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Privatization and the Corporate Cost of Capital in New Zealand: An Application of Fama and French (1999)

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ABSTRACT

Fama and French's (1999) internal rate of return method is applied to Datastream data from 1993-2001 for 81 non-financial firms listed on the New Zealand Stock Exchange. The nominal return on value is 7.09%. The real return on value is 5.07%. The nominal return on cost is 11.59%. The real return on cost is 9.48%. The 10 former state-owned enterprises have nominal and real returns significantly higher than the 71 other publicly-listed companies and their capital structures and market-to-book values differ significantly. Return on corporate investment has been profitable but real and nominal compound returns and simple returns have declined over time.

Key words: privatization, cost of capital, New Zealand

JEL Classification: G15. G32

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Privatization and the Corporate Cost of Capital in New Zealand: An Application of Fama and French (1999)

This paper applies the internal rate of return (IRR) technique used by Fama and French (1999) to a sample of firms listed on the New Zealand Stock Exchange (NZSE). The overall corporate cost of capital is determined by treating the corporate sector as an investment project starting at year-end 1993 and terminating at year-end 2001. The results show the cash flows into and out of the share market in New Zealand over a period characterized by the sale of state-owned enterprises (SOEs) to the private sector.

The IRR method of Fama and French (1999) ties together the cash flows into and out of the corporate sector of a country for firms with exchange-traded shares. It thus provides a history of the market cash flows over time and, in the case of New Zealand, uniquely documents the share market development that occurred over the time period and which has been proposed by Megginson and Netter (2001) as one reason for a country to engage in the privatization of SOEs.

This study represents the first application of the IRR method to a market other than the United States. The Fama and French (1999) study used Compustat data for the United States market, but the availability of financial information from Datastream will allow the IRR technique to be applied to the share markets of other countries.

Section I explains the IRR technique and the calculation of the variables, section II describes the sample set, section III presents and interprets the IRR results, section IV divides the sample set into former state-owned enterprises (FSOEs) and other publicly-listed companies (OPLCs) and discusses the impact of privatization on the IRR results, section V outlines the capital structure and financing decisions, and section VI concludes.

I. The IRR Technique

The Fama and French (1999) IRR technique treats the entire corporate sector as an investment project. The IRRs are calculated to be ‘the discount rates that set the net present value of cash flows into and out of the corporate sector equal to zero’ (Fama and French, 1999:1941). The Fama and French (1999) equations used to solve for r_v , the return on market value, and r_c , the return on cost, are:

$$IV_0 = \sum_{t=1}^T \frac{X_t - I_t}{(1 - r_v)^t} + \sum_{t=1}^T \frac{FS_t - FBV_t}{(1 + r_v)^t} + \frac{TV}{(1 + r_v)^T} \quad (1)$$

and

$$IC_0 = \sum_{t=1}^T \frac{X_t - I_t}{(1 - r_c)^t} + \sum_{t=1}^T \frac{FS_t - FBC_t}{(1 + r_c)^t} + \frac{TV}{(1 + r_c)^T} \quad (2)$$

where

IV_0 = the aggregate market value of the firms at the beginning of the time period; in this study, year-end 1993

IC_0 = the aggregate initial book value of firms in the sample at the beginning of the time period; in this study, year-end 1993

X_t = the total cash earnings of the firms in the sample for year t

I_t = the gross investment of the firms in the sample in year t

FS_t = the terminal market value of firms sold in year t

FBV_t = the initial market value of firms that come into the sample in year t (firms bought at value)

FBC_t = the initial book value of firms that come into the sample in year t (firms bought at cost)

TV = the terminal value of firms remaining in the sample at the end of the period; in this study, year-end 2001.

Equation (1) sets the initial *market* value of the firms in the sample equal to the cash inflows and outflows for the corporate sector from the end of 1993 to the end of 2001. Equation (2) sets the initial *book* value of the firms in the sample equal to the cash inflows and outflows for the corporate sector from the end of 1993 to the end of 2001. $X_t - I_t$ captures the cash flows from operations and investment for the firms over the time period. FBV_t (firms bought at market value), FBC_t (firms bought at cost), and FS_t (firms sold at market value), are included to account for the cash inflows and outflows of the system from the entry and exit of firms. In both equations (1) and (2), firms leave

the sample at their market values, either at an intermediate time (FS_t) or at the end (TV). However, in the calculation of r_v , firms enter at their market value (IV_0) and in the calculation of r_c firms enter at their book value (IC_0) in year t . By the nature of the IRR method, the return on value, r_v , and the return on cost, r_c are compound returns over the time period.

I.B Calculation of the Variables

All of the calculations have been carried out using the Datastream Items that correspond as closely as possible to the COMPUSTAT numbers used by Fama and French (1999). Estimates of the firms' capital are calculated by including only debt that pays explicit interest. IV_0 is the initial market value of the firms that are in the sample at the beginning of the estimation period, year-end 1993. It is calculated as follows:

$$IV_0 = \text{Market value of shares} + \text{Preference Capital} + \text{Long-term Debt} + \text{Borrowings Repayable} < 1 \text{ year.}$$

From Datastream, the relevant Items are:

$$IV_0 = \text{Datastream MV} + \text{Item 306} + \text{Item D036} + \text{Item 309.}$$

An individual firm's cash earnings for year t are measured by X_t that is calculated as follows:

$$X_t = \text{Published After-tax Profit} + \text{Net Interest Charges} + \text{Depreciation.}$$

