	65.84
Glass&steel&metal	154	54.98	14.73	68.60	25.16	68.33
Machine&equip	429	36.97	33.40	64.49	62.20	63.23
Wholesale&retail	133	29.19	21.66	63.13	30.76	57.26
Real estate	19	30.75	3.94	61.20	6.38	66.69
Service	38	11.19	1.29	16.38	3.18	16.55
Ag&ut&trans&com w/	111	31.64	32.54	29.46	58.10	26.92
Without NTT	110	31.76	29.49	31.52	47.96	29.92

Table 3: Rates of Return on Value and Cost for 1974-95

Panel A of the table shows the IRRs on value and cost, defined in equations (1) and (2), for all non-financial firms, keiretsu firms, and non-keiretsu firms over 1974-95. Keiretsu represents close members of the Six Major Industry Groups. Non-keiretsu includes either unaffiliated firms or weak members of the Groups, excluding Utilities (Code 0801) and Communications (0705). The IRR on value estimates the return on investments of firms that are acquired at market value when they enter the sample, and sold at market value, either when they leave the sample or when we liquidate the sample in 1995. The IRR on cost assumes corporate assets are acquired at book, rather than market value. Annual nominal cash flows in USD are converted from the original JPY cash flows using the USD/JPY rate in each end-March (from PACAP). We compute real IRRs by using annual nominal cash flows in JPY (or in USD) divided by the Japanese (or US) Consumer Price Index in March (from PACAP and CRSP). Panel B shows simple and compound returns on value for all non-financials, keiretsu, and non-keiretsu firms in Panel A. Note that all these firms in the sample happen to have market value data at the beginning and end of a given year after entry and before exit. The simple return for a year is $R_t=[(X_t-I_t)+(V_t-V_{t-1})]/V_{t-1}$, where V's are the aggregate market values of firms that have data at both the beginning and end of year t and X_t-I_t is their aggregate net cash flow (see Table 4 for details). Standard deviations of the simple average returns are in the parenthesis.

	Panel A: IRRs on Value and Cost (in percent)							
	IRR on Value in JPY		IRR on Cost in JPY		IRR on Value in USD		IRR on Cost in USD	
	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real
All non-financials	8.01	4.95	11.34	7.94	13.24	7.63	16.89	10.86
Keiretsu	9.07	5.71	11.26	7.73	14.56	8.61	16.86	10.72
Non-keiretsu	8.61	5.56	11.74	8.42	13.96	8.33	17.29	11.34
	Panel B: Simple and Compound Returns (in percent)							
	Simple Average				Geometric Mean			
	In JPY		In USD		In JPY		In USD	
	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real
All non-financials	8.96	5.86	15.87	10.20	8.51	5.38	13.90	8.17
(St.Dev.)	(2.20)	(2.27)	(4.98)	(4.94)				
Keiretsu	9.44	6.34	16.30	10.61	8.97	5.83	14.38	8.62
(St.Dev.)	(2.27)	(2.37)	(4.89)	(4.86)				
Non-Keiretsu	9.75	6.62	16.68	10.99	9.14	5.99	14.56	8.79
(St.Dev.)	(2.56)	(2.60)	(5.18)	(5.13)				

Table 4: Components of Cash Flows in 1995 JPY

The sample is based on PACAP's fiscal year-end data on the Japanese domestic non-financial firms (all Japanese Industry Code except 0501-0513) listed in the First and Second Sections. Keiretsu represents close members of the Six Major Japanese Industrial Groups. Non-keiretsu firms include either the unaffiliated firms or the weak members of the Groups, excluding Utilities (Code 0801) and Communications (0705). Firms stand for the number of firms at the beginning of the year. Cash earnings, $X_t=Y_t+Dp_t$, where Y_t is the sum of net income [(PACAP's data item INC9) and interest expense (JAF67)], and Dp_t is depreciation expense (JAF74). Investment, I_t, is the change in book capital from t-1 to t, plus depreciation. Thus, X_t-I_t is annual net cash flow from operations. A firm's cash flow is included in the aggregate cash flow beginning in the year after the firm enters and through the year it leaves the sample. FBC_t is the cost of new firms bought at book value of capital (Cost) in t. FBV_t is the cost of firms bought at the market value of capital (Value) in year t (see Table 1 for the definition of book and market values of capital.) FS_t is the market value capital of firms sold when they leave the sample or terminate in 1995. The total net cash flow for year t, Net Flow=$(X_t-I_t)+(FS_t-FBC_t)$ when the new firms are bought at cost. Net Flow = $(X_t-I_t)+(FS_t-FBV_t)$ when the new firms are bought at value. Panel A, B, and C show the components of the aggregate cash flows for all non-financials, keiretsu, and non-keiretsu firms, respectively.

