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Abnormal Returns in Closed-End Funds

A study on Industrivärden

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Abstract:

With a starting point in previous research on the Closed-End Fund Puzzle we look at data on Industrivärden's portfolio and stock from 1996 to 2009. We find that an investment in Industrivärden has produced annualized excess returns of 3.31 percent above the returns of its holdings for the period 1996 to 2009. We cannot explain these excess returns with a higher systematic risk factor in Industrivärden, and we therefore argue that they are abnormal from the viewpoint of classical financial theory. Further, we investigate whether behavioral finance and agency theory can provide a framework for understanding the discount in a sphere-company like Industrivärden. We argue that the heterogeneity of Industrivärden's investor base is a major causal factor for the existence of a NAV-discount and that it might not be seen as an anomaly in light of behavioral finance theory.

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1. Introduction

The valuation of closed-end funds (CEFs) is one of the most immensely researched matters in finance. The fact that the market prices of CEFs often differ substantially from the Net Asset Value (NAV) of their holdings is commonly referred to as the closed-end fund puzzle. Although the puzzle has long been observed in the marketplace and received much attention from researchers, no fully satisfying explanation for its existence has been put forward.

We pursue a slightly different path than the bulk of papers on the subject. We study the possible success of investing in a CEF that trades at a discount to NAV and proceed to discuss some of the possible causes of the outperformance and the discount's persistence over time. More specifically, we investigate whether the higher dividend yield is a way to capitalize on the discount over time and hence outperform a direct investment in a portfolio consisting of the same stocks. We also investigate if any excess return can be explained by a higher beta of Industrivärden's stock (all tests are on the INDU C stock). The results of our quantitative analysis intrigue us to make an attempt at explaining the discount.

We choose to perform our study on Industrivärden, which is a Swedish CEF. Industrivärden is an appropriate fund to study for several reasons. To begin with, all of its holdings is listed which facilitates accurate NAV valuation and portfolio replication. Furthermore, it trades with a substantial discount, which raises the question of whether an investment in Industrivärden will outperform an investment in a portfolio of its underlying holdings. Industrivärden also has a concentrated ownership structure and an active long-term owner style which poses some interesting questions around the power factor as a potential explanatory variable for the discount.

Several other CEFs do exist on the Swedish market. Our reason for limiting our study to Industrivärden is that all other CEFs have significant private equity holdings in their portfolios. For example, both Öresund Investment AB and Investor AB have holdings of private companies that amounts to around 25 percent of their portfolios. This complicates the kind of analysis that we perform in this thesis. Since the shares of these companies are not exchange traded, accurate historic valuation information is not available and it is hard to measure historic returns. Also, few investors have the capital and knowledge to invest in privately held companies while all investors can invest in listed large-cap companies. This is important as our study should be seen partly from the angle of the retail investor who wants to determine if he should invest in Industrivärden or directly in the underlying stocks.

Using historical data on Industrivärden's holdings we construct a replicating portfolio from 1996 to 2009. We compare the return on an investment in this portfolio with an investment in

the unlevered Industrivärden stock during the same period. We do find that an investment in Industrivärden during this period has produced significant excess returns over an investment in the underlying portfolio. We see this as evidence that the higher dividend yield is a way to capitalize on the discount over time. Since we cannot explain the returns by higher systematic risk in Industrivärden, we argue that they are abnormal in light of classical financial theory.

In our attempt to explain the closed-end fund discount in Industrivärden we turn to behavioral finance instead. We especially find theories about investor heterogeneity and ownership structure useful in the case of Industrivärden. We specifically argue that the diverging interests of different investor groups could act as a major causal factor in the closed-end fund puzzle.

This thesis proceeds with an introduction to some of the previous research on the closed-end fund puzzle. We then develop our model and move on to the results from our empirical study. Next, we delve into research on investor groups and agency problems in closed-end funds and make an attempt at applying it on Industrivärden. Finally, we draw some conclusions from our work and make suggestions for further research.

1.1 The closed-end fund puzzle

A closed-end fund differs from its cousin, the open-end fund, in that it cannot be redeemed for the NAV of its holdings at any point in time. The fund is instead traded on an exchange where the price is determined by supply and demand, like any other exchange traded share. It is rare, however, that the price of a CEF corresponds to the net asset value of its holdings. A premium to NAV is observed in some funds, but most common is that CEFs trade with a rather substantial discount to the net value of its holdings. Previous studies also show that the discount tends to vary over time¹. As an example, we look at data on Industrivärden from 1996 to 2009, a period where the discount varied between 13 and 40 percent.

1.2 The standard explanations

1.2.1 Management fees

Closed-end funds typically charge a management fee of between 0.5 and 2.0 percent of the fund's asset value. This is done on an annual basis. An argument which has been put forward is that the mere existence of these fees would imply that closed-end funds should sell at a discount in equilibrium. However, this argument does not seem to hold when tested. The fees of closed-end funds are often lower than the ones being charged by open-ended funds. The latter also often charge its investors with transaction costs at purchases and redemptions that are higher than the costs incurred from trading in listed CEFs. Both types of funds provide similar services, indicating that closed-end funds should trade at a higher price than an open-ended one. An easy

¹ Thompson, 1978

observation is that closed-end funds are trading at a discount, thus giving an investor a higher yield than if the money is placed in an open-end fund (since he is buying more assets for the invested money). Hence, one can conclude that the existence of management fees does not imply that funds should sell at a discounted price. An alternative way to explain the issue is that people are still investing in open-end funds without a discount as an anomaly. Historically, there has also been a significant variability in premiums and discounts, while the size of management fees often is quite stable and consistent across CEFs². Empirically, the average size of discounts is too large to be fully explained by the existence of management fees.

1.2.2 Non-listed & illiquid securities

Some investment companies hold portfolios where a part of the securities are privately held companies which cannot be bought and sold on an exchange. In these funds an apparent divergence between the share price of the investment fund and the NAV could be due to the fact that the NAV cannot be accurately and objectively determined. This is due to the fact that the valuation task of privately held firms is extremely sensitive to changes in input variables and the results are often quite subjective. In contrast to open-end funds, where the risk of quick and price-moving redemptions always is imminent, a closed-end fund can hold more illiquid stocks that are listed on exchanges. However, some critics have argued that these illiquid stocks are valued too highly in the NAV calculation and findings have shown that illiquid stocks actually can explain some portion of the discount³. However, this does not go a long way toward solving the puzzle since most closed-end funds hold few illiquid stocks but are still trading at a discount. Furthermore, the amount of these illiquid holdings does not vary enough over time to explain the discount variation. When funds are open-ended, the price rises and equals the NAV. This would not be the case if illiquid stocks were systematically overvalued. We would instead expect the NAV to decrease to the actual price.

1.2.3 Taxes

The presence of taxes is another argument put forward to explain the closed-end fund puzzle. This argument is of course highly dependent on the tax legislation in the country the fund operates in. In the United States, the law requires that 90 percent of capital gains in closed-end funds are distributed as dividends to be exempt from tax on the fund level⁴. The dividends are then taxed on the level of the individual investor. In the event that a fund would not distribute as much as 90% of the capital gains, it would incur taxes on the fund level. Capital gains are also taxed on the level of the individual investor, who then would be taxed on two levels. In this scenario, the net present value of future tax payments in the fund should be deducted when

² Brickley, Manaster and Schallheim, 1991

³ Malkiel, 1977, and Lee, Shleifer and Thaler, 1990

⁴ Hjelström, 2007

valuing the fund's stock. Clearly, it would be difficult to establish the exact size of the future tax liability since it is difficult to predict the fund management's treatment of capital gains in the future. Looking at the institutional setting in Sweden, it turns out that capital gains in closed-end funds are tax-exempt on the fund level. Dividends from portfolio companies are not taxed if they are directly passed on to shareholders. A revenue component of 2 percent is also added to the fund's taxable income to eliminate the difference between the corporate tax rate of 28 percent and the personal tax rate of 30 percent. The tax liability-argument can thus not be used to explain discounts in closed-end funds on the Swedish market.

However, there is another part where taxes might be used as an explanation of the discount even for the Swedish market. The explanation relates to the existence of tax-timing options⁵. All taxable securities give the investor the option of when to realize capital gains or losses. A rational investor will of course use this option to minimize tax payments. In option theory, it is well known that a portfolio of options on some securities is more valuable than an option on the portfolio of the same securities. This means that, from a tax-timing perspective, it is more valuable to hold the securities directly than through an investment fund which would give rise to a negative premium in the fund. The higher the correlation between the individual securities, the less can be gained by holding them directly. Both Brickley et al.⁶ and Kim⁵ find some positive, but not very conclusive, evidence that the existence of tax-timing options can explain discounts.

1.2.4 High turnover

Basic portfolio theory suggests that portfolio managers should adjust their holdings such that the securities' risk level is consistent with the risk aversion of the fund's investors. One should thus expect closed-end funds to use a buy-and-hold strategy with infrequent rebalancing. However, data often points to the contrary. Some portfolio reallocations may be justifiable in order to maintain diversification, but the average fund manager often uses a considerable amount of portfolio shifting. This is not only inconsistent with classic portfolio theory; it is also disadvantageous to the fund's shareholders since it increases transaction costs. This behavior is often unlikely to improve the performance of the portfolio even before these extra costs.

Adding up the arguments, we should find that funds with high turnover are trading at a discount. However, high turnover is negatively correlated with unrealized capital gains and positively related to distribution policy which implies that the effect might be difficult to isolate.

⁵ Kim, 1994

⁶ Brickley et al., 1991

1.2.5 Managerial performance

It has been pointed out that the NAV of a fund represents the expected returns of the present portfolio. But some researchers argue that this might not be an accurate depiction. The following quote comes from Bodreaux⁷.