The Items from Datastream are:

$$X_t = \text{Item 623} + \text{Item 2408} + \text{Item 136.}$$

I_t is an estimate of the gross net investment that a firm has made in year t . It is represented by the change in the firm's book capital over the year from $t-1$ to t , plus depreciation. The book capital is net of non-interest-paying debt. Two years of data are needed to calculate I_t as follows:

$$\begin{aligned} I_t &= (\text{Total Share Capital and Reserves} + \text{Long-term Debt} + \text{Borrowings} < 1 \text{ year})_t - \\ & (\text{Total Share Capital and Reserves} + \text{Long-term Debt} + \text{Borrowings} < 1 \text{ year})_{t-1} + \text{Depreciation in} \\ & \text{year } t \\ &= (\text{Item 307} + \text{Item D306} + \text{Item 309})_t - \\ & (\text{Item 307} + \text{Item D036} + \text{Item 309})_{t-1} + (\text{Item 136})_t. \end{aligned}$$

The value of $X_t - I_t$ is thus an estimate of the net cash flow into or out of the firm from the year $t-1$ to the year t since the cash earnings, X_t , are reduced by the amount that is spent to increase the capital of the firm. It is

therefore an estimate of the cash flow back to the system in the form of dividends and interest but net of new securities issued. A value of $X_t - I_t$ that is negative would indicate that the firm had a net cash outflow, that is the firm's total capital was reduced over the year.

For firms that enter the data set in a year subsequent to 1993, FBV_t (firms bought at value in the year t) is calculated as:

$$\begin{aligned} FBV_t &= (\text{Market Value of Shares} + \text{Preference Capital} + \text{Long-term Debt} + \text{Borrowings Repayable} < 1 \text{ year})_t \\ &= (\text{Datastream MV} + \text{Item 306} + \text{Item D036} + \text{Item 309})_t. \end{aligned}$$

The value of firms that leave the sample in year t is given by:

$$\begin{aligned} FS_t &= (\text{Market value of shares} + \text{Preference capital} + \text{Long-term Debt} + \text{Borrowings Repayable} < 1 \text{ year})_t \\ &= (\text{Datastream MV} + \text{Item 306} + \text{Item D036} + \text{Item 309})_t. \end{aligned}$$

The terminal market value of a firm at the end of the sample period is calculated as:

$$\begin{aligned} TV &= (\text{Market value of shares} + \text{Preference capital} + \text{Long-term Debt} + \text{Borrowings Repayable} < 1 \text{ year}) \\ &= (\text{Datastream MV} + \text{Item 306} + \text{Item D036} + \text{Item 309}) \text{ at year-end 2001.} \end{aligned}$$

To calculate the IRR on cost, the value of IC_0 that is used is:

$$\begin{aligned} IC_0 &= \text{Total Share Capital and Reserves} + \text{Long-term Debt} + \text{Borrowings Repayable} < 1 \text{ year} \\ &= (\text{Item 377} + \text{Item D036} + \text{Item 309}) \text{ at year-end 1993.} \end{aligned}$$

For firms that enter the sample at a time other than year-end 1993, the variable FBC_t , firms bought at cost, is calculated as:

$$\begin{aligned} FBC_t &= (\text{Total Share Capital and Reserves} + \text{Long-term Debt} + \text{Borrowings Repayable} < 1 \text{ year})_t \\ &= (\text{Item 377} + \text{Item D036} + \text{Item 309})_t. \end{aligned}$$

Equations (1) and (2) thus calculate an internal rate of return for the corporate sector represented by the sample which sets the cash outflows for the initial purchase of the firms (IV_0 , IC_0) equal to the cash flows from earnings less investments ($X_t - I_t$), plus the cash inflows from firms sold at any time t (FS_t), plus the cash outflows

from all firms bought at any time t (FBV_t, FBC_t), plus the cash flows from the sale of all of the firms at the end of the project, TV .

II. Sample Description

Datastream data are available from 1993 for New Zealand, limiting the time period for application of the technique. This is a relatively short period for analysis that could be extended with additional data at a later time. Since the cash flows for financial firms are primarily investments in other companies, all financial institutions are excluded from the sample following Fama and French (1999). This results in a set of 81 firms representing corporations listed on the New Zealand Stock Exchange for whom financial data are reported by Datastream for any two years between 1993 and 2001. The majority of the firms have their year-end at June 30. The data are not corrected for the differences in timing of the cash flows for firms who use a different year-end. It is therefore assumed that the cash flows occur at the same time. For a firm to be included in the sample it must have financial data and market value of shares as reported by Datastream for the year previous. A firm also must have cash flows for at least one year following its entry into the sample, and a terminal market value for the year when the firm leaves the sample or for 2001, the final year of this analysis.

Table I summarizes the number of firms entering and leaving the sample and the market value, V_t , of the firms at year-end in New Zealand dollars. Market value, V_t , is calculated as the market value of equity plus the book value of preferred shares, long-term debt, and short-term debt. The annual number of firms in the sample starts at 37 in 1993 and reaches a maximum of 70 at the beginning of 1999. The market value of the firms is equal to NZ\$35,595 million at year-end 1993 and reaches a maximum of NZ\$58,193 million at the end of 1998, an increase of 63.5%. Of note is the drop in market value for the 58 firms in the sample from NZ\$54,805 million at the beginning of 2001 to NZ\$50,855 at the end of 2001. The returns on value and cost obtained from the IRR calculation shown below are lower because the cash inflow, TV , at the termination of the calculation is reduced.