Year	Firms	New Firms at Book Value		New Firms at Market Value		FS	X-I	X	I	Dp	I-Dp
		Net Flow	FBC	Net Flow	FBV						
				Panel A: All non-financials							
1974	0	-89.56	89.56	-116.99	116.99	0.00	0.00	0.00	0.00	0.00	0.00
1975	868	-18.54	17.05	-27.41	25.93	0.00	-1.48	13.65	15.13	4.43	10.70
1976	1210	4.16	0.16	3.95	0.37	0.00	4.32	16.24	11.92	5.12	6.80
1977	1218	5.87	0.25	5.67	0.44	0.00	6.12	15.47	9.36	5.07	4.29
1978	1228	6.94	0.22	6.72	0.43	0.00	7.16	15.25	8.09	5.35	2.74
1979	1237	2.75	0.23	2.52	0.46	0.00	2.98	16.13	13.15	5.50	7.65
1980	1248	4.56	0.25	4.33	0.48	0.00	4.81	19.12	14.30	5.88	8.42
1981	1256	0.77	0.30	0.61	0.45	0.00	1.06	18.77	17.71	6.51	11.20
1982	1272	3.20	0.62	2.36	1.46	0.00	3.82	18.82	15.00	6.61	8.39
1983	1288	7.78	0.28	6.84	1.22	0.00	8.06	19.15	11.09	7.09	3.99
1984	1304	5.19	0.29	4.56	0.92	0.00	5.48	20.31	14.83	7.67	7.16
1985	1321	5.48	0.66	4.46	1.69	0.00	6.15	20.43	14.28	8.19	6.10
1986	1332	-6.61	8.91	-48.89	51.20	0.00	2.30	19.05	16.74	8.48	8.26
1987	1328	-0.87	0.88	-2.79	2.80	0.00	0.01	22.17	22.17	10.41	11.76
1988	1388	-6.07	1.21	-7.50	2.64	0.00	-4.87	24.24	29.11	10.87	18.24
1989	1435	-9.70	0.95	-11.63	2.89	0.75	-9.50	26.11	35.61	11.12	24.49
1990	1457	1.44	1.02	-0.35	2.80	1.13	1.32	28.49	27.17	11.68	15.49
1991	1468	-4.37	0.80	-5.81	2.23	0.56	-4.14	27.92	32.06	12.40	19.66
1992	1483	5.19	1.13	4.56	1.76	2.61	3.71	16.42	12.71	4.54	8.17
1993	1500	0.30	3.40	-6.58	10.28	0.61	3.09	21.71	18.62	12.19	6.43
1994	1513	1.28	2.14	0.51	2.91	0.08	3.34	22.61	19.27	12.87	6.40
1995	1534	423.07	0.00	423.07	0.00	411.30	11.76	23.23	11.46	13.00	-1.54