“The only time one should expect that the market price per share of a closed-end fund be equal to (or bear a constant discount relationship to) its net asset value per share would be if the market felt that the fund would never alter its present portfolio of securities”

In other words, the NAV should not be seen as the net present value of the portfolio's current composition, but rather as the cumulative net present value of all future expected compositions of the portfolio. Boudreaux finds that asset turnover is positively correlated with the absolute level of premiums or discounts, which seems to indicate that investors assign larger premiums or discounts to funds with active managers. Boudreaux concerns himself with the absolute level of discounts or premiums rather than the sign. We would expect that if investors thought that a manager would outperform the market in the future they would add a premium to the valuation of the fund. Conversely, if they believed that he would underperform the market they would assign a discount to the funds' shares. Thompson⁸ has produced a seminal paper on this issue. When assessing the information content of discounts and premiums he reaches the conclusion that discounts in closed-end fund shares are a predictor of future outperformance while funds selling at a premium were bad investments between 1940 and 1975. This indicates that investors in aggregate are not very good at assessing the quality of closed-end fund managers. From this perspective it is also noteworthy that funds often trade at a premium directly after the initial listing but soon fall in price to trade at a discount.

2. Abnormal returns – A simple model

On the surface of it, given rational investors, we would expect the price of a CEF to be very close to its NAV, potentially with a small adjustment for management fee and tax liabilities. Since market observations tells us that this is not true, the immediate question is whether one can earn abnormal risk-adjusted returns by exploiting this relationship. We develop a fairly simple model to illustrate the point more clearly. First we need to establish the relationship between the dividends which investors receive from Industrivärden and the dividends that Industrivärden receives on its portfolio.

2.1 Dividend policy and management fees

As described above, the tax legislation in most countries, including Sweden, makes it beneficial for CEFs to directly pass on most of the dividends from its holdings to its shareholders. In their

⁷ Bodreaux, 1972

⁸ Thompson, 1978

dividend policy, Industrivärden's management asserts that they tend to distribute most of the dividends the fund receives from its portfolio directly to its shareholders. We wanted to make sure that this was the case, so we made a simple comparison over time. Below is a table of the dividends received and distributed from 1996 to 2009 in Industrivärden. The management fee is also listed in the table.

DIVIDENDS TO AND FROM INDUSTRIVÄRDEN

YEAR	DISTRIBUTED DIVIDENDS	PORTFOLIO DIVIDENDS	MANAGEMENT FEE
1996	472 043 000	426 000 000	0.20%
1997	557 869 000	1 067 000 000	0.18%
1998	643 695 000	775 000 000	0.20%
1999	772 699 500	839 000 000	0.20%
2000	1 064 614 400	918 000 000	0.18%
2001	1 442 918 400	820 000 000	0.29%
2002	1 453 709 950	849 000 000	0.20%
2003	1 120 177 200	1 032 000 000	0.20%
2004	1 062 237 000	1 325 000 000	0.20%
2005	1 158 804 000	1 733 000 000	0.20%
2006	1 351 938 000	2 107 000 000	0.13%
2007	1 738 206 000	2 841 000 000	0.13%
2008	1 931 355 000	1 059 000 000	0.23%
2009	1 738 219 500	1 159 000 000	0.16%
Sum	16 508 485 950	16 950 000 000	0.19%

If we subtract the management fee from the dividends that Industrivärden receives on its holdings we would expect to arrive at a number close to what Industrivärden distributes to its owners. Performing this exercise on data from 1994 to 2009 we actually find that the sum that Industrivärden has distributed exceeds the dividends they have received less management fees for the same period. When looking at the table one notes that there is clearly some difference between what is received in a year and what is distributed in the same year. This could be due to a scenario where dividends received in one year are distributed the next year and so forth. In addition, we find that Swedish investment companies tend to distribute a very small part of their capital gains every year for tax reasons. Finally, Industrivärden has a small business unit which is engaged in more short term stock trading and the gains from this unit could also be distributed to owners as dividends. When we calculate the difference between dividends received and dividends distributed for the period we arrive at an effective average management fee of just 0.08 percent. This leads us to conclude that Industrivärden distributes most of the capital income it receives and that management fees probably not will go a long way toward explaining the existence of the discount.

2.2 Model development

Given that we found Industrivärden to distribute most of the dividends it receives, and that the stock trades at a substantial discount to NAV, the dividend yield of Industrivärden itself is higher than if you held a portfolio of its holdings. One observes that, if the discount remained reasonably constant over time, an investor who invested in Industrivärden would outperform the underlying portfolio, perhaps also without any additional risk.

Let us illustrate this with a simple two-period model. We introduce the following notation:

NAV_t = Net asset value of a fund's holdings at time t

FSP_t = Fund share price at time t

$DISPREM$ = The percentage divergence of FSP_t from NAV_t , calculated as $\frac{(NAV_t - FSP_t)}{NAV_t}$.

Consequently, if $DISPREM$ is positive, the fund trades at a discount, and conversely at a premium if it is negative.

$NDIV_t$ = The dividends of the fund's underlying portfolio

$FDIV_t$ = The dividend that the fund pays to its shareholders

For simplicity, we assume that $DISPREM$ is positive and constant over time. Given previous research on the subject, this is not an entirely unrealistic assumption to make since many funds have had discounts persisting over long periods of time.

Next, we also assume that $FDIV_t$ equals $NDIV_t$, which means that the fund passes on all the dividends it receives from its holdings to its shareholders. Neither this assumption is unrealistic. Management fees in the CEF-sphere are generally small and funds tend to pass on most of their capital income to their own shareholders.

The dividend yield of the underlying portfolio then becomes $PYIELD_t = \frac{NDIV_t}{NAV_t}$, and the dividend yield of the fund is $FYIELD_t = \frac{FDIV_t}{FSP_t}$.

It follows from our previous assumptions that FSP_t is smaller than NAV_t , which makes $FYIELD_t$ larger than $PYIELD_t$.

If this was the case, an investment in the fund would outperform an investment in a portfolio of the fund's assets with $FYIELD_t - PYIELD_t$ every year.

The investor employing this strategy would also probably assign some positive probability to the chance that the fund might be open ended. Brauer⁹ points out that it is rational to expect this probability to be some positive number for funds trading with deep discounts. We can incorporate this belief into our model by adding a variable, *OEPROB*, which is the probability an investor assigns to the fund being open-ended or liquidated in any year. When a fund is open-ended, its shares will by definition be redeemed at par and the investor will realize a capital gain equal to *DISPREM*. The expected excess return for an investor with a positive *OEPROB* is then:

$$E(ER_t) = (FYIELD_t - PYIELD_t) + (DISPREM * OEPROB)$$

We continue by plugging in some numbers into our model.

$$NAV_1 = 1000$$

$$FSP_1 = 700$$

$$OEPROB = 10\%$$

$$DISPREM = \frac{(1000 - 700)}{1000} = 30\%$$

$$NDIV_1 = FDIV_1 = 40$$

$$PYIELD_1 = \frac{40}{1000} = 4\%$$

$$FYIELD_1 = \frac{40}{700} = 5.7\%$$

$$E(ER_1) = (5.7\% - 4\%) + (30\% * 10\%) = 4.7\%$$

In this example, the investors' expected excess return for the first year is 4.7 percent. Obviously this cannot be the yearly expected excess return in infinity since the capital gain from an open-ending is 30 percent, which of course only can occur once. The investor would earn an ex-post yearly excess return of 1.7 percent in a year when the fund is not open-ended. In a year when the fund is open-ended the investor would earn an excess return of 31.7 percent.

If we relax some of our assumptions and allow the discount to vary over time, the model becomes more realistic. Brauer notes that an investor can excess capital gains even if the fund is not open-ended. If the markets perceptions of the open-ending probability changes, it is reasonable to believe that the discount will change as well. We keep everything constant from period one except *FSP₂* which we assume has increased to 800 because of changes in investor

⁹ Brauer, 1988

perceptions. The investors' total excess return between period one and two becomes the following:

$$ER_{1,2} = (5.7\% - 4\%) + \left(\frac{800-700}{700} \right) = 16\%$$

We have thus established that there are in essence three ways for an investor to achieve excess returns from an investment in a discounted CEF: the higher dividend yield, an open-ending of the fund and finally a narrowing of the discount. In our empirical study, we will not make a distinction between a narrowing of a discount and an open-ending. After all, both represent capital gains and a narrowing of the discount could be thought of as an increased possibility of an open-ending.

2.3 A static look at Industrivärden's stock

We start our empirical study by taking a snapshot look at Industrivärden's stock and its relation to the underlying portfolio. On the 7th of December 2009¹⁰, Industrivärden's portfolio consisted of the following stocks:

INDUSTRIVÄRDEN'S PORTFOLIO 2009-12-07

COMPANY	NUMBER OF SHARES	MARKET VALUE (mm SEK)
Handelsbanken	63 155	11 823
Sandvik	135 431	10 862
SCA	70 800	6 970
SSAB	51 711	5 739
Ericsson	75 381	5 710
Volvo	70 218	4 705
Skanska	29 255	3 101
Indutrade	14 758	2 166
Munters	10 950	544
Höganäs	3 550	462
TOTAL		52 082

¹⁰ Approximated by portfolio composition data from October 31st

The dividend yields of these stocks on market close December 31st were the following:

TABLE OF DIVIDEND YIELDS OF PORTFOLIO FIRMS

COMPANY	DIVIDEND YIELD
Handelsbanken	2.62%
Sandvik	1.00%
SCA	3.67%
SSAB	1.72%
Ericsson	2.76%
Volvo	1.48%
Skanska	4.26%
Indutrade	4.60%
Munters	0.00%
Höganäs	2.03%
PORTFOLIO	2.38%

Calculating the dividend yield of the entire portfolio we get a yield of 2.38 percent. If we look at Industrivärden's own stock we see that it currently yields 4.31 percent, without adjusting for leverage. Setting leverage to zero we get a yield of 4.25 percent. These yields are calculated using aggregate analyst estimates compiled from Bloomberg¹¹.