TABLE I HERE

III. Discussion of the IRR Results

The nominal and real IRRs on value (r_v) and cost (r_c) are calculated for all 81 firms in the sample and presented as Panel A of Table II. These returns are compound rates and theoretically should represent the overall cost of capital for the corporate sector represented by the sample from year-end 1993 to year-end 2001. However, the robustness of the empirical tests and statistics is naturally limited because of the small sample size, and the results should be interpreted with this limitation in mind.

TABLE II HERE

The nominal return on value, r_v , is 7.09% and the nominal return on cost, r_c , is 11.59%. The values of r_v and r_c differ greatly primarily because the return on cost is enhanced by the purchase of new firms at book value (IC_0, FBC_t), cash outflows that are lower than the market values (IV_0, FBV_t) used in calculating r_v , while the sale of the firms in the final year, a cash inflow, is at the market value (TV) for both r_v and r_c . The data show significant differences between the firms bought at value (FBV_t) and the firms bought at cost (FBC_t). The difference is shown in Figure 1 which plots the market value to book value (MV/BV) for the sample set from 1993 - 2001. Over the time period, the average of the ratio of market value to book value for all firms is 1.45 and ranges from 1.35 to 1.60.

FIGURE 1 HERE

The real returns on value and cost are calculated by dividing each annual cash flow by the value of the Consumer Price Index for December of the relevant year (Table II, Panel A). The real return on value is 5.07% and the real return on cost is 9.48% for all firms. Since inflation was relatively low in New Zealand between 1993 and 2001, the differences between the nominal rates and the real rates are not as large as those reported by Fama and French (1999) for their longer time periods. The real return on value and the real return on cost from the New Zealand data set are less than the nominal rates of $r_v = 10.72\%$ and $r_c = 11.75\%$ and the real returns of 5.95% and 7.38%, respectively found by Fama and French (1999) for 1950-96 and 1973-96 for the US market. However, direct comparisons between the results of Fama and French and this paper must be made with caution since, in

addition to covering a significantly longer time period, Fama and French also had a data set with a greater number of firms, reaching a maximum of 5217 companies at the beginning of 1995 (Fama and French, 1999:Table VI, page 1956-57). The maximum number of firms with data available for this study in any year was 70 at the beginning of 1999.

Of perhaps greater interest than the absolute value of the returns is the change in the value of the returns over time. Figure 2 is a plot of the value of the IRRs over time calculated by treating each time period as a separate investment project and selling off all of the firms at each year-end. The pattern of the cash flows generates IRR values that decline from 19.15% for 1993-94 to 7.15% for 1993-2001. Fama and French (1999, Figure 4, page 1961) show the same type of initial decline from 1961-1995, but their IRRs start to increase and level out after 1981. Thus, while the initial period shows a relatively high IRR, further away from the start of the period the IRRs start to decrease. This decrease in the IRRs on value and cost over the time period would be interpreted as a decline in the cost of capital for firms following the analysis of Fama and French (1999). That explanation may not be valid for this data set that covers a shorter time period and a smaller number of firms, which, as noted above, limits the statistical robustness and the comparability of the results with the Fama and French (1999) study. It can be argued that a longer time period is necessary for the IRRs to reach an equilibrium value.

FIGURE 2 HERE

Table III presents the nominal annual simple returns from 1994 to 2001. The simple return is calculated as:

$$R_t = [(X_t - I_t) + (V_t - V_{t-1})] / V_{t-1} \quad (3)$$

V_t is defined as the total market value (market value of equity plus book value of preferred shares, long-term debt, and short-term debt) of firms that were in the data set from the beginning of year t to the end of year t . It thus excludes those firms which were bought during the year, FBV_t , since it is assumed that they were bought at year-end and they will not as yet have contributed to cash flows through their value of $X_t - I_t$. The simple return for all firms (Table III, Column (a)) shows a steady decline in every year, ranging from 19.15% in 1993-94 to -8.44% in 2000-01. The average simple return is 4.16% with a standard deviation of 9.67%.

TABLE III HERE

In summary, the overall market in New Zealand has shown a significant decrease in returns after 1997. The effects of the 1997 Asian financial crisis would have been incorporated into share prices by the firms' year-ends at June 30, 1998 and shown in the drop in simple returns from 8.56% to 0.69% between 1997 and 1998.

IV. Privatization and the IRR Values

Privatization in New Zealand began in the mid-1980s, earlier than in many other countries, and represented a major reorganization of the economy of a developed country. The process has been well-documented and detailed analyses of the impact of privatization on the economy of New Zealand are provided by both Evans et al (1996) and Dalziel and Lattimore (2001).

In New Zealand, the State-Owned Enterprises Act came into effect in 1986. Subsequently, fourteen SOEs were identified for privatization. Over the four-year period from 1988-1991, major privatizations were carried out, including Air New Zealand and Telecom, the largest at NZ\$4.25 billion in September, 1990 (Dalziel and Lattimore (2001)). The method of privatization varied. The stock of Air New Zealand was sold initially to a consortium of corporate investors in 1989 and the shares were then listed on the NZSE (Datex Services (2001, page 3)). Telecom Corporation of New Zealand Limited's shares were listed on the NZSE in 1991 after the shares were sold to the public and institutions (Datex Services (2001, page 105)). In addition, airports, ports, power companies, and the national railway were sold and some of these companies were listed on the NZSE, making the 1990s a decade of major changes in the market size and composition in New Zealand.

