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ABSTRACT

Recent empirical evidence has suggested that the Japanese mutual fund industry has underperformed dramatically over the past two decades. Conjectured reasons for underperformance range from tax-dilution effects to high fees, high turnover and poor asset management. In this paper, we show that this underperformance is largely due to tax-dilution effects, and not necessarily to poor management. Using a broad database of funds which includes investment trusts closed to new investment, we show that once an instrument for the time-varying tax-dilution exposure is included in a factor model, there is little evidence of poor risk-adjusted performance. A style analysis of the industry demonstrates that managers appear to pursue tax-driven dynamic strategies.

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The Japanese Open-End Fund Puzzle

I. Introduction

The poor performance of Japanese investment trusts has been heavily criticized recently in the financial press and in empirical analysis of historical returns.[1] The evidence provided by Cai, Chan and Yamada (1997) [CCY] is indeed sensational: the average rate of return of 800 open-type equity funds was only 1.74% per annum for the 1981-1992 period while that of the Japanese equity market was 9.28% per annum for the same period. Even after adjusting for allocation to fixed income securities, the Japanese mutual fund industry appears to have generated highly negative risk-adjusted returns to investors. CCY attribute these negative returns to high asset turnover, high commissions, management incompetence, and tax-induced net asset value dilution. The last explanation is a unique feature of the Japanese tax system that relates to open-type fund in Japan. While the details of these tax issues will be explained below, the effect of the Japanese tax treatment of mutual fund investment is to dilute the net asset value per share by a factor related to recent share appreciation. In this paper, we find not only that this tax-dilution effect explains virtually all the underperformance, but it actually influences the active management style of the funds themselves.

In this paper, we address the nature of this underperformance through the application of style classification methods developed in Brown and Goetzmann (1997). Our classification procedure separates the Japanese investment trust industry into a few distinct active management styles and shows the dynamics of these styles to be empirically related to the tax-dilution effect. To overcome the problem of dynamic portfolio exposures conditional upon the tax-dilution effect, we develop time-varying style-analytic risk adjustment procedures similar to Sharpe (1992), Fung and Hsieh (1997) and Ibbotson (1996). Risk-adjusted returns across virtually all Japanese mutual fund

categories change from negative to zero or slightly positive once differential exposure to tax dilution is incorporated into the factor model specification.

We interpret the results of our analysis as evidence against mismanagement in the Japanese mutual fund industry. The widely reported lackluster performance of Japanese mutual funds led to significant reforms by the Ministry of Finance beginning in 1994. These reforms included deregulation of various controls on asset selection and allocation, changes toward fuller disclosure for investors and more systematic disclosure of fund performance. The results of our analysis suggest that the focus of the reform has, to date, been misplaced. The apparent failure of the Japanese mutual fund industry may in fact lie principally with the tax structure , rather than within the financial industry[2]. We find that the poor relative performance of Japanese mutual funds is partially due to the fact that measured returns represent the after tax return of the average Japanese investor, whereas U.S. returns are reported on a pre-tax basis. In fact, to the extent that the funds are actively managed to minimize exposure to the tax dilution factor, we hypothesize that after-tax investor returns may be enhanced by strategic rebalancing. A test of this hypothesis awaits collection of tax basis information for each fund, however, and is beyond the scope of this paper to address.

The implications of our findings extend far beyond an analysis of unique Japanese institutional factors. Our results shed some light on crucial tax and investment policy issues. Not only can policy influence the rate of return achieved by investors, it also directly influences the strategies pursued by managers. While there is only limited evidence in the U.S. mutual fund industry that some fund managers pursue active strategies that seek to maximize investor after-tax returns, in Japan, the tax effects are dramatic enough that they appear to explain a significant portion of the differences in out-of-sample performance. In other words, the Japanese experience provides

a framework for policy makers around the world who are considering the potential consequences of apparently innocuous decisions such as simplifying the rules for calculation of the basis for capital gains taxation. Not only are such rules not revenue-neutral, they are not risk-neutral. Japanese tax policy has apparently hobbled one of the most potentially beneficial institutions in the economy.

Over the past decade, the mutual fund industry has boomed in most of the world's major economies, as small investors in a number of countries have discovered that benefits of diversification through investing in regulated trusts. While risk-adjusted performance has differed from country to country due to institutional factors such as tax policy, legal environment, disclosure practices and market efficiency, the net effect has been to reduce the volatility of investor wealth globally. Although the growth of the mutual fund industry in Japan has reflected the global trend, the unusual tax policy appears to have extracted a high price for these diversification benefits.

The paper is organized as follows. Section II provides an institutional framework for the Japanese mutual fund industry, including a description of the tax-dilution effect and institutional style classifications. Section III describes the data and methodology used in our analysis. Section IV reports the results. The conclusion discusses the implications of our findings and directions for future research.

II. Institutional Framework

II.1 Investment trusts in Japan

The Securities Investment Trust Law of 1951 enabled Japanese investment trust business to re-emerge from the turmoil of its post-war condition. Patterned on the U.S. Investment Company Act of 1940, it created a legal framework for regulated, professional money management for the

benefit of small investors. The investment trust industry developed with the dramatic expansion of the Japanese stock market over the ensuing decades. The net asset value of total investment trust accounts grew from 767 billion yen in 1960 to 1,257 billion yen in 1970, to 6,051 billion yen in 1980, to 45,993 billion yen (342.2 billion U.S. dollars) in 1990, to 43,408 billion yen in 1994. By way of international comparison, in U.S. dollar terms, Japan's $470 billion in net asset value at the end of 1995 is third in the world, behind the U.S. mutual fund industry ($2.8 trillion) and the French mutual fund industry ($540 billion dollars)[3]. Despite its absolute magnitude, the assets held in the form of investment trusts as a percentage of the total financial assets held by all Japanese individual investors is limited to 2.8% while the same figure reaches to 8.2% for the U.S. individual investors in 1995. This differential may reflect the fact that Japanese investment trust funds have performed poorly in comparison to international standards (*The Economist* January 20, 1994).

Japanese investment trusts do not have a corporate form of organization. Rather, shares are sold as financial contracts between management companies and individual investors. They fall into two major classifications depending on whether common stock can or cannot be held in their portfolios: equity funds and bond funds. Each of these two fund types has another type of classification depending on transaction procedures or possibilities: open-type and unit-type. Open-type funds are functionally similar to open-end (mutual) funds in the U.S. except for their legal status. On the other hand, unit-type funds are closed to contract addition, i.e., new investment. Thus cancellation or cash outflows are possible, but not diluting inflows. These unit-type funds typically have a stated redemption date, but the redemption date in practice may be contingent upon performance. When redemption value is less than original invested capital, their redemption is typically postponed.