Given this, an investment in Industrivärden today outperforms the underlying portfolio of stocks by 1.86 percent annually, assuming a constant discount to NAV. Even though this is a static look, at a single point in time, and with expected rather than realized dividends, the potential outperformance must be considered quite remarkable.

The risks associated with this investment strategy are dependent on the investor's time horizon. With an infinite horizon the investor would not be worried about movements in the fund's discount and he would always outperform the fund's holdings as long as the dividend policy stayed constant.

However, investors with infinite horizons are probably rare. With a finite horizon the most tangible risk is that the discount to NAV has widened at the time when the investor wants to liquidate his holdings. This leads us to one of the central points of this thesis, namely the quantification of this risk. If we find excess return in our study over time, can we explain this by increased systematic risk or can it be categorized as abnormal?

¹¹ A financial news and data service

3. Hypotheses

The main purpose of this quantitative investigation is to establish whether abnormal returns can be achieved by an investment in a closed-end investment fund that holds a portfolio of listed assets and which trades with a discount to net asset value. Our first hypothesis is therefore formulated as follows:

H1: An investment in a self-financing portfolio consisting of a long position in the unlevered Industrivärden C stock and a short position in a portfolio of its holdings will yield significantly positive returns during the period 1996 to 2009.

Secondly, we investigate how the beta of the Industrivärden stock differs from the beta of its underlying portfolio for the above mentioned period. Previous studies show that closed-end funds are, on average, more volatile than the assets they hold. It is crucial to determine if the extra risk that discount variability brings can be quantified as systematic. Our second hypothesis is therefore formulated as follows:

H2: The beta of the unlevered Industrivärden's stock between 1996 and 2009 is, on average, higher than the beta of its assets

4. Methodology

To compare returns we construct a portfolio consisting of Industrivärden's holdings from 1996-01-01 to 2009-09-30. We get all our data on the portfolio composition from Industrivärden and data on historical prices from Nasdaq OMX. Data on the composition of the portfolio is only available on a yearly basis so we can only perform a re-weighting of our replicating portfolio once a year. This is of course a source of insecurity as we cannot be certain of exactly when Industrivärden bought and sold shares for their own portfolio during the year. What we do know, however, is that Industrivärden is a long term owner who does not trade excessively in its portfolio. Therefore the portfolio at year end should give a good picture of what the portfolio has looked like during the year. We proceed to measure the total return one would get from investing in this portfolio under the above mentioned time frame.

We move on to calculate the return from an investment in the Industrivärden stock for the same period. Industrivärden usually operates with leverage in their portfolio at any point in time which of course also indirectly gives leverage to the investors in Industrivärden's shares. We adjust for this effect to achieve comparability since the other leg of our strategy is unlevered. To do this we have calculated Industrivärden's average interest rate that it pays on its debts for each year during the period. We then construct a new portfolio consisting of a position in Industrivärden's stock and a position in a fixed income instrument with the same yield as the

average loan rate. The investment in the fixed income instrument is continually rebalanced as Industrivärden's debt-to-equity ratio changes over time.

Following on from our reasoning regarding volatility, we also need to incorporate a risk factor into the model. The factor which seems most straight forward to use is beta. The beta of a stock is a measure of systematic risk, or how a stock moves in relation to the market as a whole. Beta is calculated with the following formula:

$$\beta_a = \frac{Cov(R_a, R_p)}{Var(R_p)}$$

A beta of one indicates that a stock will move in tandem with the market. A beta of less than one means that the stock on average moves less than the market while a beta higher than one conversely indicates that the stock on average moves more than the market. We get data on historical betas from DataStream¹². Since we measure unlevered returns we also use unlevered betas, which are calculated with the formula below.

$$B_u = \frac{B_l}{[1 + (1 - T_c) * (D/E)]}$$

Where D/E is the debt-to-equity ratio and T_c is the corporate tax rate.

According to the Capital Asset Pricing Model (CAPM) the return of a security is equal to the formula below.

$$R_i = R_f + \beta_i(R_m - R_f)$$

Intuitively, the formula means that investors only get increased return by taking on increased systematic risk (β). Accordingly, for the closed-end fund discount to be coherent with the CAPM we must find a higher beta in the Industrivärden stock than its underlying portfolio, given that it produces excess returns.

5. Results

5.1 Excess returns

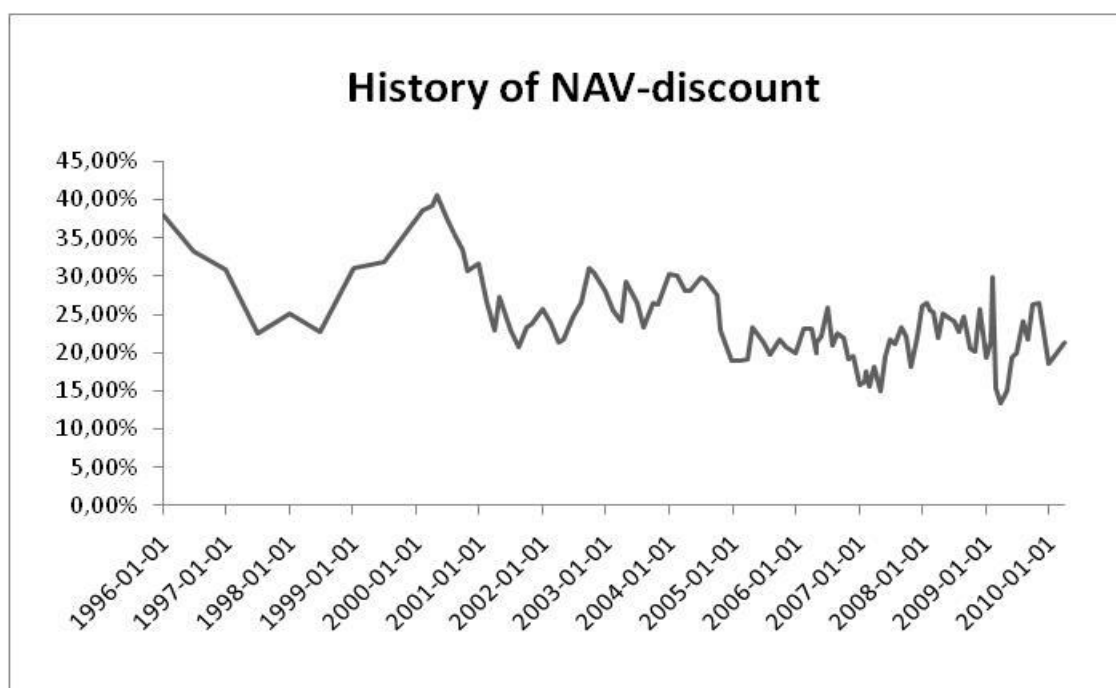
Our calculations show that the portfolio had a total return of 298.22 percent over the period which works out to an annualized return of 10.57 percent. It should be noted that Industrivärden's portfolio at the beginning of this period contained private equity holdings to a small extent. The privately held companies amounted to 20 percent in 1996 but was decreased

¹² A financial data provider

to 10 percent in 1997 and then steadily decreased until the portfolio almost completely consisted of listed stocks in 2005.

An investment in the unlevered Industrivärden C stock returns 497.47 percent over the same period as measured above which becomes 13.88 percent annualized. The self-financing portfolio that we describe in our first hypothesis above would then have a positive yearly return of 3.31 percent assuming no transaction costs. We can thus confirm our first hypothesis; the self-financing portfolio does indeed produce significantly positive returns.

There are some implications of the results above which deserve further discussing. First and foremost, it is important to compare the discount to NAV of the Industrivärden stock at the beginning of our sample period with the discount at the beginning. For this purpose, we have constructed a time-series of the discount during the period, illustrated in the graph below.



At the beginning of the sample period the discount to NAV stands at 38 percent while at the end of the period it has decreased to 26 percent. Some of the return thus comes from the fact that the discount has narrowed during our sample period. To neutralize this factor in our model we calculate the return over the period with a normalized discount. The average discount during the period is 24.3 percent. If we use this discount at both the start and the end of the period we arrive at a yearly return of 2.68 percent for the self-financing portfolio. A non-negligible part of our return thus comes from the fact that the discount has narrowed over the period. But even after we account for this fact we arrive at a significantly positive return from the self-financing

portfolio. This also shows that most of the excess return comes from the higher dividend yield we achieve by investing in the Industrivärden stock instead of a portfolio of its holdings.

Another implication is of course that for a portfolio with short positions we would have to pay borrowing costs. The stocks in Industrivärden's portfolio are all liquid large cap stocks and we should thus, for most of the time, not incur any expensive borrowing costs. Nevertheless, this would undoubtedly cut into the returns for the strategy. The self-financing portfolio should thus not be seen as evidence of a pure arbitrage strategy but rather as a way of demonstrating the outperformance this strategy can bring. An outright long investment in Industrivärden should be a superior alternative to an investment in its portfolio companies or, as we shall investigate further, an index strategy.