In the same decade, privatization was a theme of global capital markets that resulted in the transfer of major amounts of state-owned assets to the private sector. Many researchers are assessing the impact of this major wealth transfer (Boutchkova and Megginson (2000), Evans et al. (1996), Megginson et al. (2000), Megginson and Netter (2001)). Megginson and Netter (2001) provide a useful survey of empirical studies of privatization.

Siniscalco et al (2001:Table 2, page 30) have documented Public Offer Deals from 17 developed countries from 1977-99 and report that New Zealand had 34 deals that resulted in government revenues of US\$12.077 billion (1996 dollars) over the time period. The average of Revenue/GDP defined as revenues from privatization as a percentage of Gross Domestic Product for 17 developed countries was 0.07670. New Zealand ranked the highest of the 17 at 0.23188 (Siniscalco et al (2001, page 20)), a measure of the extent of the privatization process and New Zealand's move to an open, market-based economy. Australia had the second highest ranking with Revenue/GDP of 0.18651 and 108 deals, followed by the United Kingdom at 0.11947 and 169 deals.

Meggison et al (2000) study the market returns to individual shares of privatized firms and demonstrate that the 1-, 3-, and 5-year holding period returns for privatized firms are greater than those realized for firms which were not privatized. In addition, it appears that the impact of privatization on the liquidity of share markets has been positive by increasing the number and dollar amounts of shares traded on individual share markets. Boutchkova and Meggison, (2000:Table III, page 38) report that in New Zealand, market capitalization as a percentage of GDP has increased from 20.5% in 1990 to 162.0% in 1998 and the volume of shares traded as a percentage of GDP has also increased from 4.5% to 90.5% over the same time period.

Thus it is reasonable to expect that the IRR calculations of this study reflect the impact of the privatization of SOEs during the time period. The returns are dominated by the largest privatization in New Zealand, Telecom, which represents an average of 29.96% of the total value, V_i of the firms in the data set. Including Air New Zealand whose value averages an additional 5.35% of V_i , the influence of these two formerly state-owned enterprises (FSOEs) on the IRRs is significant.

Meggison et al (2000) have shown that firms that are newly-privatized show higher returns than other stock market investments, a result that would bias the IRR results in this study. If, as Meggison et al. (2000) have suggested for other countries, the newly-privatized firms are riskier than other firms and if the newly-privatized firms were under-priced by the government to generate popular interest in the shares (Meggison and Netter (2001)), then the IRRs would be biased upward since the initial cash outflow would be lower.

In order to assess the impact of privatization, the sample is divided into two subsets: former state-owned enterprises (FSOEs) and other publicly-listed companies (OPLCs). Of the 81 firms in the sample, 10 are FSOEs classified as transport (2 firms), energy (2 firms), ports (5 firms) and media & telecommunication (1 firm) sectors of the NZSE. The 71 OPLCs are from more diverse sectors of the NZSE, including mining, leisure and tourism, agriculture, property companies and services. All of the 23 firms leaving the sample prior to 2001 are from the OPLC subset. Each of the 10 FSOEs thus remains in the sample after entering and therefore has a terminal value in 2001. The ten former state-owned enterprises are listed in Table IV.

TABLE IV HERE

Table II shows that the nominal return on value, r_v , is 12.12% for the 10 FSOEs (Panel B), and 4.70% for the OPLCs (Panel C). The nominal return on value for the FSOEs is significantly higher. The nominal return on cost, r_c , is 21.94% for the FSOEs, and 7.71% for the OPLCs. Thus the cash inflows over the time period and the cash inflow from the sale of the firms at market value in 2001 provides a higher return on value for the FSOEs than for the OPLCs, providing evidence that the FSOEs may have been underpriced, or that they may have been perceived as riskier than the OPLCs. The simple returns are presented in Table III for the FSOEs and the OPLCs. The FSOEs show a higher simple return that declines over time, starting from 45.83% in 1993-94 and reaching -5.75% in 1999-2000. The average return for the FSOEs is also higher at 12.91%. The OPLCs show a negative average return of -0.81% over the time period. This measure of simple returns supports Megginson et al's (2000) finding that 1-3- and 5-year holding period returns are higher for former SOEs than for other publicly-listed companies since the FSOEs in this sample outperform the OPLCs in every time period. However, the robustness of the results is limited by the small sample size available for New Zealand.

As shown in Figure 1, for the FSOEs, the average MV/BV is 2.14 and ranges from 1.67 to 2.52. For the OPLCs, the average MV/BV is 1.22 with a range from 1.10 to 1.34. The IRR on cost for the FSOEs is thus significantly higher than for the OPLCs because the higher market value to book value for these firms is reflected in a higher IV_0 relative to IC_0 , inflating r_c relative to r_v .

Table V summarizes the total market value of the equity of (i) the FSOEs, (ii) the OPLCs, and (iii) of all firms from 1993 to 2001. The FSOEs represent 35.8% of the market value of equity capital of the sample firms in 1993, reach a maximum of 53.7% in 1999, and decline to 47.2% by year-end 2001. It is expected that the 10 FSOEs would have a major impact on the share market because of the size of the privatized assets. In terms of market development, these large share issues coming onto a share market impact on the liquidity and on the ability of firms in a country to raise share capital from both domestic and foreign investors.