At the beginning of our sample period in 1978, equity funds represented 68.9% of investment trusts. By 1994, the end of our sample, this fraction dropped to 40.2 %, with the rest represented by bond funds. The fraction of unit-type equity funds dramatically decreased over the 1978 through 1994 period from 79.5% to 36.0%, due to the cancellation of many unit-type contracts. Over the same period, open-type funds, those with relatively greater exposure to tax-dilution effects, increased from 24.1% to 64.0%.[4] These trends are particularly curious in light of the evidence we present later in the paper on the differential performance between the two investment vehicles.

II.2 Return calculations and tax effects

The ideal means to measure the economic effects of investment would be to use after-tax capital appreciation and income returns. In practice, this information is difficult to obtain. For example, U.S. mutual fund researchers are forced to use pre-tax returns on funds and on passive indices used for benchmarking fund performance, due to differential tax rates. In contrast, instead of pre-tax return data, Japanese mutual fund researchers only have returns measured after all taxes are paid on transfer of ownership. Such returns correspond to the after tax return to an average investor defined as one with basis equal to the average tax-adjusted offer price. On the other hand, return on benchmarks such as the TSE are computed on a pre-tax basis. Thus, the returns to benchmarks and funds are not comparable. In addition, as we will show, the magnitude of the post-tax capital appreciation approximation is biassed upwards.

Appreciation returns for Japanese mutual funds are calculated from net asset value per contract, [NAV] which is publicly reported on a daily basis by fund companies. This NAV is not the price at which a share is purchased, however. New shares are offered at a post-tax price. This

offer price [OP] is equal to the NAV less the tax liability due to past share appreciation at that time. The tax liability is assessed on the basis of past transaction prices, and is paid by the fund out of net asset value.

While source withholding is common outside the United States, and averaging is available as an option by the Internal Revenue Service for calculating tax basis of mutual fund transactions, a unique feature of the Japanese tax system is source withholding where a common tax basis is assigned to all fund shareholders. The purpose of a common tax basis is to simplify tax calculations. Each fund can calculate the tax liability on transfers of ownership without needing to know the tax basis of each investor.

This procedure introduces an interesting tax timing option in investment fund returns. The common tax basis for all contract shareholders is the average purchasing price of all existing contracts AP_t, defined as:

$$AP_t = \frac{1}{N_t}\sum_{\tau=0}^{t}\left(OP_\tau \cdot NI_\tau - NAV_\tau \cdot NO_\tau\right).$$

where OP_τ is a contract offer price at time τ; NAV_τ is the cancellation price of the existing contracts at the past time τ; NI_τ and NO_τ are the number of newly added and the number of canceled contracts at the past time τ; N_t is the number of existing contracts at time t and is equal to $\sum_{\tau=0}^{t}(NI_\tau - NO_\tau)$. The offer price is then given as:

$$OP_t = \begin{cases} NAV_t - (NAV_t - AP_t)\cdot TR & \text{if } NAV_t > AP_t \\ NAV_t & \text{if } NAV_t \le AP_t \end{cases}$$

where TR represents the tax rate applied to the capital gains (typically 20 percent)[5].

This method of calculating the offer price has two important implications for mutual fund

performance. The first implication is that the percentage change in the NAV is more closely an approximation to after-tax returns, but with a bias depending upon the sign of the return. To see this, consider a simple setting in which a single contract is purchased in one period and sold in the next, holding all other shares constant, and ignoring dividends. Consider the average investor, defined as one with a tax basis equal to the average price at *t-1*, AP_{t-1}. The after-tax return for such an investor would be:

$$R_{t,after-tax} = \frac{NAV_t - (NAV_t - AP_t)TR}{NAV_{t-1} - (NAV_{t-1} - AP_{t-1})TR} - 1$$

for older funds, $AP_{t-1} \approx AP_t$ *, thus:*

$$R_{t,after-tax} = \frac{(1-TR)*NAV_t + TR*AP_t}{(1-TR)*NAV_{t-1} + TR*AP_t} - 1$$

Consider how well the percentage change in NAV approximates the after-tax return. When the tax rate is low, or the basis is zero, the approximation is close. When the basis is positive, then the after-tax return is less than the percentage change in the NAV. In rising markets, this means that use of the NAV overestimates the after-tax capital appreciation. The sign of this bias is reversed for negative returns. When the basis changes due to capital appreciation, the effect is lessened, but not dramatically. The practical consequence is that researchers using NAV changes to approximate appreciation returns will overestimate their magnitude.[6] In addition, this will affect systematic risk calculations — after-tax betas will be lower than empirical estimates based on NAV changes.

The second implication of the calculation of tax basis is that the claims of existing shareholders are diluted by the sale of new contracts, implying a wealth transfer between new and old investors in the fund. Note that the offer price, OP has the character of an Asian-style option,

where the strike price is dependent upon the past average since inception. The difference between NAV_t and AP_t represents an average (unrealized) capital gain per existing contract. Cash inflows are based on the lower offer price OP_t rather than NAV_t if $NAV_t \leq AP_t$ while cash outflows are unconditionally based on NAV_t. The amount that new investors pay per contract is set at the same level as an average price that existing investors receive after tax if they cancel their contracts at time t.

The dilution effect on the net asset value immediately occurs to the fund (i.e., to the existing investors) with cash inflow transactions in the bull-trend market with $NAV_t > AP_t$. Through any cash inflow transaction, the wealth transfer always occurs from the existing to the new investors. The effect is either zero or negative for the existing investors because of its asymmetric nature with a truncated gain, either zero or positive, for the new investors. With large capital appreciation, there is a motivation for an existing shareholder to exit the fund and avoid dilution unless commissions are set high enough for cancellation or cancellation is prohibited[7]. It is probably not a good strategy for the existing investors to hold on to better performing funds with large cash inflows because the dilution effect on the net asset value accumulates and compounds over time. The net asset value of an open-type fund is more diluted as contract cancellation increases. Notice that cancellation (as well as new addition) could increase even with better performance for open-type funds. This leads to an interesting conjecture. Due entirely to tax motives, the Japanese open-type (especially equity) funds may find it optimal to perform poorly (or to report poor performance) during a bull market.