The first leg of our quantitative analysis clearly demonstrates that excess returns have been possible to achieve during the period we have studied. With this in mind, it is all the more interesting to investigate if there are any factors specific to Industrivärden that might explain the existence of a persistent NAV-discount. We proceed to discuss some of the theories with a starting point in behavioral finance and agency theory. In the next section, we demonstrate why we think that these two strands of research provide the most compelling explanations regarding the discount in a sphere-company like Industrivärden.

5.2 Investor heterogeneity and volatility

One direction of research diverges from the ground belief of the efficient market theorem and concerns itself with investor behavior. The fundamental thought of this string of research is that investors can be divided into different groups with different beliefs. Another feature is that arbitrage opportunities are limited in some way, which also violates one of the key assumptions in traditional finance.

5.2.1 Noise trader risk

One of the first papers within the new behavioral strand of research was Summers et al.¹³. They split the market participants into two different kinds of investors: rational and irrational, the latter also referred to as noise traders. The former have as the description suggests unbiased expectations and are rational in the decision making whereas latter systematically makes forecasting errors. This error from the noise trader is shown by the constant change in investment sentiment; noise traders are sometimes excessively bullish about the stock market while at other times being irrationally bearish. A noise trader often fails to fully diversify, holding just a single stock or a small number of them. They are not even that sophisticated in their stock picking; most of them choose their investments after doing some own research or

¹³ Summers et al. 1990

reading the latest stock market chronicle. Black¹⁴ believes that such investors act irrationally on news that to the insider would be considered as noise.

A central feature of the model is that noise-traders tend to be more prevalent in closed-end funds. Suppose that an investment company has a high concentration of noise traders and that this concentration is higher than in the underlying assets. In times of negative market sentiment, the noise trades will become excessively bearish on the prospects of the investment company and thereby drive down the price. Since the presence of irrational traders is higher in the investment company, its stock price will go down more than the price of the portfolio and hence the discount widens.

The sentiment variability creates a significant risk for the rational investor who trades in securities where the number of noise traders is high. An important assumption in the model is that rational investors are risk averse and have a finite investment horizon. This is not that farfetched, since many professionals managing other people's money could be characterized in such manner. As a result, the rational investors deter from investing in securities with a significant number of noise traders in order to reduce the risk for a change in sentiment. A seemingly attractive position could prove costly if the share price is heavily influenced by a potential change in the sentiment of noise traders. This would then lead to the rational investor shifting its investment focus, foregoing potential arbitrage opportunities between the CEF and its underlying portfolio. The unpredictability of the noise traders' beliefs about the future market prospects acts as a substantial obstacle for rational investors trying to profit from arbitrage.

5.2.2 Volatility

The fact that studies have proved the discount to vary over time leads into the realization that the volatility of the fund and the volatility of its underlying portfolio must not be the same. Pontiff¹⁵ uses closed-end funds to establish if stocks are excessively volatile and finds that the average CEF is 64 percent more volatile than the portfolio of its underlying assets. With a starting point in the investor sentiment theory he tries to quantify the risk factors behind the excess volatility. He finds that only about 15 percent of this excess volatility can be explained by factors such as market risk, small-firm risk and the risk associated with the discount movement of other closed end funds. Sharpe & Sosin¹⁶ reaches similar conclusions, albeit of smaller magnitude, when studying a sample of funds between 1933 and 1972. They find that the average fund has variance 17 percent larger than that of its holdings.

¹⁴ Black, 1986

¹⁵ Pontiff, 1997

¹⁶ Sharpe & Sosin, 1975

Excess volatility in closed-end funds is closely related to the investor sentiment theory. Summer et al. tries to establish that the reason for divergences from NAV as well as excess volatility in CEFs is due to the fact that a larger percentage of the investor base, relative to the underlying stocks, consists of noise traders. They state that “*fluctuations in discounts are in fact the reason that there is an average discount*”. The interpretation of this statement is that excess volatility is in their view most likely the main explaining factor for the existence of closed-end fund discounts. Summers et al. argues that discounts are not arbitrated because investors do not have long enough investment horizons. In addition, rational investors cannot accurately predict noise trader sentiment in any period and therefore always run the risk that the discount widens. For Summer et al.’s model to be coherent, one needs to show that the noise trader risk is systematic. The evidence on this point is inconclusive at best. Gemill and Thomas¹⁷ concur with Summers et al. on the point that irrational traders are the main factor that discounts fluctuates. On the other hand, they disagree with the statement that noise trader risk is systematic and causes the discount to exist in the first place. Even less support comes from Pontiff’s sample which displayed mostly idiosyncratic excess volatility.

5.2.3 Investor heterogeneity in Industrivärden

Since the noise-trader theory to us is one of the most compelling possible explanations to the closed-end fund puzzle we want to investigate how it relates to our specific case. To do so we need to study the ownership structure in Industrivärden to see if we can distinguish different groups of investors. Below is a table of the percentage of shares held by the 50 largest owners in all of Industrivärden’s portfolio companies and in Industrivärden.

TABLE OF THE 50 LARGEST OWNERS IN PORTFOLIO FIRMS AND INDUSTRIVÄRDEN

STOCK	PERCENTAGE OF CAPITAL	PERCENTAGE OF VOTES	NUMBER OF OWNERS
Volvo	62.00	73.10	2 287
SSAB	60.20	64.20	71 980
Ericsson	41.60	63.30	668 500
Sandvik	-	57.90	112 457
SHB	53.60	54.40	102 861
SCA	44.00	66.70	85 642
Skanska	49.20	66.70	85 642
Höganäs	81.80	85.50	7 800
Indutrade	-	84.10	5 429
Munters	77.40	78.50	5 415
Industrivärden	73.40	82.30	48 536

It becomes clear that except for the small cap companies, Höganäs and Indutrade, Industrivärden has the highest percentage share owned by the 50 largest owners. What is also

¹⁷ Gemill and Thomas, 2002

noteworthy is that the number of owners in Industrivärden is lower than in any of the large cap portfolio companies. This is by no means conclusive evidence that the number of irrational investors is lower in Industrivärden, but on the other hand it gives us no reason to believe that the number would be higher than in the portfolio companies. We suspect that the kind of investment funds that are studied in the American studies on the investor sentiment theory have somewhat different modus operandi than the Swedish sphere company. Lee et al.¹⁸ for example states that “*closed-end funds are a device by which smart entrepreneurs take advantage of a less sophisticated public*”. We are not sure if this statement is a product of times long past or if it reflects an inherent characteristic of the current market for closed-end funds in the United States. In which case, the sophistication of the average investor in Industrivärden does seem to be high, mainly because its position as a hub in an industrial sphere. Therefore, we find it hard to explain any part of the discount by the investor sentiment, or noise trader, theory.

5.2.4 Quantitative results regarding volatility

As stated above, we do not believe that the classical application of the noise trader theory is relevant in our case. However, we still find it useful to test if we can find any increased systematic risk in the Industrivärden stock which would help us explain the excess returns we find.

Our findings confirm our doubts regarding the noise trader theory. As can be seen in the table below, the average beta of the stock is very close to the beta of the portfolio and in fact even slightly lower. Since we have measured unlevered returns, we have also adjusted the beta for leverage. The stock of Industrivärden actually has a higher beta than the portfolio of its holdings but this seems to stem entirely from the leverage factor. What this means is that none of the abnormal returns can be explained by increased systematic risk in the case of Industrivärden. We thus have to reject our second hypothesis.

¹⁸ Lee et al., 1991

TABLE OF PORTFOLIO BETA AND UNLEVERED DITO

YEAR	PORTFOLIO BETA	UNLEVERED STOCK BETA	DIFFERENCE
1996	1.047	0.977	-0.07
1997	1.003	1.057	0.05
1998	0.932	1.064	0.13
1999	1.053	1.234	0.18
2000	0.854	1.204	0.35
2001	0.837	0.981	0.14
2002	1.043	0.769	-0.27
2003	1.138	0.849	-0.29
2004	1.120	0.915	-0.21
2005	1.148	0.898	-0.25
2006	1.148	1.010	-0.14
2007	1.089	0.874	-0.22
2008	0.854	1.009	0.16
2009	1.025	1.080	0.06
AVERAGE	1.021	0.994	-0.026

While this result fails to give any support to the noise trader theory, it is the more interesting from other angles. Since excess systematic risk is an insufficient explanation of the returns, we have a strategy which outperforms the portfolio without increased risk and we have to wonder why it is not automatically corrected by the market. Pontiff have previously showed that most of the excess volatility in CEFs is idiosyncratic, which also seems to be the case in Industrivärden. This is of course important because it means that it can be diminished by diversification, and an investor could achieve excess returns without taking on extra risk.

5.2.5 Diversification

Another application of the research based on different groups of investors is the theory that the act of diversification is what induces a negative premium to arise. Investor heterogeneity is at the center once again as Miller¹⁹ argues that investors have different beliefs about different industries and companies. An investor is likely to be optimistic about some stocks and pessimistic about others. The natural thing to do is then to buy the stocks that he likes while abstaining from buying the stocks that he is not fond of. The alternative to buy shares in a predetermined portfolio is then inferior to buying the shares individually. According to this theory, the more diversified a portfolio is, the higher the discount has to be in order to attract investors. This theory has not been applied to the pricing of investment companies, so one must look to research on conglomerates to find empirical evidence. Hjelström²⁰ summarizes the research on the subject and states that the empirical evidence from research on conglomerates and multi-segment firms provides strong evidence of a negative premium due to diversification.

¹⁹ Miller, 1977

²⁰ Hjelström, 2007

Some of the proposed explanations of negative premiums concern allocation of funds within a group of companies and over-investment. It is very interesting to speculate as to whether a large Swedish investment company such as Industrivärden has the power to exert such managerial control. With the substantial voting stakes it owns in some of its portfolio companies it is a very real possibility that it can use its controlling power to make decisions which might be deemed sub-standard in the eyes of investors. We investigate this further in the next section.