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Table 4 Continued

Year	Firms	New Firms at Book Value Net Flow	FBC	New Firms at Market Value Net Flow	FBV	FS	X-I	X	I	Dp	I-Dp
						Panel B: Keiretsu Firms					
1974	0	-53.88	53.88	-70.75	70.75	0.00	0.00	0.00	0.00	0.00	0.00
1975	382	-10.36	9.31	-15.53	14.49	0.00	-1.04	8.25	9.29	2.52	6.78
1976	502	2.89	0.01	2.83	0.07	0.00	2.90	9.44	6.54	2.80	3.74
1977	503	4.23	0.01	4.22	0.02	0.00	4.24	8.84	4.59	2.73	1.86
1978	504	4.85	0.03	4.84	0.04	0.00	4.88	8.53	3.65	2.83	0.82
1979	505	2.91	0.00	2.91	0.00	0.00	2.91	9.32	6.40	2.94	3.47
1980	505	3.02	0.18	2.94	0.26	0.00	3.20	10.81	7.61	3.12	4.49
1981	507	1.12	0.05	1.09	0.08	0.00	1.17	10.57	9.40	3.47	5.92
1982	510	2.32	0.03	2.24	0.12	0.00	2.35	10.55	8.19	3.43	4.76
1983	512	4.58	0.07	4.42	0.23	0.00	4.65	10.66	6.02	3.73	2.29
1984	515	3.07	0.08	2.84	0.31	0.00	3.15	11.41	8.26	4.13	4.13
1985	519	3.94	0.05	3.82	0.17	0.00	3.99	11.22	7.23	4.39	2.84
1986	522	0.17	0.06	0.07	0.16	0.00	0.23	10.36	10.12	4.59	5.53
1987	524	0.67	0.21	0.26	0.62	0.00	0.88	10.82	9.94	4.78	5.16
1988	530	-2.59	0.64	-3.47	1.53	0.00	-1.95	12.04	13.99	4.99	9.00
1989	536	-5.58	0.27	-6.12	0.81	0.04	-5.35	13.29	18.64	5.14	13.49
1990	542	-0.45	0.15	-0.74	0.44	0.12	-0.42	14.76	15.17	5.48	9.69
1991	545	-0.96	0.01	-0.99	0.03	0.56	-1.52	14.37	15.89	5.91	9.98
1992	546	2.79	0.08	2.73	0.14	0.76	2.11	8.83	6.72	2.72	4.00
1993	549	4.48	0.22	4.25	0.45	0.46	4.25	10.26	6.01	5.52	0.49
1994	554	0.89	0.19	0.83	0.25	0.05	1.03	10.55	9.52	5.74	3.78
1995	558	207.25	0.00	207.25	0.00	200.56	6.69	10.75	4.06	5.63	-1.56
						Panel C: Non-keiretsu Firms					
1974	0	-26.52	26.52	-35.74	35.74	0.00	0.00	0.00	0.00	0.00	0.00
1975	473	-7.60	7.68	-11.29	11.37	0.00	0.08	4.11	4.03	1.39	2.64
1976	698	1.72	0.15	1.58	0.30	0.00	1.88	5.29	3.41	1.66	1.75
1977	703	1.79	0.23	1.60	0.42	0.00	2.02	4.94	2.92	1.67	1.25
1978	710	2.62	0.19	2.41	0.40	0.00	2.81	4.92	2.11	1.74	0.37
1979	718	0.92	0.23	0.69	0.46	0.00	1.15	5.36	4.21	1.78	2.43
1980	730	1.35	0.08	1.21	0.22	0.00	1.43	5.94	4.51	1.83	2.68
1981	736	0.01	0.25	-0.11	0.37	0.00	0.26	5.84	5.58	1.95	3.62
1982	748	1.04	0.59	0.29	1.34	0.00	1.63	5.82	4.19	2.07	2.12
1983	764	1.98	0.21	1.20	0.99	0.00	2.19	5.84	3.65	2.20	1.45
1984	777	1.39	0.21	0.99	0.61	0.00	1.60	6.15	4.56	2.27	2.28
1985	791	0.31	0.62	-0.60	1.52	0.00	0.92	6.28	5.36	2.43	2.93
1986	818	0.73	0.73	-0.78	2.24	0.00	1.46	5.54	4.08	2.48	1.59
1987	848	-3.54	0.67	-5.04	2.18	0.00	-2.86	6.27	9.14	2.66	6.47
1988	869	-5.20	0.56	-5.75	1.11	0.00	-4.64	7.22	11.86	2.86	8.99
1989	889	-5.26	0.68	-6.66	2.08	0.71	-5.29	8.02	13.31	2.98	10.33
1990	902	1.02	0.87	-0.48	2.36	1.01	0.87	9.00	8.13	3.24	4.89
1991	920	-3.48	0.62	-4.84	1.98	0.00	-2.86	8.70	11.56	3.47	8.10
1992	933	1.93	1.05	1.36	1.62	1.85	1.13	4.88	3.75	0.83	2.92
1993	945	-3.98	2.94	-9.30	8.26	0.15	-1.19	6.82	8.01	3.51	4.50
1994	966	0.39	1.55	-0.47	2.41	0.03	1.90	7.20	5.29	3.77	1.53
1995	983	164.86	0.00	164.86	0.00	161.17	3.69	7.19	3.50	3.82	-0.32

Table 5: Capitalized Cash Flows for 1974-95 as Percents of 1995 Terminal Value

The table shows the 1995 value of the annual components of cash flow capitalized at the real or nominal IRR on value or cost (Table 3) and expressed as a percent of the terminal market value of capital (TV_{1995}) of the firms in the sample in 1995. FB_t is the cost of new firms that enter the sample at book value (Cost) or market value (Value). FS_t is the market value of firms sold from the sample before 1995. $X_t=Y_t+Dp_t$, where Y_t is the net income before interest expense, and Dp_t is depreciation expense. I_t-Dp_t is the change in book capital from t-1 to t and investment, I_t, is the change in the book capital plus depreciation. Thus, X_t-I_t is annual net cash flow from operations. A firm's cash flow is included in the aggregate cash flow beginning in the year after the firm enters and through the year it leaves the sample. (See more detailed definitions in Table 4.) $FB_t-FS_t-(X_t-I_t)=100$ percent, due to the fact that the IRR equates the capitalized cost of the net corporate investment to the terminal value TV_{1995} in 1995.