The dilution effect was large for open-type equity funds during the so-called "bubble" period of the Tokyo Stock Exchange (TSE) in 1988 and 1989. In these years, the expanded gap between NAV and AP for each of the existing open-type equity funds seems to have been fully utilized for

additional sales of shares while not only their cash inflows but also outflows significantly increased due to sales -anticipated cancellation (which was typically the case in 1989)[8]. The NAV dilution might have been aggravated by then popular "block offers" which were used very aggressively to sell a large volume of additional contract shares over a short period of time. This offering method is similar to the one seen in seasoned security offerings except for a distinctive option feature unique to block offers. The option attached in this method allowed investors to purchase shares at the ordinary offering price (OP) prevailed one day prior to the offering period, normally encompassing seven trading days, or the lowest OP during the period. Since the offer size is large in a typical block offer, the expected (and realized) NAV dilution after that is also sizable. This suggests the optimal strategy for existing investors is to exit the fund if the net proceeds from their cancellation before the offering are greater than their (after-tax) post-offering NAV per contract[9]. If this applies, the net asset value of the contract held by older investors is diluted by both pre-event cancellation and new block offer(s).

The potential for large scale tax and regulatory influences on fund performance should be apparent from even this limited overview of dilution effects. At the heart of the institutional structure of investment trusts in Japan is the simple question of why open-type funds even exist. Given the relatively low exposure of unit-type funds to the tax dilution factor, it appears that open-type funds are dominated as an investment vehicle during bull markets. It is tempting to believe that the trend from unit to open-type funds since 1978 is a consequence of active marketing of new shares, and perhaps a public misunderstanding of the adverse effects of dilution upon fund performance.

II.3 Style and related issues

Traditionally, there are three investment styles considered for unit-type investment trusts depending on limitations on equity holdings. "Growth" funds must hold in excess of 70% equity; "Income and Growth" which holds between 50% and 70% equity , and "Income", which holds less than 50% equity. It is fairly obvious that the "Growth" style here is comparable neither with Morningstar, Inc. classification of U.S. mutual funds, nor in the sense of a "Growth" manager style, since the terminology indicates nothing about the types of equity securities the fund holds. Since Japanese equities typically pay low dividends, the main source of "income" is from bonds, not from high dividend yield stocks.

The styles for open-type equity funds are more rigorously and formally provided by the Investment Trusts Association (Toshishintaku Kyokai, ITA) of Japan, a private self-regulatory agency of the industry. They use eight broad style categories: 1) "Domestic Equity" (lower limit of 70% in equity, mostly domestic); 2) "International" (lower limit of 70% in foreign equity); 3) "Balanced fund" (upper limit of 70% in equity); 4) "Convertible bonds" (upper limit of 30% in equity and the rest mainly domestic and foreign convertible bonds); 5) "Index fund"; 6) "Industry/Sector" (lower limit of 70% in domestic and foreign equity in a specified industry/sector; 7) "Derivatives"; and 8) "Limited".

Kinyu Data Systems (KDS) also provides style classifications[10] which are important in relation to the dilution effect discussed above. First, the funds in their "Limited" style are basically prohibited from selling new contract shares either during a specified period or throughout the life of the fund. In addition, for various index funds, block offers are normally prohibited. Thus, the tax-based dilution effect is expected to be minimal for those in the "Limited" style. The "Limited"

category is of particular interest to this study, since it is not defined by investment objective, but rather by the limitations placed upon sale of new contracts. Such funds limit new contract offers to a portion of reinvested dividends, or (in some cases) limited offers on a periodic, usually quarterly, basis. The limited category is relatively new — KDS first recognized this as a distinct style in 1989[11].

The dilution effect should also be relatively small for index funds since index funds since this style group prohibit block offers. Those in the other styles (except for "Limited") are allowed to block-offer additional contract shares under certain conditions.[12] Finally, other two procedure-based style classifications, "Money Pooled" and "Savings," in the balanced category are also expected to be less subject to the dilution effect. These funds are not heavily invested in the equity market, and so we would not expect a great difference between average price (AP) and NAV that would trigger a substantial tax dilution. In addition, "Savings" funds have a relatively low cancellation rate, which would further diminish tax dilution for this category.

There are also funds that have temporal constraints on dilution. Some open-type (equity) funds include a "closed" period clause in their contract with investors; these funds are therefore not completely opened. They are closed for cancellation usually for the first few years depending on individual contract specification. There is no formal management style classification along this procedure. This contrasts with the procedure of open-type equity funds with limited contract addition, which are formally classified as the Limited style. Although not common, these (conditionally closed) open-type funds are distributed across the formal style classification. Another important contract feature is whether funds have a specified maturity or not. When specified, the maturity normally ranges from 10 years to 30 years for open-type equity funds. As maturity

approaches, the fund could effectively change its investment style. Again, this feature is independent of the existing style classification.

The special arrangements made in the past for open-type equity funds, including the above-discussed new contract offering methods and limits to cash inflows and outflows, have not been effective during the recent years characterized by the long slump of the TSE. Without the opportunity to exercise tax options, cash outflows exceeded inflows by a large margin for existing funds, and limiting cash inflows became meaningless during this period. Further, those conditionally protected from cancellation were subject to huge cancellation immediately after the closed period.

III. Data and Methodology

III.1. Data

Our data set consists of 1,275 open-type equity funds, defined as those holding a combination of equity and other financial assets, mostly bonds and cash equivalent, and opened for both cancellations and new additions to the existing contract. KDS provided monthly rates of returns for these funds existed from January 1978 to July 1995. We eliminate funds with less than five months of data, as well as one fund that was unclassified by KDS. When dealing with any newly introduced fund during the period, the rate of return for the month of introduction is not recorded. The returns were computed using net asset value (NAV) at the beginning and the end of each month as well as dividend (DIV), if paid during the month, per unit of investment trust contract. As discussed in the previous section, the return calculated on a NAV basis could be significantly diluted mainly due to the tax effect unique to the open-type of funds in Japan. KDS provide eight broad and thirty-one more narrowly classified categories as of August 1995. Although KDS services are new, these categories can apply retrospectively as fund classifications do not change in Japan.

This means that the KDS classifications never change. This is very different from the typical classifications available for U.S. investors, however it is similar to the fixed investment styles of Italian mutual funds, for example.

KDS also provided short descriptions of major investment characteristics for each of the 1,275 open equity funds, i.e., a condensed version of a prospectus statement at the time of their initial offerings. This data set seems more relevant for style classification or information for investors than the KDS formal categories which are in part procedure-based rather than investment objective or strategy-based. We used this information to develop an alternative style classification. This third classification is completed by subjectively allocating each of the 1,275 funds to one of eighteen categories expanded from the Morningstar categories used in the Brown and Goetzmann's (1997) study for U.S. mutual funds. This allocation was made by re-arranging the existing categories and newly adding a few categories unique to the Japanese investment trust fund management environment. Thus, we have three different approaches to *ex ante* style classification which allow an analysis of our endogenously determined styles at the three different levels.