5.3 Industrivärden and the power factor

Another argument in the closed-end discount debate has been the relationship between block ownership and the discount. In 1993, Barclay et al.²¹ showed that the size of the discount could be due to the block ownership of closed-end fund shares. The reasoning behind is that large block holders could use the enhanced voting power to secure private benefits that are not to the benefit of other shareholders. The character of these benefits does not necessarily have to be of pecuniary character, but could also take the form of power or prestige. Furthermore, by using the voting power, large block holders could ensure the future of these benefits. As a result, smaller investors should discount this relationship when valuing the price of closed-end funds. Barclay et al. document a negative impact on premiums of 7 percentage points when block holders are present.

It is well known that the Swedish business world is in major parts divided between a few well established families and spheres. Being perhaps the most famous of them all, the Wallenberg family with its different trusts and investment companies owns a significant part of many Swedish companies. The Handelsbanken-sphere is another major owner in the Swedish business world. Industrivärden is the core in the web of cross ownership that constitutes the Handelsbanken-sphere. Below is a table of the largest owners of Industrivärden, all of them from the Handelsbanken-sphere or closely connected to it.

TABLE OF THE LARGEST OWNERS OF INDUSTRIVÄRDEN

OWNER	PERCENTAGE OF VOTES	PERCENTAGE OF SHARES
L E Lundbergföretagen	15.50	11.20
Handelsbankens pensionsstiftelse	9.90	7.20
Handelsbankens pensionskassa	9.80	7.10
Jan Wallander & Tom Hedelius stiftelse	8.50	6.20
SCA Pensionsstiftelse	6.10	4.40
AB Landå	4.30	3.10
SCA	3.80	2.70
SCA Vorsorge-Treuhand	3.10	2.20
SCA Pensionsstiftelse för tjänstemän och arbetsledare	2.30	1.70
Handelsbanken	2.00	1.40
SUM	65.30	47.20

²¹ Barclay, Holderness and Pontiff, 1993

By Barclay et al.'s reasoning, investors outside the Handelsbanken sphere would realize that the aims and incentives of the largest block holders in Industrivärden could be disconnected from their own. Even though the management of Industrivärden of course wants to achieve good returns on their investments, the cross-ownership structure is mainly established to ensure future control of the companies involved. We previously discussed the research on conglomerates and concluded that Industrivärden may in some ways be seen as a conglomerate since it owns controlling stakes in several of its portfolio companies and has an active management style. The two goals of return and control might not contradict each other, but it is reasonable to believe that some doubts regarding this is present in the minds of investors. The big question is if the sphere's long history sometimes gets in the way of alternative, more profitable, investments. Arguing by simple common sense one would definitely think so. For example, let us suppose that it became obvious to the management of Industrivärden that the future prospects of a competitor to Volvo, one of its main portfolio holdings, was clearly superior to those of Volvo. In this scenario, which is not at all unrealistic, it is very unlikely that they would act in a profit maximizing way by switching out of the stake in Volvo into the competitor. If we assume that outside investors anticipate situations like this and discount them in the valuation of the shares, we may have found a plausible explanation for some part of the discount in Industrivärden. We find some empirical evidence in support of this in Hjelström who performs his study on the British and Swedish market. Hjelström finds that discounts are strongly positively related to controlling power, especially when shares with different voting power are used. He also finds a strong positive relation between diversification and discounts, particularly in the range of low to medium levels of diversification.

5.3.1 Minority shareholders as price setters

In 2005, Holmén and Högfeldt²² examined the pyramid structure of a number of Swedish companies. They found that the ownership structure is constructed in a way to ensure that the firms in the top control the ones further down the pyramid. Closed-end investment companies, such as Industrivärden, are used as the holding company at the pyramid top with the objective to control the firms that are included in the sphere. The authors found that there is a positive correlation between the amount of time that the currently controlling investor group has been in control and the discount. From a minority shareholder perspective, this is quite intuitive. A minority shareholder noticing the historical ownership structure probably concludes that the current composition will prevail in the future. Consequently, the control over investment decisions, portfolio composition, remuneration etc, is seen as impossible to affect. Hence, the lack of influence by the minority shareholders is compensated by the presence of discounts.

²² Holmén and Högfeldt, 2005

Both portfolio concentration and the ownership structure of Industrivärden are aspects that could potentially be relevant for the explanation of the discount puzzle. The two of them starts with the individual investors' perception of Industrivärden and are assumed to affect the price of the stock on the market. The underlying assumption is that the minority shareholder plays a key role in the process of setting prices on the stock market. Investors with no influence over the portfolio composition will only accept investing in Industrivärden if it is priced accordingly to their subjective beliefs about the portfolio. The combination of the lack of influence and potentially negative subjective beliefs could possibly generate discounts. By pure logic, the chance of individual investors having negative subjective beliefs about certain portfolio components is increasing with portfolio diversification. However, if the investors who do have control over the portfolio composition were active and could affect prices, they most certainly would correct any price deviation from the value of the underlying portfolio and act as arbitrageurs. Accordingly, the assumption of the minority shareholders as price setters is crucial. It is here that the Swedish sphere situation becomes truly interesting to our case about Industrivärden. The major investors in Industrivärden are definitely sophisticated enough to profit from any arbitrage opportunities arising from the discount of the NAV. However, instead of short term arbitrage trading, these major block holders have their positions in order to ensure the future of the sphere. Consequently, the assumption of minority shareholders as price setters is not that mind-boggling. The major block holders are potentially buyers if the discount widens far enough, getting a yet stronger grip of the sphere. This could possibly also explain the fact that NAV discounts historically have been mean reverting. In conclusion, the controlling owners of the sphere are not the kind of investors who would take an interest in closing any potential arbitrage opportunities arising from the NAV-discount. It could instead be argued that a persistent and stable discount is in their interest and in fact necessary to attract minority shareholders from outside the sphere.

6. Conclusions

Conventional tests and calculations show that abnormal returns can be achieved by investing in Industrivärden. Based on classical financial theory, it is evident from this thesis that some form of mispricing is prevalent between the Industrivärden stock and its holdings. Behavioral finance makes less strict assumptions and seems to provide far more potent tools to explain the discount puzzle. In our view, the assumption about investor heterogeneity is crucial to make in any attempt at an explanation. It is probably also the most useful in a case like ours, which concerns a sphere-company where the aims and incentives of the controlling owners obviously are different to those of the minority owners. Based on our analysis, we find the divergence of interests between the investor groups as the most reasonable and compelling explanation for the discount's persistence in Industrivärden. However, there are still questions that remain

unanswered. For example who would be most suited to profit from the discount puzzle? Behavioral finance allows us to distinguish between investor groups, and we would like to argue that there are a group of investors who should seriously consider an investment in Industrivärden as long as a considerable discount exists.

If we put ourselves in the shoes of the average retail investor who is looking for an index-replicating strategy, we are faced with a few alternatives. To achieve full index replication we could invest in an index ETF (Exchange Traded Fund). These instruments have very low management fees and trades at, or very close to, NAV. Our next alternative would be to invest in an open end mutual-fund with a passive index-strategy. Management fees in these types of funds tend to be higher, they are not traded on exchange and their shares can always be bought and sold at NAV plus a percentage commission. Finally, we are left with the alternative to invest in a closed end fund that has a high correlation with the market and a long term investment horizon. Our results show that Industrivärden has an unlevered beta that is very close to one, which means that the selection of stocks within the fund's portfolio is a good representation of the broader market's composition. Furthermore, the turnover of assets in Industrivärden's portfolio has historically been very low, and they have always promoted themselves as an owner with a long-term investment horizon. Most importantly, as we have demonstrated, Industrivärden trades with a significant discount to NAV and therefore offers a dividend yield which most of the time is well above that of the market. To avoid the idiosyncratic risk of discount-variability, the investor could invest in more than one CEF, if he would be comfortable with the fact that most other funds have some part of their assets invested in private equity. It is evident that an investment in a discounted CEF with a beta close to one is, for many investors, a superior alternative to an investment in a mutual fund or an ETF.

When it is established that the discount exists and persists over time the obvious question is why it is not subject to arbitrageurs. While the discount might not be an anomaly from the perspective of behavioral finance, we find it hard to come to terms with the fact that arbitrage profits seems to be within investors reach. As we have touched upon before, borrowing and transaction costs are reasons that probably make a pure arbitrage difficult. But one could envision other strategies that should be profitable in this case. Since the beta of Industrivärden is close to one, the opposing short position in a self-financing portfolio could be an index short. An index short is much less expensive to maintain than a portfolio of shorts, and no rebalancing is needed as long as the beta stays close to one. Even though this seems like a profitable strategy, in reality it is unlikely that many arbitrageurs have long enough investment horizons to be able to engage in it. Given that the discount stays reasonably constant over time, it is the accumulation of the higher dividend that produces long term outperformance. Most hedge funds

that partake in arbitrage activities report results to their investors on a monthly basis and could have difficulties explaining such a position in the presence of other opportunities which provide quicker profits. This could serve as an explanation as to why the anomaly is likely to persist, and investors that are willing to slowly capitalize on the higher dividend yield will be able to do so in the future as well. Still, this area would surely be in need of a more thorough empirical study to establish if there are any other limits to arbitrage. Another suggestion for further research on the subject would be an empirical study on sphere-companies in particular, to find more empirical evidence that the differences in investor beliefs is in fact what causes the discount to exist.