TABLE V HERE

By its nature, the IRR technique is highly sensitive to the values of the firms entering and leaving the sample and to the timing of the cash flows. Thus, the beginning and ending years may have significant effects on the IRRs. For example, in the year 2001, Air New Zealand's share value subsequent to the year-end financial statements declined with the result that the government purchased shares and took back majority ownership. It is interesting to note that a country that, relative to North America, approached privatization as an extreme sport, saw a reversal of the trend with the effective de-privatization of Air New Zealand in 2001 and, more recently, the government's support for the shares of Tranz Rail, the former state railway. However, it might be argued, given the recent poor results of the airline industry worldwide, that Air New Zealand might not be classified as a failed privatization but as a particularly poor performer in a global industry that is performing poorly. Thus poor performance may be a function of the type of industry chosen to undergo privatization and only continued observation of privatization as a global phenomenon will permit conclusions about the nature of the process.

The entrance and exit of FSOEs and OPLCs may be controlled by different factors. While the supply of OPLCs would be expected to be subject to market forces, the addition of FSOEs to the sample depends on the availability of government-owned assets and government support for their sale. Similarly, while the exit of OPLCs should be market-driven, the continued existence of FSOEs could be influenced by non-market forces. For example, subsequent to year-end 2001, Air New Zealand's financial difficulties that could have bankrupted a private company resulted in the government effectively 'de-privatizing' the company and taking over ownership of approximately

84% of the common shares. The company thus continues to be listed on the NZSE with its restored majority government ownership.

In conclusion, the time period of the study is long enough to provide insights into the privatization process in New Zealand, but may not be sufficiently long to provide reliable estimates of the IRRs on cost and value. However, even for a period of close to fifty years (1950-96), Fama and French (1999) note that the terminal values of the firms have a major impact on the IRRs. A longer estimation period would, therefore, be expected to provide a more reliable estimate of returns.

V. Capital Structure and Financing Decisions

As noted by Fama and French (1999), it is the nature of the cash flows documented rather than the actual IRRs that may provide the most insight into the capital market over the time period. Table VI shows how the capital structures have changed over time for the firms in the sample, based on both the market value of equity and the book value of equity. Market value of equity increases from 58.47% of total capitalization for the firms in the data set at the beginning of 1994 to 71.38% in 1997 and declines to 62.75% at the end of 2001. The components average 66.39% market value of equity, 28.10% long-term debt, 5.40% short-term debt and 0.11% of preferred shares over the time period. On a book value basis, equity increases from 44.53% in 1993 to a maximum of 54.71% in 1997, and ends at 49.57% in 2001.

TABLE VI HERE

Table VI also presents the capital structures for the FSOEs and the OPLCs. The ten FSOEs have a higher average market value of equity (77.08%) than the OPLCs (60.77%) and a lower average long-term debt (17.11% versus 34.26%, respectively). The FSOEs show a trend to increasing both short-term and long-term debt over the period that is not observed for the OPLCs. Several effects may be operating here. The most obvious explanation is that the FSOEs evolve from newly-minted to seasoned publicly-listed companies, developing track records and therefore reputations and growth opportunities that might warrant the move to higher levels of debt over time. This

explanation is consistent with Fama and French (1999) who find that new firms entering their sample from 1974-96 have a higher average market value of common stock (74.35%) than all firms (65.84%) and the market equity is replaced over time by short-term and long-term debt, consistent with the argument of Myers (1977) that mature firms use more debt. In this New Zealand sample, there may be effects that are specific to the privatization process such as, for example, government requirements that shares initially be sold as widely as possible among the privatizing firm's employees and New Zealand residents. In addition, it should be noted that the sample size of FSOEs, while representing a large asset base, constitute a small number of firms to represent the privatization process in New Zealand.

The changes in capital structure show the types of financing decisions made over the time period, but it should be noted that there may be vestiges of their previous government ownership that prevent the FSOEs from reacting solely to market forces. For example, as part of its capital structure after privatization, Air New Zealand operated over the 1993-2001 period with an A and B share structure which restricted the ownership of A shares to New Zealand residents and limited the total shareholdings by foreign owners to less than 50%. In addition, the Kiwi Shareholder, representing the New Zealand government, held certain veto rights over share sales and purchases to foreign investors and to other airlines. Therefore, even ten years beyond the initial privatization, structural differences between FSOEs and OPLCs may still exist that prevent FSOEs from operating strictly in response to market forces.

As a final note, in this study, for the period between 1993 and 2001, both the FSOEs and the OPLCs in New Zealand use a minimal amount of preferred stock (0% and 0.21%, respectively). This contrasts with the US sample of Fama and French (1999) that averaged 2.64% preferred shares in the market capital of all firms for the time period from 1974-1996. In both studies, preferred shares are not a major component of capital structure for the non-financial corporate sector.

VI. Conclusions

This study represents the first application of Fama and French's (1999) IRR technique to a market outside of the US. The simplicity of the technique and the availability of financial information from Datastream warrant its

application to other share markets because of the different perspective it provides on market development. In addition, because Datastream is a single database covering many countries, it provides a reasonable expectation that the accounting numbers reported are standardized and meet similar criteria.

The questions that must be asked are what the IRR numbers mean and are they significant. Can they be used as macroeconomic indicators of the health of the capital market in a privatizing country? It can be concluded that, while the IRR technique offers a different view of a country's capital market, the significance of the returns over time is indeterminate without data from other countries for comparison. This type of analysis will have to await further research. However, it can be concluded that the process of examining the course of investment and market values of companies over time has revealed differences between former state-owned enterprises and other publicly-listed firms, thereby providing a window on a share market that is developing with the impetus of a high level of privatization. The scope of the privatization process on a global basis and its significance for market development makes it an important area for further research, and should in the process demonstrate differences between other global markets and the North American share markets where privatization has been more limited in its effects.