	IRR on	FB	FS	X-I	X	I	Dp	I-Dp
	Nominal Cash Flows as Percents of TV $_{1995}$							
All non-financials	Cost	141.15	2.00	39.25	254.85	215.60	96.17	119.43
	Value	126.53	1.78	24.81	178.57	153.76	68.94	84.82
Keiretsu	Cost	156.88	1.34	55.51	283.17	227.66	100.04	127.62
	Value	142.59	1.25	41.26	222.38	181.12	79.73	101.39
Non-keiretsu	Cost	129.93	3.49	26.41	212.14	185.73	76.62	109.10
	Value	117.62	3.10	14.57	151.17	136.60	55.32	81.28
	Real Cash Flows as Percents of TV $_{1995}$							
All non-financials	Cost	133.97	1.82	32.20	217.47	185.27	82.49	102.78
	Value	122.76	1.63	21.04	157.02	135.98	60.88	75.09
Keiretsu	Cost	146.12	1.22	44.89	237.61	192.72	84.43	108.29
	Value	135.06	1.15	33.86	189.33	155.47	68.26	87.21
Non-keiretsu	Cost	124.68	3.18	21.45	182.76	161.31	66.20	95.11
	Value	114.80	2.84	12.04	133.21	121.18	48.87	72.30

Table 6: Japanese Corporate Capital Structures

Capital Structures of all non-financial firms (Panel A), Keiretsu (Panel B), and Non-keiretsu firms (Panel C) are shown in terms of average shares of different classes of liabilities measured in percents of total market capital for non-financial firms in the sample at the end of each fiscal year. keiretsu represents the close members of the Six Major Industry Groups. Non-keiretsu includes either unaffiliated firms or the weak members of the Groups, excluding Utilities (Code 0801) and Communications (0705). Market capital is the total end-of-year book value of short-term debt (PACAP's data item BAL11) and long-term debt (BAL14 and BAL15) plus the market value of equity [(MKTVAL or share price (MKT3) times shares outstanding (MKT5) at the end of March]. Long-term debt includes Long-term Loans (BAL14) and Debentures (BAL15) which in turn consist of Bond (JAF50) and Convertible Bonds (JAF51).

Year	Common Stock	LT Debt				ST Debt
		Total	Loan	Bond	Convertible Bond	
Panel A: All Non-financials						
1974-80	38.39	35.11	26.53	7.04	1.54	26.50
1981-85	50.57	26.73	18.01	6.91	1.81	22.71
1986-90	68.31	17.76	8.32	7.40	2.05	13.92
1991-95	57.58	25.24	11.07	10.96	3.20	17.18
1974-95	52.32	27.02	16.94	7.98	2.09	20.66
Panel B: Keiretsu Firms						
1974-80	36.92	34.41	27.43	5.27	1.70	28.67
1981-85	49.63	25.79	18.60	5.37	1.82	24.58
1986-90	65.62	18.03	9.06	6.83	2.14	16.35
1991-95	55.20	25.42	11.16	10.91	3.35	19.38
1974-95	50.49	26.69	17.55	6.93	2.20	22.83
Panel C: Non-keiretsu Firms						
1974-80	45.13	27.86	23.61	2.57	1.68	27.00
1981-85	58.64	18.40	13.25	2.83	2.33	22.96
1986-90	72.73	13.19	5.98	4.75	2.46	14.08
1991-95	63.05	19.64	9.10	7.11	3.42	17.31
1974-95	58.55	20.51	13.95	4.16	2.40	20.94