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8. Appendix

8.1 Return calculations for INDU C 1996-2009

INDUSTRIVÄRDEN C - RETURNS FROM 1996-01-01 TO 2009-09-30								
Date	Event	DVD/Share	Price	Split Factor	# Shares	Market Value	Adjusted Shares	MV + Reinvestment
1996-01-01	Buy	-	199.00	1	1 000	199 000	1 000	199 000
1996-05-07	Dividend	11	223.00	1		223 000	1 049	234 000
1997-04-30	Dividend	13	378.00	1		378 000	1 085	410 287
1998-05-06	Dividend	15	535.00	1		535 000	1 116	596 978
1998-05-27	Split	Split 4:1	140.00	4	4 000	560 000	4 463	624 875
1999-04-22	Dividend	4.5	115.00	1		460 000	4 638	533 375
2000-05-08	Dividend	5	219.00	1		876 000	4 744	1 038 922
2000-05-08	Dividend	1.2	219.00	1		876 000	4 770	1 044 615
2001-05-04	Dividend	5	174.00	1		696 000	4 907	853 817
2001-05-04	Dividend	3.4	174.00	1		696 000	5 003	870 501
2002-04-18	Dividend	5	142.00	1		568 000	5 179	735 424
2002-04-18	Dividend	3.35	142.00	1		568 000	5 301	752 773
2003-04-03	Dividend	5	86.50	1		346 000	5 608	485 062
2003-04-03	Dividend	0.8	86.50	1		346 000	5 660	489 548
2004-03-30	Dividend	5.5	122.50	1		490 000	5 914	724 418
2005-04-21	Dividend	6	150.00	1		600 000	6 150	922 524
2006-05-09	Dividend	7	234.50	1		938 000	6 334	1 485 263
2007-03-28	Dividend	9	267.00	1		1 068 000	6 547	1 748 113
2007-04-25	Split	Split 2:1	144.50	2	8 000	1 156 000	13 094	1 892 153
2008-04-16	Dividend	5	94.75	1		758 000	13 785	1 306 175
2009-05-11	Dividend	4.5	67.00	1		536 000	14 711	985 662
2009-09-30			74.50	1	8 000	596 000	14 711	1 095 997
Percentage Change						199.50%		450.75%
Average Annualized Return						8.30%		13.21%

8.2 Unlevered return calculations for INDU C 1996-2009

INDUSTRIVÄRDEN C - RETURNS FROM 1996-01-01 TO 2009-09-30 (ADJUSTED FOR LEVERAGE)																
Date	Event	Leverage	Interest Rate	Leverage	Split	Div/Share	Shareprice	No of shares	Adj Shares	Adj Leverage	Equity	Interest	Investment	Ratio	Adj Ratio	Total Market Value
1996-01-01	Köp	15.00%	8.10%	0.85	1.00	-	199	1000	1000	850	169150		29850	0.15	0.15	199000
1996-05-07	Utdelning	15.00%	8.10%	0.85	1.00	11,00 kr/aktie	223		1049.32735	868.3319032	193638		33842.35	0.13	0.15	227480.3618
1997-04-30	Utdelning	16.00%	7.60%	0.84	1.00	13,00 kr/aktie	378		1085.41533	852.9974745	322433		57191.35	0.10	0.15	379624.3977
1998-05-06	Utdelning	16.00%	5.50%	0.84	1.00	15,00 kr/aktie	535		1115.84754	888.0088066	475084.7		85326.59	0.11	0.15	560411.3063
1998-05-27	Split	16.00%	5.50%	0.84	4.00	Split 4:1	140	4000	4463.39015	3749.247726	524894.7			0.00		524894.6817
1999-04-22	Utdelning	7.00%	4.80%	0.93	1.00	4,50 kr/aktie	115		4638.04455	4670.262781	537080.2		44985.23	0.15	0.08	582065.4485
2000-05-08	Utdelning	26.00%	5.80%	0.74	1.00	5,00 kr/aktie	219		4743.93598	2802.435553	613733.4		171385.56	0.06	0.22	785118.9487
2000-05-08	Utdelning	26.00%	5.80%	0.74	1.00	1,20 kr/aktie	219		4769.93015	3252.576662	712314.3		227319.67	0.18	0.24	939633.9598
2001-05-04	Utdelning	27.00%	5.60%	0.73	1.00	5,00 kr/aktie	174		4906.9971	3642.005207	633708.9		229453.17	0.29	0.27	863162.0733
2001-05-04	Utdelning	27.00%	5.60%	0.73	1.00	3,40 kr/aktie	174		5002.88096	3634.89653	632472		232433.00	0.27	0.27	864905.0006
2002-04-18	Utdelning	7.00%	5.00%	0.93	1.00	5,00 kr/aktie	142		5179.03874	5746.045215	815938.4		86586.41	0.26	0.10	902524.8323
2002-04-18	Utdelning	7.00%	5.00%	0.93	1.00	3,35 kr/aktie	142		5301.22028	5127.673668	728129.7		57411.98	0.11	0.07	785541.6449
2003-04-03	Utdelning	7.00%	5.00%	0.93	1.00	5,00 kr/aktie	86.5		5607.6492	5464.812782	472706.3		37649.46	0.12	0.07	510355.7673
2003-04-03	Utdelning	7.00%	5.00%	0.93	1.00	0,80 kr/aktie	86.5		5659.51185	5296.921395	458183.7		34726.67	0.08	0.07	492910.366
2004-03-30	Utdelning	12.00%	4.00%	0.88	1.00	5,50 kr/aktie	122.5		5913.61238	4858.516616	595168.3		75625.54	0.05	0.11	670793.8229
2005-04-21	Utdelning	7.00%	3.00%	0.93	1.00	6,00 kr/aktie	150		6150.15688	5795.342737	869301.4		66389.51	0.08	0.07	935690.9165
2006-05-09	Utdelning	7.00%	3.50%	0.93	1.00	7,00 kr/aktie	234.5		6333.74365	5757.189009	1350061		99240.55	0.05	0.07	1449301.371
2007-03-28	Utdelning	17.00%	4.60%	0.83	1.00	9,00 kr/aktie	267		6547.24063	4873.22105	1301150		238126.97	0.07	0.15	1539276.991
2007-04-25	Split	17.00%	4.60%	0.83	2.00	Split 2:1	144.5	8000	13094.4813	10451.75373	1510278		296026.95	0.13	0.16	1806305.362
2008-04-16	Utdelning	31.00%	4.70%	0.69	1.00	5,00 kr/aktie	94.75		13785.4829	8997.337598	852497.7		356064.58	0.26	0.29	1208562.32
2009-05-11	Utdelning	25.00%	4.00%	0.75	1.00	4,50 kr/aktie	67		14711.3736	11957.5249	801154.2		303215.11	0.33	0.27	1104369.277
2009-09-30		20.00%	4.00%	0.80	1.00		74.5		14711.3736	12476.74824	929517.7		259453.91	0.26	0.22	1188971.649
Percentage change																497.47%
Average annualized return																13.88%

8.4 Industrivärden's portfolio 1996-2009

PORTFOLIO COMPOSITION 1996 - 2009							
Year	Stock	# Shares	Market value	Share of portfolio	Beta	Market value share	Portfolio beta
1995	Ericsson A	21 930 000	3 026 000 000	19.06%	1.02	0.17	0.18
	PLM	19 667 000	1 839 000 000	11.58%	0.5	0.10	0.05
	SSAB A	10 700 000	728 000 000	4.59%	1.29	0.04	0.05
	SSAB B	440 000	29 000 000	0.18%	1.32	0.00	0.00
	Volvo B	550 000	75 000 000	0.47%	1.11	0.00	0.00
	SCA A	18 232 000	1 933 000 000	12.18%	1.21	0.11	0.13
	SCA B	500 000	51 000 000	0.32%	1.29	0.00	0.00
	Handelsbanken A	12 545 000	1 731 000 000	10.90%	1.27	0.10	0.13
	Skanska	2 771 000	632 000 000	3.98%	1.45	0.04	0.05
	Skanska B	1 425 000	325 000 000	2.05%	1.45	0.02	0.03
	AGA A	28 915 000	2 646 000 000	16.67%	0.5	0.15	0.08
	AGA B	2 350 000	215 000 000	1.35%	0.5	0.01	0.01
	AGA B Convertible	24 163 050	51 000 000	0.32%	0.5	0.00	0.00
	ASG B	826 000	103 000 000	0.65%	0.5	0.01	0.00
	Custos A	2 475 000	319 000 000	2.01%	0.5	0.02	0.01
	Skandia	400 000	72 000 000	0.45%	1.1	0.00	0.00
	Industrirörelsen (unlisted)		3 800 000 000	23.94%	1	0.22	0.22
	Net debt		-1 700 000 000	-10.71%			
	Total		15 875 000 000	100.00%		1.00	0.94
1996	Ericsson A	21 930 000	4 726 000 000	21.78%	1.1	0.21	0.23
	AGA A	28 615 000	2 947 000 000	13.58%	0.5	0.13	0.07
	AGA B	1 425 000	145 000 000	0.67%	0.5	0.01	0.00
	SCA A	18 232 000	2 525 000 000	11.63%	1.28	0.11	0.14
	SCA B	550 000	76 000 000	0.35%	1.25	0.00	0.00
	Handelsbanken	12 405 000	2 431 000 000	11.20%	1.24	0.11	0.13
	Skanska A	2 772 132	836 000 000	3.85%	0.5	0.04	0.02
	Skanska B	1 425 000	430 000 000	1.98%	1.62	0.02	0.03
	SSAB A	10 700 000	1 214 000 000	5.59%	1.25	0.05	0.07
	SSAB B	340 000	39 000 000	0.18%	1.27	0.00	0.00
	PLM	10 000 000	1 180 000 000	5.44%	0.5	0.05	0.03
	Custos A	2 838 000	412 000 000	1.90%	0.5	0.02	0.01
	Skandia	2 000 000	386 000 000	1.78%	1.1	0.02	0.02
	Astra B	536 900	177 000 000	0.82%	0.5	0.01	0.00
	Näckebo A	1 240 500	145 000 000	0.67%	0.5	0.01	0.00
	Volvo B	550 000	83 000 000	0.38%	1.14	0.00	0.00
	Industrirörelsen		4 800 000 000	22.12%	1	0.21	0.21
	Net debt		-850 000 000	-3.92%			
	Total		21 702 000 000	100.00%		1.00	0.98
1997	Ericsson A	21 930 000 000	6 897 000 000	24.18%	1.19	0.22	0.26
	Ericsson B	400 000	119 000 000	0.42%	0.89	0.00	0.00
	Sandvik	22 000 000	4 972 000 000	17.43%	1	0.16	0.16
	Handelsbanken	14 850 000	4 076 000 000	14.29%	1.26	0.13	0.16
	SCA A	18 232 000	3 264 000 000	11.44%	1.19	0.10	0.12
	SCA B	150 000	27 000 000	0.09%	1.33	0.00	0.00
	AGA	28 615 000	3 133 000 000	10.98%	0.5	0.10	0.05
	SSAB A	10 815 000	1 406 000 000	4.93%	1.19	0.04	0.05
	SSAB B	420 000	55 000 000	0.19%	1.2	0.00	0.00
	Skanska A	2 774 365	903 000 000	3.17%	1.55	0.03	0.04
	Skanska B	1 525 000	496 000 000	1.74%	1.55	0.02	0.02
	Skandia	3 440 000	1 288 000 000	4.52%	1.1	0.04	0.04
	PLM	10 000 000	1 110 000 000	3.89%	0.5	0.04	0.02
	Volvo A	1 000 000	212 000 000	0.74%	1.12	0.01	0.01
	Volvo B	550 000	117 000 000	0.41%	1.17	0.00	0.00
	Incentive A	300 000	215 000 000	0.75%	0.5	0.01	0.00
	Astra B	1 430 000	191 000 000	0.67%	0.5	0.01	0.00
	Näckebo	1 240 500	143 000 000	0.50%	0.5	0.00	0.00
	Industrirörelsen		3 000 000 000	10.52%	1	0.09	0.09
	Net debt		-3 100 000 000	-10.87%			
	Total		28 524 000 000	100.00%		1.00	1.06