The IRR technique allows the use of data that is readily available in a standardized form to examine the capital market for an individual country. It is a macroeconomic instrument that, by its nature enables the study of aggregate flows and market values in a country's corporate sector. It is useful because it uses the currency of the particular country and it captures broad market trends in addition to the growth of the market post-privatization in the New Zealand context. The difficulty comes in attributing the change in the market solely to the privatization process. While the dominant theme of the New Zealand market from 1990 onwards was privatization, the subsequent events, in particular the 'de-privatization' of Air New Zealand in 2001, seems to indicate that it is not possible to forecast privatization's effects in the longer term. It may be that the momentum of the initial boost to the share markets provided by the influx of both domestic and foreign capital is not sustainable in the longer-term. However, by its nature, the increased exposure of a country's corporations to global share market influences means that the effects of events such as the Asian Financial Crisis in 1997 are also reflected in the cash flows into and out of the capital markets. Thus, while FSOEs represent in excess of 30% of the value of the companies in the data set, the increased market exposure of all firms must also be considered as a factor in the observed pattern of cash flows.

While IRR returns have been generated for both the FSOEs and OPLCs, the value of this index is still under consideration. It is clear that the cost of capital that results is not an appropriate number for the individual firm in making investment decisions, and neither does it seem to provide an appropriate number for the market as a whole. The value of the exercise lies in its insight into the financing and investment decisions for the firms and the comparisons between the FSOEs and OPLCs. However, it is the impact of the privatization process on the development of the share market that has been revealed by the application of Fama and French's (1999) IRR technique to the New Zealand market for the time period of this study.

If we take a macroeconomic view of the IRRs, for share markets that are in the development stage, such as New Zealand's, the IRRs on cost and value must be viewed as evolving numbers, perhaps trending towards an equilibrium. Only examination over a longer time period will reveal if this is the case. When the market is small and large firms are able to dominate the volume of capital, then the IRRs are less a number useful for forecasting and more of an indicator that the markets are generating returns in excess of their costs. IRRs from other markets may be useful in expanding interpretations and the advancement of this technique as a valuable exercise.

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Table I: Summary of the number of firms entering and leaving the sample.

Year	Firms at Beginning of the Year	Firms Entering	Firms Leaving	Year-end Market Value, V_t \$NZ (000,000)
1993	0	37	0	\$35,595
1994	37	15	0	\$41,399
1995	52	8	0	\$47,096
1996	60	5	0	\$52,980
1997	65	3	1	\$55,205
1998	67	5	2	\$58,193
1999	70	3	4	\$55,431
2000	69	5	16	\$54,805
2001	58	0	58	\$50,855

Note: The year-end market value includes those firms purchased during the year, and is calculated as the sum of market value of equity, book value of preferred shares, and book value of long- and short-term debt.

Table II: Summary of cash flows and IRR calculations. Real r_v and real r_c are calculated by dividing each cash flow by the December value of the Consumer Price Index. All figures are in New Zealand dollars.

Panel A: All Firms						
	$FS_t(TV_{2001})$	X_{cI_t}	FBV_t	Aggregate Cash Flow	FBC_t	Aggregate Cash Flow
1993	0	0	-35,594,979	-35,594,979	-28,540,339	-28,540,339
1994	0	3,888,010	-2,874,700	1,013,310	-2,320,528	1,567,482
1995	0	1,803,548	-4,170,806	-2,667,258	-3,959,364	-2,155,816
1996	0	2,483,002	-2,139,103	343,899	-1,174,697	1,308,305
1997	19,140	3,615,638	-1,307,063	2,327,715	-1,058,123	2,576,655
1998	4,023,444	-1,071,086	-1,533,790	1,418,568	-496,458	2,455,900
1999	4,683,054	3,690,810	-1,915,910	6,457,954	-1,425,549	6,948,315
2000	3,437,612	-2,104,152	-731,616	601,844	-503,943	829,517
2001	50,855,214	-677,149	0	50,178,145	0	50,178,145
			Nominal r_v=	7.09%	Nominal r_c=	11.59%
			Real r_v=	5.07%	Real r_c=	9.48%
Panel B: FSOEs:						
	$FS_t(TV_{2001})$	X_{cI_t}	FBV_t	Aggregate Cash Flow	FBC_t	Aggregate Cash Flow
1993		0	-9,961,382	-9,961,382	-6,170,576	-6,170,576
1994	0	1,140,930	-427,331	713,599	-278,402	862,528
1995	0	848,080	-256,947	591,133	-188,271	659,809
1996	0	1,073,450	-1,004,409	69,041	-531,936	541,514
1997	0	825,334	-62,916	762,418	-47,694	777,640
1998	0	-286,897	-154,767	-441,664	-60,654	-347,551
1999	0	464,925	-1,485,365	-1,020,440	-777,555	-312,630
2000	0	-2,396,771	0	-2,396,771	0	-2,396,771
2001	25,773,553	-403,024	0	25,370,529	0	25,370,529
			Nominal r_v=	12.12%	Nominal r_c=	21.94%
			Real r_v=	9.92%	Real r_c=	19.52%
Panel C: OPLCs:						
	$FS_t(TV_{2001})$	X_{cI_t}	FBV_t	Aggregate Cash Flow	FBC_t	Aggregate Cash Flow
1993	0		-25,633,597	-25,633,597	-22,369,763	-22,369,763
1994	0	2,747,080	-2,447,369	299,711	-2,042,126	704,954
1995	0	955,468	-3,913,859	-2,958,391	-3,771,093	-2,815,625
1996	0	1,409,552	-1,134,694	274,858	-642,761	766,791
1997	19,140	2,790,304	-1,244,147	1,565,297	-1,010,429	1,799,015
1998	4,023,444	-784,189	-1,379,023	1,860,232	-435,804	2,803,451
1999	4,683,054	3,225,885	-430,545	7,478,394	-647,994	7,260,945
2000	3,437,612	292,619	-731,616	2,998,615	-503,943	3,226,288
2001	25,081,741	-274,125	0	24,807,616	0	24,807,616
			Nominal r_v=	4.70%	Nominal r_c=	7.71%
			Real r_v=	2.76%	Real r_c=	5.71%

Table III: Year by year simple returns for (i) all firms, (ii) former state-owned enterprises (FSOEs), and (iii) other publicly-listed companies (OPLCs).