Table 7: Cash In- and Outflows, Retained Cash Earnings, and Free Cash Flows

The table shows the average annual cash in- and outflows, retained cash earnings, and free cash flows as percents of aggregate year-start book capital. Components of the cash in- and outflows and combinations of the components like retained cash earnings and free cash flows are expressed as percents of cash inflows, which balance cash outflows:

$$Y_t + Dp_t + dS_t + dLTD_t + dSTD_t = I_t + Div_t + Int_t$$

Y_t is the sum of net income (PACAP's data item INC9) and interest expense (JAF67), Dp_t is depreciation expense (JAF74). $dLTD_t$ is the change in the book value of the sum of long-term loans (BAL14) and debenture (BAL15) from t-1 to t. $dSTD_t$ is the change in the book value of short-term debt (BAL11). Investment, I_t, is the change in book capital from t-1 to t, plus depreciation. Int_t is interest expense (JAF67). Div_t is dividend [dividend per share (MKT1) times shares outstanding (MKT5)]. The net flow from the sale and repurchase of stock, $dS_t = I_t + Div_t + Int_t - Y_t - Dp_t - dSTD_t - dLTD_t$, balances the cash flow identity. The retained cash earnings, $RCE_t = Y_t + Dp_t - Div_t - Int_t$, or $RCE_t = I_t - dS_t - dLTD_t - dSTD_t$. The free cash flow, $FCF_t = Y_t + Dp_t - Int_t - I_t$.

Year	Y	Dp	dS	dLTD	dSTD	I	Div	Int	RCE	FCF
Panel A: All Non-financials										
1975-80	10.94	5.31	0.36	3.15	1.81	12.41	1.37	7.80	7.09	-3.95
1981-85	10.32	6.03	0.31	1.77	1.99	12.33	1.38	6.72	8.26	-2.69
1986-90	8.14	6.38	1.36	3.85	1.73	15.71	1.31	4.44	8.77	-5.63
1991-95	5.03	4.80	1.50	0.81	0.20	8.39	0.84	3.11	5.88	-1.67
1975-95	8.72	5.62	0.86	2.43	1.45	12.22	1.23	5.62	7.48	-3.51
Panel B: Keiretsu Firms										
1975-80	11.09	4.91	0.15	2.69	1.84	11.27	1.25	8.16	6.59	-3.43
1981-85	10.59	5.72	0.26	1.59	1.99	11.81	1.26	7.08	7.98	-2.58
1986-90	8.30	5.79	1.43	3.95	1.99	15.52	1.23	4.70	8.15	-6.14
1991-95	5.02	4.34	1.57	0.67	-0.26	7.31	0.84	3.18	5.33	-1.14
1975-95	8.86	5.18	0.82	2.25	1.41	11.47	1.15	5.90	6.99	-3.33
Panel C: Non-keiretsu Firms										
1975-80	11.19	5.50	0.89	1.37	1.75	11.79	1.47	7.44	7.79	-2.54
1981-85	10.16	5.81	0.80	1.17	2.16	12.49	1.51	6.09	8.36	-2.62
1986-90	7.87	5.24	2.20	4.89	1.82	16.91	1.43	3.69	7.99	-7.49
1991-95	4.76	3.69	1.68	0.43	0.99	8.02	0.90	2.62	4.93	-2.19
1975-95	8.62	5.08	1.37	1.94	1.68	12.28	1.33	5.08	7.29	-3.65

Table 8: Dividend Yield and Payout Ratio (in Percent) for 1975-95

The table shows the average annual dividend yield (Div/Price) of stocks and the average annual dividend payout ratio (Div/Earnings) in all non-financial firms, keiretsu, and non-keiretsu firms. The aggregate dividend yield is defined as (value-weight) aggregate dividend _Dividend per share (MKT1) times shares outstanding (MKT3)] over the aggregate market equity _[MKTVAL or share price (MKT3) times shares outstanding (MKT5)] at the beginning of the fiscal year.

Year	Dividend Yield			Payout Ratio		
	Non-Financials	Keiretsu	Non-Keiretsu	Non-Financials	Keiretsu	Non-Keiretsu
1975-80	2.90	2.77	2.50	0.46	0.45	0.42
1981-85	2.05	1.86	1.84	0.38	0.36	0.37
1986-90	0.89	0.91	0.85	0.36	0.35	0.35
1991-95	0.91	0.99	0.84	0.44	0.48	0.43
1975-95	1.74	1.69	1.56	0.41	0.41	0.39