The return data in this study is longer in duration than the data used in CCY although they report results for a shorter period of time for 800 or more funds. Our fund data is free of survival bias in the sense that we do not exclude funds that were redeemed prior to the end of our sample period in July 1995. No funds in the sample were liquidated due to poor performance.

III.2 Methodology

III.2.1 Style analysis

We examine and compare these style classifications with those obtained by applying the

GSC algorithm developed in Brown and Goetzmann (1997) to the problem of style classification of mutual funds. The objective of this quantitative procedure is to use past returns to determine a natural grouping of funds that has some predictive power in explaining the future cross-sectional dispersion in fund returns. If there are K such styles the *ex post* total return in period *t* for any fund can be represented as:

$$_{it} = \alpha_{J_t} + \beta' I_t + \epsilon$$

where fund *j* belongs to style *J*. Such style classifications explain the cross-sectional dispersion of fund returns which can be seen by writing the equation as :

$$_{t} = \mu_{J_t} +$$

where μ_{J_t} is the expected return for style J conditional upon the factor realization I_t. If the idiosyncratic return component ε_{jt} has zero mean *ex ante* and is uncorrelated across securities, the classification into styles will suffice to explain the cross-sectional dispersion of fund returns to the extent that μ_{J_t} differs across styles. The GSC algorithm assigns funds to styles in such a way as to maximize the explanatory power of equation (1), allowing for time-varying and fund-specific residual return variance.

III.2.2 Risk Adjustment

A central issue in the analysis of actively managed funds is the question of how to control for the systematic risk of portfolios with dynamic weights. Once we have identified meaningful styles, our goal is to determine whether controlling for tax dilution changes risk-

adjusted returns. To do this, we adopt a procedure developed in Sharpe (1992), and recently applied to mutual funds (Brown and Goetzmann, 1997) and hedge funds (Fung and Hsieh, 1997). In this method, passive indices are used in a multi-factor linear model as benchmarks. The model constrains weights on these passive indices to be positive and sum to one, while also allowing an unconstrained intercept.

$$R_{Jt} = \alpha_{Jt} + \sum_{k=1}^{K} \beta_{Jk} I_{kt} + e_{Jt}$$

$$s.t.$$

$$\sum_{k=1}^{K} \beta_{Jk} = 1$$

$$\beta_{Jk} \geq 0 \ \forall \ k$$

As Sharpe (1992) points out, the advantage of this specification is that the benchmark represents an investable policy. One caveat to this interpretation is that these investment benchmarks do not incorporate the tax dilution effects incorporated in fund returns R_{Jt}. Thus, we would expect the intercepts α to be negative in this equation..

Although we do not replicate the "conditional" performance measurement procedures (c.f. Ferson and Schadt, 1996) used in CCY, we do allow for time-varying exposure by managers to asset classes. Factor loadings are constrained to be fixed for only 9 month windows of the data. Consequently, the risk-adjusted return may not credit managers sufficiently for timing skill. This time-variation in exposures may be important, however. CCY find evidence that conditioning on macro-economic variables may be significant to Japanese mutual fund management strategies.

For benchmark indices we use data obtained from The Institute of Investment Technology, Nikko Securities Company Ltd. (NSC): the NIKKO J-MIX (Nikko Japan Mix Index) Indices and the BARRA/NIKKO Japanese Equity Style Indices. They are all value-weighted indices. The NIKKO J-MIX consists of investment asset categories available for the investors domiciled in Japan. In the NIKKO J-MIX, there are two levels of sub-indices: the six major asset indices of money market; domestic bonds; domestic CBs; domestic equity; foreign bonds; and foreign equity as well as the eleven asset sub-indices constructed breaking down domestic bonds into short- and long-term bonds and domestic equity into small-cap, manufacturing, chemical, transportation, and financial sectors. All NIKKO J-MIX equity sub-indices used in this study are, for the most part, adjusted for cross share-holdings among listed corporations and for capital changes as well as dividends. The return performance of the BARRA/NIKKO equity style indices are also available for growth, value, small, and large stock portfolios on a monthly basis. They are value-weighted collectively including all stocks either listed on the national and regional exchanges or registered in the OTC markets.

III.2.3 Explanatory power of styles

Our out-of-sample measurement of styles as predictors of differential performance follows Brown and Goetzmann (1997). Style classifications are determined using the GSC algorithm, and then are used as regressors in the following year to explain cross-sectional differences in returns. The R^2 from these regressions is compared for various classifications. In addition, equal-weighted indices for each style are formed and used as regressors in an analogous Fama-MacBeth procedure.

IV. Empirical Results

IV.1 Style analysis

The GSC procedure identifies eight categories across the 1,275 sample funds managed by the 27 management companies.[13] Thus, the number of analytical styles found among Japanese open-type equity funds coincides approximately with their U.S. counterpart reported by Brown and Goetzmann (1997). Figure 1 shows a breakdown of the GSC style classification by number of funds in each management company. The GSC classification is not generally explained by a few limited number of management companies, but in some categories a more than proportional share is taken by a specific company or companies reflecting their particular strategic (i.e., marketing) interest in style. In the second GSC category, for example, Daiwa (DW) takes a significant proportion while the rest of the *Big Four*, Nomura (NM), Nikko (NK), and Yamaichi (YI), maintains rather small exposure. On the other hand, Universal (UNV), not included in the *Big Four*, shows a significant presence in GSC group 7. The interpretation of Figure 1 will become more interesting after interpreting in economic terms each of the GSC style groups subsequently.

IV.1.1 Cross-tabulation of styles

Table 1 summarizes the cross-tabulation of the GSC classifications with the KDS categories. The "General" and the "Industry/Sector" category, the first and the third largest destination for the KDS categories, are spread widely across several different GSC categories, indicating that these broad rubrics employ many different portfolio strategies or procedures allowed by the existing rules and regulations applied to the Japanese investment trust funds. Both