Simple Return:			
Time Period	(a) All Firms R_t	(b) FSOEs R_t	(c) OPLCs R_t
1993-1994	19.15%	46.82%	8.40%
1994-1995	8.04%	15.72%	4.16%
1995-1996	13.22%	16.37%	11.68%
1996-1997	8.56%	9.98%	7.83%
1997-1998	0.69%	13.03%	-5.78%
1998-1999	-1.70%	9.62%	-8.54%
1999-2000	-6.25%	-5.75%	-6.65%
2000-2001	-8.44%	-2.46%	-13.84%
Average	4.16%	12.91%	-0.34%
Standard Deviation	9.67%	15.92%	9.46%

Note: Simple returns are calculated as $R_t = (X_t - I_t) + (V_t - V_{t-1}) / V_{t-1}$ where V_t is the market value of firms at year-end. Firms added to the sample at year-end are excluded from the calculation.

Table IV: List of former state-owned enterprises and their industry sectors on the New Zealand Stock Exchange (NZSE).

	COMPANY	NZSE SECTOR
1.	Air New Zealand	Transport
2.	Auckland International Airport	Ports
3.	Horizon Energy Distribution Ltd.	Energy
4.	Lyttelton Port Company	Ports
5.	Ports of Auckland	Ports
6.	Port of Tauranga	Ports
7.	Southport New Zealand	Ports
8.	Telecom Corporation of NZ	Media and telecommunications
9.	Tranz Rail Holdings	Transport
10.	Trust Power	Energy

Table V: Comparison of the value of the market equity (MV) of the FSOEs and the OPLCs in the sample.

	1993	1994	1995	1996	1997	1998	1999	2000	2001
	(NZ\$ 000)								
MV of FSOEs	7,448,654	11,307,750	12,785,074	15,281,515	15,942,224	17,922,550	20,390,533	16,841,874	15,074,449
MV of OPLCs	13,363,699	16,756,141	18,958,193	22,028,203	23,462,992	20,920,586	17,570,968	18,246,743	16,837,986
Total MV	20,812,353	28,063,891	31,743,267	37,309,718	39,405,216	38,843,136	37,961,501	35,088,617	31,912,435
% FSOEs	35.8%	40.3%	40.3%	41.0%	40.5%	46.1%	53.7%	48.0%	47.2%
% OPLCs	64.2%	59.7%	59.7%	59.0%	59.5%	53.9%	46.3%	52.0%	52.8%

Note: The mean (median) MV of the 10 FSOEs is NZ\$14,777,180,000 (\$15,281,515,000), representing an average of 43.7% of the market equity in the sample. The mean (median) MV of the equity of the 71 OPLCs is NZ\$18,682,835,000 (\$18,246,743,000), representing an average of 56.3% of the total market equity over the 1993 – 2001 time period. (FSOEs = formerly state-owned enterprises; OPLCs = other publicly-listed companies.)

Table VI: Year by year market and book value capital structure.