Year	Stock	# Shares	Market value	Share of portfolio	Beta	Market value share	Portfolio beta
1998	Ericsson	44 660 000	9 343 000 000	31.78%	1.15	27.97%	0.32
	Handelsbanken	14 650 000	5 010 000 000	17.04%	1.18	15.00%	0.18
	Sandvik	23 000 000	3 243 000 000	11.03%	1.24	9.71%	0.12
	SCA	18 382 000	3 217 000 000	10.94%	1.06	9.63%	0.10
	AGA	28 615 000	3 076 000 000	10.46%	0.50	9.21%	0.05
	Skandia	17 200 000	2 133 000 000	7.26%	1.10	6.39%	0.07
	Skanska	8 463 577	1 904 000 000	6.48%	1.25	5.70%	0.07
	SSAB	12 046 600	934 000 000	3.18%	1.07	2.80%	0.03
	Pfizer	437 900	448 000 000	1.52%	0.50	1.34%	0.01
	Volvo	1 400 000	254 000 000	0.86%	0.93	0.76%	0.01
	Astra	1 430 000	236 000 000	0.80%	0.50	0.71%	0.00
	Industrirörelsen		3 600 000 000	12.25%	1.00	10.78%	0.11
	Net debt		-4 000 000 000	-13.61%			
	Total		29 398 000 000	100.00%		100.00%	1.06
1999	Ericsson	46 520 000	26 191 000 000	46.36%	1.48	45.24%	0.67
	Sandvik	23 000 000	6 130 000 000	10.85%	0.95	10.59%	0.10
	SCA	21 314 532	5 335 000 000	9.44%	0.98	9.22%	0.09
	Skandia	20 125 000	5 172 000 000	9.16%	1.40	8.93%	0.13
	Handelsbanken	44 650 000	4 778 000 000	8.46%	1.03	8.25%	0.09
	Skanska	8 075 689	2 560 000 000	4.53%	0.65	4.42%	0.03
	SSAB	12 065 600	1 593 000 000	2.82%	1.12	2.75%	0.03
	Scania	3 000 000	916 000 000	1.62%	1.20	1.58%	0.02
	Pfizer	2 450 000	684 000 000	1.21%	0.50	1.18%	0.01
	Volvo	2 000 000	433 000 000	0.77%	1.08	0.75%	0.01
	Industrirörelsen		4 100 000 000	7.26%	1.00	7.08%	0.07
	Net debt		-1 400 000 000	-2.48%			
	Total		56 492 000 000	100.00%		100.00%	1.23
2000	Ericsson	186 000 000	20 460 000 000	39.15%	1.83	35.70%	0.65
	Handelsbanken	49 000 000	7 194 000 000	13.77%	0.68	12.55%	0.09
	Skandia	47 846 800	7 344 000 000	14.05%	1.17	12.81%	0.15
	Sandvik	23 000 000	5 221 000 000	9.99%	0.91	9.11%	0.08
	SCA	20 087 532	4 056 000 000	7.76%	0.76	7.08%	0.05
	Skanska*	8 075 689	3 150 000 000	6.03%	0.38	5.50%	0.02
	Lundbeck	2 100 000	1 943 000 000	3.72%	1.07	3.39%	0.04
	Pfizer	3 000 000	1 312 000 000	2.51%	0.50	2.29%	0.01
	SSAB	12 065 600	1 086 000 000	2.08%	1.14	1.89%	0.02
	Pharmacia	1 300 000	745 000 000	1.43%	0.50	1.30%	0.01
	Scania	3 000 000	623 000 000	1.19%	0.88	1.09%	0.01
	Industrirörelsen		4 176 000 000	7.99%	1.00	7.29%	0.07
	Net debt		-5 056 000 000	-9.68%			
	Total		52 254 000 000	100.00%		100.00%	1.20
2001	Ericsson	189 000 000	11 052 000 000	28.35%	1.92	25.01%	0.48
	Handelsbanken	48 655 900	7 493 000 000	19.22%	0.38	16.96%	0.06
	SCA	18 982 000	5 334 000 000	13.68%	0.54	12.07%	0.07
	Sandvik	21 000 000	4 715 000 000	12.09%	0.64	10.67%	0.07
	Skandia	47 846 800	3 636 000 000	9.33%	1.72	8.23%	0.14
	Lundbeck	8 427 400	2 265 000 000	5.81%	0.19	5.13%	0.01
	Skanska	28 302 756	1 939 000 000	4.97%	0.14	4.39%	0.01
	Pfizer	3 000 000	1 255 000 000	3.22%	0.50	2.84%	0.01
	SSAB	12 065 600	1 237 000 000	3.17%	0.85	2.80%	0.02
	Scania	3 000 000	571 000 000	1.46%	0.72	1.29%	0.01
	Volvo	1 800 000	309 000 000	0.79%	0.72	0.70%	0.01
	Eniro	4 000 000	300 000 000	0.77%	0.15	0.68%	0.00
	Indsutrirörelsen		4 080 000 000	10.47%	1.00	9.23%	0.09
	Net debt		-5 202 000 000	-13.34%			
	Total		38 984 000 000	100.00%		100.00%	0.98