KDS categories were, however, somewhat concentrated in GSC group 3 if any common pattern could exist. The second largest KDS classification, the "Limited" category, is heavily concentrated in GSC group 2. The "Balanced" and "convertible" categories split between the two GSC groups, 1 and 2. This common characteristic is interesting: portfolios in each of these two KDS categories are considered as a combination between bonds and stocks. The "Million" category also splits in an interesting way between GSC group 2 and 7. For "Asia and Oceania," "Europe," "general international," "Latin America," "Money Pooled," and "North America," the GSC and KDS classifications generally agree. For example, "General International" in KDS matches with GSC group 1 very well while the other foreign categories are almost exclusively classified into GSC group 1. GSC group 1 is clearly an "International" in style. Although "Money Pooled" is a procedure-oriented category, it perfectly matches with GSC group 1 ("International"). Since GSC group 8 almost perfectly matches with "electric and precision machinery" and to some lesser extent with the "Industry/Sector" category, it can be interpreted as an "High-Tech" investment style. Notice that some good portion of funds in the "Industry/Sector" category is specialized in high-tech stocks. Both GSC group 6, including "Nikkei 300" and "TOPIX," and group 7, including "Nikkei 225," may represent index fund approach or passive style. These two groups would be distinguished by the size of weights given to the banking/financial and the public utility sector: these sectors are more weighted in the Nikkei 300 and the TOPIX (value-weighted) than in the Nikkei 225 (price-weighted for the 225 representative stocks). The former, interpreted as a financial and utility sector tilted index style, actually contains the KDS "Financial" and "Utility" sector category. The KDS sector categories of "Automotive," "Chemical, Textile and Paper," "Commerce," "construction and real estates,"

"petroleum and nonferrous," "pharmaceutical and food," "public utility," and "steel and shipbuilding," the KDS classifications generally agree with the GSC classifications. They are reclassified either into GSC group 4 ("commerce" and "pharmaceutical and food") or 5 (the rest). These two style groups are interestingly distinguished because the "Small" and "OTC stock" categories are almost exclusively included in GSC group 4 not in GSC group 5. Notice that the "large" category is included in GSC group 3 together with significant parts of the "General" as well as the "Industry/Sector" category. Thus, the size (or risk) is an important factor to distinguish otherwise similar equity-based investments like GSC groups 3, 4, and 5. Although "Balanced," "Money Pooled," and "Savings" are commonly subject to conservative management with a 70% upper limit of equity portion, only the "Savings" category seems to be real conservative being classified into GSC group 2. The "Money Pooled" funds are entirely classified into the same GSC group 1 (i.e., "International") while the "Balanced" category has a blended characteristic of these two GSC groups. All in all, the GSC algorithm is more successful in identifying the Japanese funds in terms of the existing classification categories than the U.S. counterparts.

Table 2 shows the cross-tabulation of the GSC classifications with the expanded Morningstar classifications. As explained in the previous section, we use this new classification in order to maintain a comparability as much as possible with the Brown and Goetzmann's (1997) results for U.S. mutual funds. Most of the expanded Morningstar classification categories are the same as those used in the previous study except for the added categories of "North America," "passive," and "Value/Active." The results in Table 2 are consistent with those documented in Table 1. Again, GSC group 1 is "International" while GSC group 8 is obviously

"High-Tech." The "Growth" category is spread again widely across several different GSC groups with the highest concentration in GSC group 3 and then group 2. The largest "Growth and Income" category also splits between two distinct GSC groups with more concentration in group 2 than in group 3. Most of the sector-based categories ("Financial," "Health," and "Natural Resources") are unambiguously allocated to each of the GSC groups. As expected, the "unaligned" category is not distinguished along the GSC classification. The "Small" category is almost completely included in GSC group 4 while the former represents a fraction which is smaller than one third of the latter. This implies that a small firm characteristic could be obtained from the stated or interpreted classifications, too. Here again, "passive (index fund)" category splits between GSC group 6 and 7 for the same reason as discussed for Table 1 above. The "Value/Active" category is broken down roughly into two GSC groups, namely, 2 and 3. Table 2 also shows that GSC group 2 primarily consists of the "Growth and Income" category, GSC group 5 of the "unaligned" (sector) category; and GSC group 7 and 8 of the "passive (index fund)" category.

The cross-tabulation analysis through Tables 1 and 2 leads to the tentative conclusion that all eight GSC groups can be identified as follows: "International (1)," "Growth and Income (2)," "Growth (3)," "general/value-oriented (4)," "industrial sector-focused (5)," "passive income/sector (6)," "passive (7)," and "High-Tech (8)."

2 IV.1.3 Characteristic analysis of the GSC categories

Tables 3 and 4 provide further insight into the characteristics of the GSC categories. For each category, we estimated the mean and standard deviation of portfolio weights adopted in

Sharpe (1992). Thus, we constrain the coefficients to be non-negative, and to sum up to unity so that they can be interpreted as weights in short-sale constrained analogue portfolios. However, we modified the Sharpe procedure allowing for the inclusion of an "Other" category but yet disallowing a non-zero intercept to be included (see: methodology in the previous section). This new procedure is particularly more relevant when only domestic equity benchmarks are used to explain individual fund returns than when various foreign and non-equity performance benchmarks are added. Table 3 assumes a twenty-four-month non-overlapping return interval for the 1980-95 period, whereas in Table 4 the non-overlapping estimation interval is decreased to six months in order to pick up variations in exposure to key indices for the same period. The NIKKO J-MIX sub-indices, consisting of the eleven benchmark indices, are used in Table 3 while the BARRA/NIKKO equity style benchmarks, consisting of the four domestic classical equity styles, are used in Table 4. In both tables, an "Other" category is added as already explained.

In Table 3, group 1 has a large average exposure to the foreign equity index while group 2 has a relatively large exposure to the convertible bond, manufacturing sector, and money market indices. The result is very consistent with the one obtained from both Tables 1 and 2 above for these two groups. Group 3 has a relatively large exposure to the domestic industrial sector indices (manufacturing and chemical) and the small-cap index and has few exposure to non-equity indices. This is not inconsistent with our previous interpretation for group 3, "Growth." The group 4's exposure is similar to the Group 3's except for its larger exposure to the small-cap index, which is again not inconsistent with our previous interpretation. Group 5 has the second largest single exposure (0.427) in the entire table to the (chemical) sector index

while maintaining a relatively large exposure to the small-cap index. Thus, this GSC group shows a sector-focused style characteristic as previously interpreted. Although group 6 is previously interpreted as a sort of index approach, Group 6 shows some deviation from the market index more toward the transport sector and to convertible bonds. While the group does include many index-type funds, this group is perhaps better described as a passive income/sector style. Based on the weights for the domestic equity indices, group 7 is again easily interpreted as a passive index style. Group 8 has the largest single exposure (.803) in the entire table to the manufacturing sector index. This is consistent with earlier evidence that this is a "High-Tech" style.