Panel A: All Firms								
	Market Value				Book Value			
	Equity	Long-term Debt	Short-term Debt	Preferred	Equity	Long-term Debt	Short-term Debt	Preferred
1993	58.47%	34.72%	6.76%	0.05%	44.53%	46.38%	9.03%	0.07%
1994	67.79%	27.15%	5.06%	0.00%	51.45%	40.92%	7.63%	0.00%
1995	67.40%	28.07%	4.53%	0.00%	51.78%	41.52%	6.70%	0.00%
1996	70.42%	26.29%	3.27%	0.01%	53.84%	41.03%	5.11%	0.02%
1997	71.38%	25.08%	3.54%	0.01%	54.22%	40.11%	5.65%	0.01%
1998	66.75%	28.28%	4.92%	0.05%	52.34%	40.54%	7.05%	0.07%
1999	68.48%	26.79%	4.35%	0.38%	54.71%	38.50%	6.25%	0.55%
2000	64.03%	28.75%	6.82%	0.41%	51.51%	38.75%	9.19%	0.55%
2001	62.75%	27.73%	9.40%	0.12%	49.57%	37.55%	12.72%	0.16%
Mean	66.39%	28.10%	5.40%	0.11%	51.55%	40.59%	7.70%	0.16%
Median	67.40%	27.73%	4.92%	0.05%	51.78%	40.54%	7.05%	0.07%
Panel B: FSOEs								
	Market Value				Book Value			
	Equity	Long-term Debt	Short-term Debt	Preferred	Equity	Long-term Debt	Short-term Debt	Preferred
1993	74.78%	18.79%	6.49%	0.00%	59.28%	30.33%	10.39%	0.00%
1994	81.28%	15.67%	3.05%	0.00%	58.09%	35.09%	6.83%	0.00%
1995	82.44%	14.19%	3.36%	0.00%	58.88%	33.24%	7.88%	0.00%
1996	85.01%	13.48%	1.51%	0.00%	62.65%	33.59%	3.76%	0.00%
1997	83.87%	12.27%	3.86%	0.00%	59.31%	30.96%	9.74%	0.00%
1998	81.74%	13.87%	4.39%	0.00%	56.33%	33.17%	10.50%	0.00%
1999	81.38%	12.82%	5.80%	0.00%	57.54%	29.23%	13.22%	0.00%
2000	64.75%	24.25%	11.00%	0.00%	38.72%	42.16%	19.16%	0.00%
2001	58.49%	28.65%	12.86%	0.00%	30.81%	47.75%	21.43%	0.00%
Mean	77.08%	17.11%	5.81%	0.00%	53.51%	35.05%	11.43%	0.00%
Median	81.38%	14.19%	4.39%	0.00%	58.05%	33.24%	10.39%	0.00%
Panel C: OPLCs								
	Market Value				Book Value			
	Equity	Long-term Debt	Short-term Debt	Preferred	Equity	Long-term Debt	Short-term Debt	Preferred
1993	52.13%	40.91%	6.89%	0.07%	40.08%	51.21%	8.62%	0.09%
1994	60.96%	32.96%	6.08%	0.00%	49.51%	42.63%	7.86%	0.00%
1995	60.02%	34.88%	5.10%	0.00%	49.91%	43.69%	6.39%	0.00%
1996	62.93%	32.87%	4.18%	0.02%	51.46%	43.04%	5.47%	0.03%
1997	64.82%	31.81%	3.36%	0.01%	52.80%	42.67%	4.51%	0.01%
1998	57.69%	36.99%	5.24%	0.08%	51.18%	42.68%	6.04%	0.10%
1999	57.85%	38.31%	3.15%	0.70%	53.57%	42.19%	3.47%	0.77%
2000	63.37%	32.82%	3.04%	0.78%	58.96%	36.77%	3.40%	0.87%
2001	67.13%	26.79%	5.84%	0.24%	62.70%	30.41%	6.63%	0.27%
Mean	60.77%	34.26%	4.76%	0.21%	52.24%	41.70%	5.82%	0.24%
Median	60.96%	32.96%	5.10%	0.07%	51.46%	42.67%	6.04%	0.09%

Note: The percentages are calculated based on the market values (market value of equity plus book value of preferred shares, long-term debt and short-term debt) and book values (book value of equity, preferred shares, long-term debt and short-term debt) of the firms that are in the sample at year-end, including those purchased during the year. (FSOEs = formerly state-owned enterprises; OPLCs = other publicly-listed companies.)

Figure 1: Plot of Market Value/Book Value for (i) all firms, (ii) FSOEs, and (iii) OPLCs from 1993 to 2001.

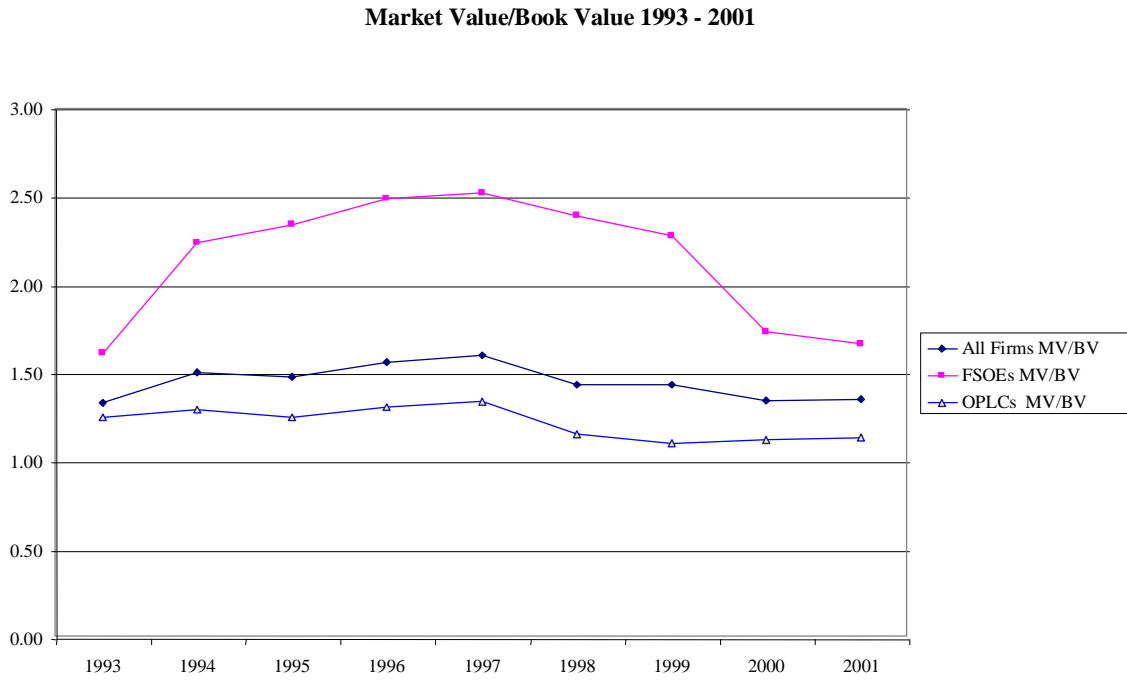


Figure 2: Internal rates of return for sample periods beginning in 1993 and ending in 2001 for (i) all firms, (ii) former state-owned enterprises (FSOEs), and (iii) other publicly-listed companies (OPLCs).