Year	Stock	# Shares	Market value	Share of portfolio	Beta	Market value share	Portfolio beta
2002	Handelsbanken	48 656	5 644 000 000	23.35%	0.40	21.56%	0.09
	SCA	18 982	5 572 000 000	23.05%	0.51	21.29%	0.11
	Sandvik	21 000	4 085 000 000	16.90%	0.75	15.61%	0.12
	Ericsson	401 539	2 902 000 000	12.00%	2.01	11.09%	0.22
	Skanska	33 303	1 698 000 000	7.02%	0.36	6.49%	0.02
	SSAB	12 066	1 243 000 000	5.14%	0.87	4.75%	0.04
	Skandia	48 847	1 133 000 000	4.69%	1.00	4.33%	0.04
	Pfizer inc	2 018	540 000 000	2.23%	0.50	2.06%	0.01
	Scania	3 002	501 000 000	2.07%	0.51	1.91%	0.01
	Ossur	52 000	304 000 000	1.26%	1.17	1.16%	0.01
	Volvo	1 800	248 000 000	1.03%	0.65	0.95%	0.01
	Eniro	4 000	220 000 000	0.91%	0.87	0.84%	0.01
	Industrirörelsen	2 018	2 085 000 000	8.62%	1.00	7.97%	0.08
	Net debt	3 002	-1 999 000 000	-8.27%			
	Total		24 176 000 000	100.00%		100.00%	0.77
2003	Handelsbanken	52 752	7 754 000 000	25.91%	0.49	23.68%	0.12
	SCA	21 207	6 235 000 000	20.83%	0.49	19.04%	0.09
	Sandvik	21 168	5 249 000 000	17.54%	0.64	16.03%	0.10
	Ericsson	364 039	4 882 000 000	16.31%	2.36	14.91%	0.35
	Skanska	33 303	2 115 000 000	7.07%	0.46	6.46%	0.03
	SSAB	13 113	1 685 000 000	5.63%	0.69	5.15%	0.04
	Scania	3 002	607 000 000	2.03%	0.49	1.85%	0.01
	Pfizer inc	2 018	513 000 000	1.71%	0.50	1.57%	0.01
	Munters	2 708	471 000 000	1.57%	0.42	1.44%	0.01
	Volvo	1 786	382 000 000	1.28%	0.70	1.17%	0.01
	Ossur	52 000	230 000 000	0.77%	1.10	0.70%	0.01
	Nokia	1 400	174 000 000	0.58%	1.33	0.53%	0.01
	Industrirörelsen		2 449 000 000	8.18%	1.00	7.48%	0.07
	Net debt		-282 000 000	-9.42%			
	Total		29 926 000 000	100.00%		100.00%	0.85
2004	Handelsbanken	66 364	11 481 000 000	31.70%	0.34	27.77%	0.09
	Ericsson	372 000	807 200 000	22.29%	2.57	19.52%	0.50
	Sandvik	26 954	7 224 000 000	19.95%	0.68	17.47%	0.12
	SCA	18 382	5 254 000 000	14.51%	0.39	12.71%	0.05
	Skanska	32 300	2 576 000 000	7.11%	0.58	6.23%	0.04
	SSAB	14 114	2 258 000 000	6.23%	0.57	5.46%	0.03
	Munters	3 219	644 000 000	1.78%	0.24	1.56%	0.00
	Volvo	2 266	579 000 000	1.60%	0.66	1.40%	0.01
	Ossur	65 118	537 000 000	1.48%	0.47	1.30%	0.01
	Pfizer Inc	1 000	178 000 000	0.49%	0.66	0.43%	0.00
	Industrirörelsen		2 544 000 000	7.02%	1.00	6.15%	0.06
	Net debt		-5 128 000 000	-14.16%			
	Total		36 219 000 000	100.00%		100.00%	0.92
2005	Handelsbanken	67 000	13 199 000 000	27.42%	0.41	25.31%	0.10
	Sandvik	26 000	10 367 000 000	21.54%	0.61	19.88%	0.12
	Ericsson	377 000	9 620 000 000	19.99%	2.60	18.45%	0.48
	SCA	23 600	7 009 000 000	14.56%	0.37	13.44%	0.05
	SSAB	14 200	4 104 000 000	8.53%	0.54	7.87%	0.04
	Skanska	32 300	3 908 000 000	8.12%	0.58	7.49%	0.04
	Indutrade	14 858	1 322 000 000	2.75%	1.00	2.54%	0.03
	Volvo	2 400	880 000 000	1.83%	0.80	1.69%	0.01
	Munters	3 400	745 000 000	1.55%	0.26	1.43%	0.00
	Höganäs	3 400	585 000 000	1.22%	0.67	1.12%	0.01
	Industrirörelsen		407 000 000	0.85%	1.00	0.78%	0.01
	Net debt		-4 013 000 000	-8.34%			
	Total		48 133 000 000	100.00%		100.00%	0.90

Year	Stock	# Shares	Market value	Share of portfolio	Beta	Market value share	Portfolio beta
2006	Handelsbanken	68 109	14 099 000 000	24.22%	0.56	22.37%	0.13
	Sandvik	130 000	12 935 000 000	22.22%	0.73	20.52%	0.15
	Ericsson	377 000	10 405 000 000	17.87%	2.60	16.51%	0.43
	SCA	23 600	8 557 000 000	14.70%	0.44	13.58%	0.06
	SSAB	41 903	6 809 000 000	11.70%	0.68	10.80%	0.07
	Skanska	32 315	4 363 000 000	7.50%	0.76	6.92%	0.05
	Indutrade	14 858	2 006 000 000	3.45%	2.37	3.18%	0.08
	Volvo	2 481	1 205 000 000	2.07%	0.87	1.91%	0.02
	Munters	3 638	1 153 000 000	1.98%	0.36	1.83%	0.01
	Höganäs	3 550	637 000 000	1.09%	0.67	1.01%	0.01
	Tandberg Television ASA	5 963	510 000 000	0.88%	0.88	0.81%	0.01
	Industrirörelsen		347 000 000	0.60%	1.00	0.55%	0.01
	Net debt		-4 814 000 000	-8.27%			
	Total		58 212 000 000	100.00%		100.00%	1.01
2007	Sandvik	136 431	15 178 000 000	27.68%	0.70	23.05%	0.16
	Handelsbanken	68 404	14 159 000 000	25.82%	0.79	21.50%	0.17
	SSAB	56 552	9 951 000 000	18.15%	0.56	15.11%	0.08
	SCA	70 800	8 289 000 000	15.12%	0.48	12.59%	0.06
	Ericsson	382 000	5 866 000 000	10.70%	2.57	8.91%	0.23
	Volvo	45 512	4 916 000 000	8.96%	0.87	7.47%	0.06
	Skanska	33 325	4 066 000 000	7.41%	0.91	6.18%	0.06
	Indutrade	14 758	1 819 000 000	3.32%	1.19	2.76%	0.03
	Munters	10 950	840 000 000	1.53%	0.39	1.28%	0.00
	Höganäs	3 550	485 000 000	0.88%	0.74	0.74%	0.01
	Hemtex	3 700	275 000 000	0.50%	1.13	0.42%	0.00
	Net debt		-11 007 000 000	-20.07%			
	Total		54 837 000 000	100.00%		100.00%	0.87
2008	Handelsbanken	65 114	8 204 000 000	34.28%	0.75	23.61%	0.18
	Sandvik	136 431	6 685 000 000	27.93%	1.03	19.24%	0.20
	SCA	70 800	4 738 000 000	19.80%	0.72	13.64%	0.10
	Ericsson	74 400	4 412 000 000	18.44%	1.57	12.70%	0.20
	SSAB	52 911	3 597 000 000	15.03%	1.27	10.35%	0.13
	Volvo	69 950	3 057 000 000	12.77%	1.02	8.80%	0.09
	Skanska	30 325	2 350 000 000	9.82%	0.98	6.76%	0.07
	Indutrade	14 758	978 000 000	4.09%	1.05	2.81%	0.03
	Munters	10 950	420 000 000	1.76%	0.76	1.21%	0.01
	Höganäs	3 550	249 000 000	1.04%	1.07	0.72%	0.01
	Hemtex	3 700	54 000 000	0.23%	1.55	0.16%	0.00
	Net debt		-10 813 000 000	-45.18%			
	Total		23 931 000 000	100.00%		100.00%	1.01
2009	Handelsbanken	63 082	12 900 000 000	30.07%	0.75	24.07%	0.18
	Sandvik	135 431	11 700 000 000	27.27%	1.25	21.83%	0.27
	SCA	45 100	6 800 000 000	15.85%	0.78	12.69%	0.10
	SSAB	51 589	6 300 000 000	14.68%	1.63	11.75%	0.19
	Ericsson	76 680	5 000 000 000	11.65%	1.22	9.33%	0.11
	Volvo	70 218	4 300 000 000	10.02%	1.44	8.02%	0.12
	Skanska	15 091	3 500 000 000	8.16%	1.01	6.53%	0.07
	Indutrade	14 757	2 000 000 000	4.66%	0.67	3.73%	0.03
	Munters	10 950	500 000 000	1.17%	0.78	0.93%	0.01
	Höganäs	3 550	600 000 000	1.40%	0.73	1.12%	0.01
	Net debt		-10 693 000 000	-24.92%			
	Total		42 907 000 000	100.00%		100.00%	1.08

8.5 Return calculations for the portfolio 1996-2009

PORTFOLIO RETURNS

Year	Net Asset Value	Dividends	NAV-Return	Portfolio beta	Total Portfolio Value
1995 (1995-12-31)	15875000000			0.944	15875000000
1996	21702000000	426000000	36.71%	0.977	22128000000.0000
1997	28524000000	1067000000	31.43%	1.057	30486322919.5466
1998	29398000000	775000000	3.06%	1.064	32219196858.3940
1999	56492000000	839000000	92.16%	1.234	63525534285.4750
2000	52254000000	918000000	-7.50%	1.204	59609014383.5094
2001	38984000000	820000000	-25.40%	0.981	45082954352.3315
2002	24176000000	849000000	-37.98%	0.769	28484786795.1459
2003	29926000000	1032000000	23.78%	0.849	36537035143.5943
2004	36219000000	1325000000	21.03%	0.915	45823867234.7070
2005	48133000000	1733000000	32.89%	0.898	63200383517.1636
2006	58212000000	2107000000	20.94%	1.01	78982681513.7459
2007	54837000000	2841000000	-5.80%	0.874	77079729663.4591
2008	23931000000	1059000000	-56.36%	1.009	34099931425.4288
2009 (2009-09-30)	42907000000	1159000000	79.29%	1.08	63217373727.4194
Total Return					298.22%
Annualized return					10.57%

8.6 Calculation of unlevered beta for INDU C

UNLEVERED BETA INDU C

Year	Beta	Tax rate	Debt/Equity	Unlevered beta
1996	1.18	0.28	17.65%	1.05
1997	1.14	0.28	19.05%	1.00
1998	1.06	0.28	19.05%	0.93
1999	1.11	0.28	7.53%	1.05
2000	1.07	0.28	35.14%	0.85
2001	1.06	0.28	36.99%	0.84
2002	1.1	0.28	7.53%	1.04
2003	1.2	0.28	7.53%	1.14
2004	1.23	0.28	13.64%	1.12
2005	1.21	0.28	7.53%	1.15
2006	1.21	0.28	7.53%	1.15
2007	1.25	0.28	20.48%	1.09
2008	1.13	0.28	44.93%	0.85
2009	1.21	0.28	25.00%	1.03