Table 4 uses Japanese growth, value, large, and small equity benchmark indices based on the standard US classifications. In addition it allows for an "Other" classification that accounts for the fact that Japanese funds may diversify beyond domestic equities. The BARRA/NIKKO style benchmarks do not appear to sort styles very well in comparison to the previous NIKKO J-MIX sub-indices including non-equity as well as non-domestic investment classes. It is reasonable that group 1 ("International") has the largest exposure (.77) to the "Other" class, which partially represents foreign assets. Group 2 ("Growth and Income") also has a large exposure to this "Other" class, but a lower exposure to the growth sector than does Group 3 ("Growth"). This result too is reasonable since income for Japanese equity funds is largely from fixed-income investments included in the "Other" class, and since the stated growth style -- applied to group 3 -- is achieved through more investment in domestic equity (not necessarily in "Growth" stock as opposed to "Value" stock). Investment weights associated with other groups are less easy to interpret. Overall, the characteristic analysis of individual styles is not very useful

with the BARRA/NIKKO style benchmarks but useful with a set of more clearly classified (category-based) benchmarks, like the NIKKO J-MIX sub-indices including equity sector, foreign, and fixed-income benchmarks available for Japanese investors. The result using the NIKKO J-MIX sub-indices is consistent with our previous style interpretation for the eight GSC groups.

IV.2 Performance evaluation

Table 5 demonstrates the Japanese open-end fund puzzle. In this Table, we change the set of benchmarks to cover a comprehensive set of investments available to the Japanese investor, and thereby eliminate the need for an "Other" category. The intercept, which is negative for each style category, can be interpreted as a measure of absolute risk-adjusted performance. Our results are consistent with the CCY findings. The alphas range from -.18% per month to -.43% per month which annualizes to a magnitude of negative 3% to 5% per year[14].

The cross tabulation of Table 1 shows that 129 out of the 166 Limited funds falls in the GSC2 style. They are clearly the most important component group in GSC 2, representing 129 out of the 270 funds that make up the style. As noted above, Limited funds are closed to new investment, or cash inflows from new contract shares are very limited. Thus the tax-induced dilution effect due to the tax system applied to cash inflow transactions is expected to be very small for Limited funds. To test this proposition, we include an additional term in the risk adjustment model. Table 6 uses the same specification as Table 5 except for the inclusion of an instrument to capture the style-specific dilution effect which might be induced by the Japanese tax system. As before, we constrain the benchmark return coefficients to be non-negative and

the sum of the constrained coefficients to be unity. The tax effect variable T_{Jt} is defined as the previous month end style J benchmark value in excess of the 24-month average style benchmark value, where benchmark values are normalized to 1.00 as of month end January 1978. Note that the tax effect variable is path-dependent and is a surrogate for the net cash inflow caused by new contracts and cancellation of the existing contracts. We estimate the model coefficients by using nine-month non-overlapping return data and the NIKKO J-MIX index benchmarks for the period during 1980 through 1995[15]. The average values and associated t-values of estimated coefficients are given in Table 6. It is clear from the table that the estimated coefficient for the tax effect variable is negative for all GSC styles and is statistically significant for GSC styles 3, 4, 6, 7 and 8. What is also striking is that the economic significance of the tax dilution effect is similar across fund groups 3 through 8. The estimated coefficient is of the same order of magnitude for all funds.

The insignificant negative tax effect coefficient for GSC 2 is explained by the preponderance of Limited funds in this classification. The result that the coefficient is negative but insignificant in GSC1 can be interpreted in a similar way. The cross-tabulation results of Table 1 shows that this group covers both "International" and "Money Pooled" funds. As discussed in Section 2, the tax dilution effect for "Money Pooled" funds is expected to be limited due to a low rate of contract cancellation. Thus the tax dilution effect estimated for GSC 1 may be weakened by this characteristic specific to "Money Pooled" funds. GSC group 5, interpreted as an industry/sector-based style, has an insignificant (negative) alpha as well as (negative) slope coefficient estimate for the tax effect in Tables 5 and 6. The tax-based dilution effect is of a

similar order of magnitude to that reported for groups 3 through 8, but it is statistically insignificant.

The change from negative alphas to zero or positive alphas through the simple inclusion of a tax-dilution exposure instrument provides evidence strongly consistent with the hypothesis that Japanese mutual fund underperformance is due to tax dilution and not to some form of mismanagement. It is possible to interpret the negative exposure of each style to past positive returns as evidence that the majority of Japanese fund managers follow simple momentum-type strategies (see, for example Carhart 1997). This may indeed be the case. However, this does not explain why the use of momentum strategies should be correlated with restrictions on the turnover of fund assets, and why Japanese investors should continue to tolerate the limited success of such strategies in the Japanese market. Tax dilution appears to be a simpler explanation for the observed facts.

IV. 3 Explanatory Power of Styles

In this section we examine how GSC style classifications are useful in predicting future performance. Table 7 reports the out-of-sample prediction of subsequent annual fund return conditional on prior fund classifications and on implied portfolio weights. The first panel shows the R^2 that results from three different fund classifications, i.e., the GSC, BARRA/NIKKO and NIKKO J-MIX classifications. The fund classifications are represented as a matrix of dummy variables $\{d_{jk}\}$, which is equal to 1 if fund belongs to classification K, and zero otherwise, each with five possible classifications. The GSC classifications are determined on the basis of the iterative reallocation algorithm described by Brown and Goetzmann (1977) using 5 classifications. The BARRA/NIKKO and NIKKO J-MIX classifications are based on the largest

implied portfolio weight. The portfolio weights were estimated on the basis of the previous 24 months of fund return data. The BARRA/NIKKO weights are determined on the basis of Large Equity, Small Equity, Value and Growth benchmarks, allowing for an "Other" category. Similarly, the NIKKO J-MIX weights are based on Money Market, Domestic Equity, Domestic Fixed Income and Foreign Equity, allowing for an "Other" category. The second panel of the table shows the R^2 that results from the implied portfolio weight regressions. For BARRA/NIKKO and NIKKO J-MIX results, the cross-section of subsequent annual fund returns are regressed on the implied portfolio weights of the first four benchmarks, i.e., all benchmarks except the "Other" category. In the case of the GSC results, the benchmarks are defined using the style benchmarks generated by the GSC procedure as the weighted average of returns for all funds in each style, with weights proportional to the residual variance of each fund.

It is clear from the first panel of the table that the GSC procedure dominates the BARRA/NIKKO and NIKKO J-MIX benchmark classifications in predicting cross-sectional variation in out-of-sample subsequent annual returns. Although R^2's differ for thirteen test years, the GSC categories explain more than a third of cross-sectional variation of returns, *ex ante*. The NIKKO J-MIX categories outperform the BARRA/NIKKO categories; the former categories explain on average 27 percent of the variation in fund returns, while the latter categories explain 22 percent on average.

The second panel of the table reports the percentage of cross-sectional variation explained by the implied portfolio weights regression. We would expect these to have greater predictive power, since the predictors are continuous state variables, rather than dummy variables. In this comparison, the GSC computed benchmarks perform about as well as the NIKKO J-MIX

benchmarks, but again dominate the BARRA/NIKKO benchmarks. This provides further support for the position that the standard US Growth/Value Large/Small taxonomy may not be particularly useful for analysis of the performance of Japanese investment trusts.