Table 9: Forms of Financing as Percents of Investment

The table shows the average annual retained cash earnings, raised equity and debt as percents of the investment they finance:

$$I_t = RCE_t + dS_t + dLTD_t + dSTD_t,$$

Investment, I_t, is the change in book capital from t-1 to t, plus depreciation expense, Dp_t (PACAP's data item JAF74). The retained cash earnings, $RCE_t = Y_t + Dp_t - Div_t - Int_t$, where Y_t is the sum of net income (PACAP's data item INC9) and interest expense, Int_t (JAF67) and Div is dividend _[dividend per share (MKT1) times shares outstanding (MKT5)]. dLTD is the change in the book value of the sum of long-term bank loans (BAL14), dLTL, and debentures (BAL15) from t-1 to t. The newly issued debenture consists of straight bonds, dBD (JAF50) and convertible bonds, dCBD (JAF51). $dSTD_t$ is the change in the book value of short-term debt (BAL11). The net flow from the sale and repurchase of stock, $dS_t = I_t - RCE_t - dLTD_t - dSTD_t$ balances the cash flow identity.

Year	RCE	dS	dLTD				dSTD
			TOTAL	dLTL	dBD	dCBD	
Panel A: All Non-financials							
1975-80	61.51	2.80	21.52	9.06	10.02	2.41	14.16
1981-85	69.54	0.65	13.52	1.67	9.63	2.19	16.28
1986-90	57.06	8.33	24.49	4.44	14.44	5.61	10.13
1991-95	77.93	15.23	5.48	5.51	-1.49	1.44	1.36
1975-95	66.27	6.56	16.50	5.36	8.24	2.89	10.66
Panel B: Keiretsu Firms							
1975-80	66.07	0.93	17.06	7.09	7.97	1.99	15.93
1981-85	70.12	-0.01	12.94	-0.14	11.27	1.79	16.95
1986-90	53.71	8.54	24.91	1.82	16.97	6.12	12.84
1991-95	88.82	18.00	4.20	4.21	-1.35	1.34	-11.02
1975-95	69.51	6.58	14.89	3.43	8.68	2.77	9.02
Panel C: Non-keiretsu Firms							
1975-80	72.30	7.82	5.95	-1.96	3.25	4.60	13.93
1981-85	68.92	5.10	8.42	-2.94	7.77	3.52	17.56
1986-90	52.48	12.54	29.16	5.94	17.58	5.63	5.82
1991-95	73.73	16.22	-4.55	3.72	-10.42	2.12	14.60
1975-95	67.12	10.30	9.56	1.04	4.48	4.00	13.02

Figure 1: IRR on value and cost in JPY.

A: All Non-financials
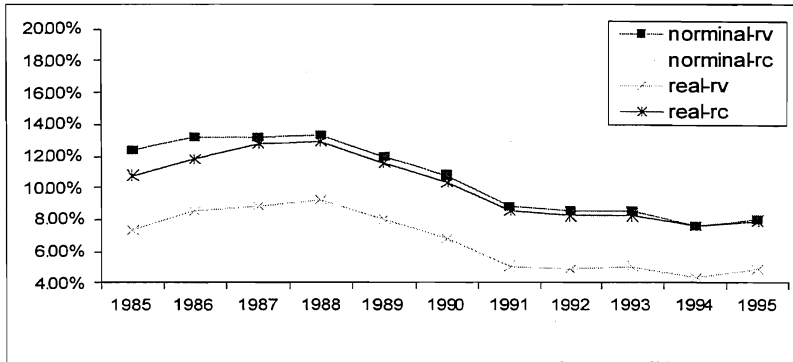
B: Real: Keiretsu vs. Non-Keiretsu
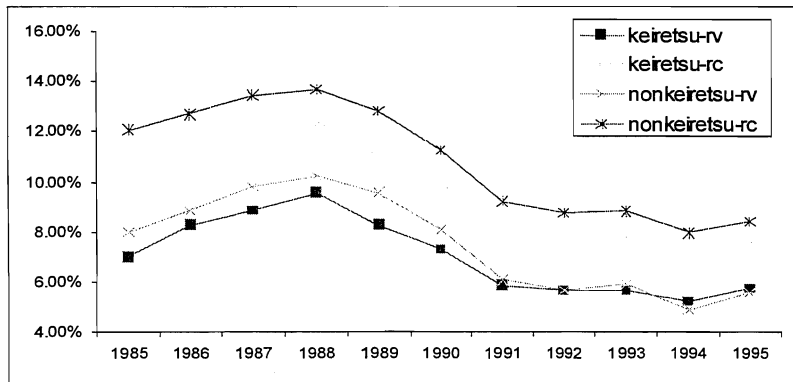
C: Real Value Added: Keiretsu vs. Non-Keiretsu

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