V. Conclusion

The Japanese open-end fund puzzle is more than an academic anomaly. The question of whether the third-largest mutual fund industry in the world systematically provides negative risk adjusted returns questions the assumptions of economic rationality. Since the apparent poor relative performance of Japanese investment trusts first came to the world's attention in 1994, the Ministry of Finance has taken reform measures. The analysis in this paper suggests that even carefully estimated negative risk-adjusted returns may be an artefact of NAV dilution and consequent downward biases in measured returns, rather than as a result of the factors generally associated with underperformance, namely poor management, excessive fees and high turnover.

To the extent that the underperformance of Japanese mutual funds is due to dilution, there is a message for tax authorities and regulators of financial markets around the world. Methods of calculating taxes may have untoward consequences, affecting not only investment profits, but the attractiveness of the entire investment sector. Whatever the arguments might be for the institution of tax based asset dilution, it has created enormous problems for Japanese fund investors, as well as for the reputation of the fund managers. While the Ministry of Finance in Japan has begun much-needed changes, including the introduction limitations of issuance of new investment company contracts, the current tax structure will undoubtably continue to hamper the growth of mutual funds until the tax laws are changed. In the meantime, Japanese investors will seek other vehicles for diversified investing.

Table 1: Count of Funds by KDS and GSC Classifications

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	***Total***
Asia and Oceania	72	2	0	0	0	0	0	0	***74***
Automotive	0	0	1	0	15	0	0	1	***17***
Balanced	26	24	1	1	0	0	0	1	***53***
Chemical, Textile and Paper	0	0	2	1	20	0	1	0	***24***
Commerce	1	0	0	16	5	0	0	0	***22***
Construction & RE	0	0	2	1	16	3	1	0	***23***
Convertible	13	29	1	0	1	1	0	0	***45***
Derivatives	3	1	0	0	1	0	1	0	***6***
Electric and Precision Machinery	0	0	2	0	1	0	0	16	***19***
Europe	26	1	0	0	0	0	0	0	***27***
Financial	0	0	0	0	0	15	0	0	***15***
General	2	25	87	32	19	14	17	8	***204***
General International	35	7	1	0	1	0	1	0	***45***
Industry/Sector	4	13	32	29	19	14	5	29	***145***
Large Stock	0	2	13	0	0	3	0	0	***18***

Latin America	7	1	0	0	0	0	0	0	*8*
Limited	14	129	19	0	0	4	0	0	*166*
Million (Periodic Contribution)	0	12	0	0	0	2	14	0	*28*
Money Pooled	74	0	0	0	0	0	0	0	*74*
Nikkei 225 Index	0	0	0	0	2	0	56	0	*58*
Nikkei 300	0	0	0	0	0	30	0	0	*30*
North America	19	0	0	0	0	1	0	0	*20*
OTC Stock	0	4	0	16	0	0	0	3	*23*
Other Index	0	0	1	0	0	2	1	0	*4*
Petroleum, Nonferrous	0	0	0	0	13	0	1	0	*14*
Pharmaceutical and Food	0	0	1	18	1	0	0	0	*20*
Public Utility	0	0	2	0	2	10	0	0	*14*
Saving (zaikei)	0	18	0	0	0	0	0	0	*18*
Small and Medium Size	0	1	3	19	3	0	0	2	*28*
Steel and Shipbuilding	0	0	0	0	14	0	0	0	*14*
TOPIX	0	0	0	0	0	19	0	0	*19*
Total	***296***	***269***	***168***	***133***	***133***	***118***	***98***	***60***	***1275***

The 31 KDS classifications are given by Kinyu Data Systems Company (KDS) as of August 1995. Owing to the static nature of fund classifications in Japan, it is appropriate to apply these classifications retrospectively. The GSC classifications are determined on the basis of the iterative relocation algorithm described by Brown and Goetzmann [1997] with eight style classifications.

Table 2: Count of Funds by Expanded Morningstar and GSC Categories

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	***Total***
Equity-Income	0	1	0	8	0	0	0	0	***9***
Europe	20	1	1	1	0	0	0	0	***23***
Financial Sector	0	0	0	0	0	19	1	0	***20***
Foreign	29	2	0	0	0	0	0	0	***31***
Growth	3	25	65	20	4	11	17	2	***147***
Growth and Income	104	176	6	7	2	3	1	0	***299***
Health Sector	0	1	5	16	1	0	0	0	***23***
High Technology	0	1	3	3	0	0	0	42	***49***
Natural Resources	1	0	2	0	16	0	1	0	***20***
North America	37	1	1	0	0	1	0	0	***40***
Others (derivatives)	1	2	0	0	1	0	1	0	***5***
Pacific	76	2	0	0	0	0	0	0	***78***
Passive	1	7	3	0	1	54	71	0	***137***
Small Companies	0	7	3	37	3	1	0	7	***58***
Unaligned Sector	3	4	22	39	86	9	2	8	***173***
Utilities	0	1	6	0	2	12	0	0	***21***
Value/Active	3	34	50	2	16	8	3	0	***116***
World	18	4	1	0	1	0	1	1	***26***
Total	***296***	***269***	***168***	***133***	***133***	***118***	***98***	***60***	***1275***

The Extended Morningstar classifications represent eighteen categories expanded from the Morningstar categories used in the Brown and Goetzmann's (1997) study for U.S. mutual funds. This allocation was made by re-arranging the existing categories and newly adding a few categories unique to the Japanese investment trust fund management environment. The GSC classifications are determined on the basis of the iterative relocation algorithm described by Brown and Goetzmann [1997] with eight style classifications.

Table 3: Mean and Standard Deviation of Portfolio Weights based on 24 Month Non-overlapping Data 1983-1995

	Money Market	ST Bond	LT Bond	Convertibles	Small Cap	Chemical	Manufacturing	Transport	Financial	Foreign Bonds	Foreign Equity	Other
GSC Group 1												
Mean	0.145	0.069	0.066	0.006	0.009	0	0.07	0	0	0.024	0.421	0.191
Std. Dev.	0.183	0.151	0.114	0.015	0.016	0	0.065	0	0	0.063	0.198	0.25
GSC Group 2												
Mean	0.18	0.018	0.098	0.227	0.075	0.087	0.153	0.069	0.015	0.01	0.037	0.033
Std. Dev.	0.149	0.046	0.132	0.068	0.06	0.045	0.076	0.055	0.014	0.018	0.023	0.044
GSC Group 3												
Mean	0.067	0.02	0.035	0.094	0.146	0.182	0.287	0.093	0.027	0.017	0.033	0
Std. Dev.	0.064	0.052	0.059	0.083	0.084	0.092	0.202	0.082	0.031	0.038	0.028	0
GSC Group 4												
Mean	0	0.059	0.077	0.101	0.277	0.191	0.095	0.069	0.048	0.071	0.014	0
Std. Dev.	0	0.107	0.114	0.139	0.121	0.214	0.029	0.124	0.107	0.127	0.025	0

GSC Group 5												
Mean	0.09	0.026	0.023	0.01	0.229	0.427	0.052	0.054	0.019	0.023	0.036	0.011
Std. Dev.	0.146	0.065	0.035	0.025	0.165	0.143	0.105	0.049	0.032	0.038	0.031	0.026
GSC Group 6												
Mean	0.038	0	0.046	0.116	0.067	0.11	0.015	0.366	0.168	0.006	0.015	0.054
Std. Dev.	0.093	0	0.053	0.149	0.041	0.084	0.034	0.177	0.128	0.015	0.029	0.073
GSC Group 7												
Mean	0.026	0	0.02	0.036	0.167	0.278	0.182	0.135	0.127	0.011	0.018	0
Std. Dev.	0.065	0	0.054	0.076	0.092	0.146	0.223	0.096	0.072	0.021	0.017	0
GSC Group 8												
Mean	0.055	0	0	0.002	0.083	0	0.803	0.003	0	0.007	0.032	0.017
Std. Dev.	0.071	0	0	0.004	0.044	0	0.082	0.007	0	0.019	0.039	0.024

This table gives the average values and associated t-values of coefficients estimated using 24 month non-overlapping periods 1983-1995. These coefficients are estimated using the model $R_{Jt} = \alpha_{Jt} + \sum_{k=1}^{11} \beta_{Jk} I_{kt} + \varepsilon_{Jt}$ for fund j belonging to style J, where I_{kt} is the return on the kth benchmark with the constraint that the benchmark return coefficients be non-negative and sum less than or equal unity. The weight on the "Other" category is determined as the complement $\beta_{J12} = 1 - \sum_{k=1}^{11} \beta_{Jk}$. The so-called NIKKO J-MIX benchmarks used in this Table are obtained from Nikko Research Center, Ltd. and represent the return on value weighted composites of investments available to investors domiciled in Japan. The intercept in this regression (not reported) represents the true style alpha plus the expected return on the "Other" category, weighted by β_{J12}.

Table 4: Implied Portfolio Weights on Barra-Nikko Style Index Benchmarks 6 Month Non-overlapping Data 1980-1995

	Growth	**Large**	**Small**	**Value**	**Other**
GSC Group 1					
Mean	0.083	0	0.121	0.025	0.77
Std. Dev.	0.131	0	0.268	0.053	0.254
GSC Group 2					
Mean	0.2	0.08	0.103	0.179	0.438
Std. Dev.	0.212	0.169	0.124	0.16	0.134
GSC Group 3					
Mean	0.364	0.04	0.174	0.242	0.181
Std. Dev.	0.336	0.117	0.15	0.264	0.15
GSC Group 4					
Mean	0.291	0.01	0.41	0.075	0.214
Std. Dev.	0.276	0.037	0.291	0.184	0.175
GSC Group 5					
Mean	0.251	0.036	0.245	0.275	0.193
Std. Dev.	0.285	0.101	0.243	0.276	0.25
GSC Group 6					

Mean	0.37	0.077	0.036	0.351	0.165
Std. Dev.	0.319	0.202	0.057	0.31	0.164
GSC Group 7					
Mean	0.352	0.123	0.187	0.263	0.075
Std. Dev.	0.371	0.275	0.193	0.301	0.123
GSC Group 8					
Mean	0.31	0.041	0.211	0.237	0.201
Std. Dev.	0.392	0.151	0.267	0.319	0.264

This table gives the average values and associated t-values of coefficients estimated using 24 month non-overlapping periods 1983-1995. These coefficients are estimated using the model $R_{Jt} = \alpha_{Jt} + \sum_{k=1}^{4} \beta_{Jk} I_{kt} + \varepsilon_{Jt}$ for fund j belonging to style J, where I_{kt} is the return on the k[th] benchmark with the constraint that the benchmark return coefficients be non-negative and sum less than or equal unity. The weight on the "Other" category is determined as the complement $\beta_{J5} = 1 - \sum_{k=1}^{4} \beta_{Jk}$. The BARRA/NIKKO Equity Style benchmarks used in this Table are obtained from the Institute of Investment Technology, The Nikko Securities Company, Ltd., Tokyo. The intercept in this regression (not reported) represents the true style alpha plus the expected return on the "Other" category, weighted by β_{J5}.

Table 5: Implied Portfolio Weights on Alternative Asset Class Data 6 month non-overlapping data 1980-95 (allowing for alpha)

		alpha	t-value of alpha	Money Market	Domestic Bonds	Domestic Equity	Foreign Equity
GSC 1	**Mean**	**-0.0040**	**-5.54**	**0.3566**	**0.1052**	**0.0268**	**0.5115**
	Std. Dev	0.0038		0.2492	0.1609	0.0516	0.1616
GSC 2	**Mean**	**-0.0028**	**-5.23**	**0.3393**	**0.0652**	**0.5109**	**0.0846**
	Std. Dev	0.0028		0.1997	0.1115	0.1462	0.0782
GSC 3	**Mean**	**-0.0039**	**-3.98**	**0.1459**	**0.0177**	**0.7065**	**0.13**
	Std. Dev	0.0052		0.143	0.038	0.1794	0.13
GSC 4	**Mean**	**-0.0043**	**-3.51**	**0.0888**	**0.0932**	**0.6326**	**0.1853**
	Std. Dev	0.0064		0.1264	0.1472	0.2053	0.1609
GSC 5	**Mean**	**-0.0024**	**-2.06**	**0.0911**	**0.086**	**0.7063**	**0.1167**
	Std. Dev	0.0061		0.1204	0.1461	0.2478	0.1239
GSC 6	**Mean**	**-0.0026**	**-2.77**	**0.0579**	**0.2023**	**0.7268**	**0.013**
	Std. Dev	0.005		0.1391	0.2404	0.2384	0.0264
GSC 7	**Mean**	**-0.0032**	**-3.25**	**0.0681**	**0.0295**	**0.8208**	**0.0817**
	Std. Dev	0.0051		0.1085	0.0785	0.1831	0.1076
GSC 8	**Mean**	**-0.0041**	**-2.28**	**0.161**	**0.0025**	**0.5871**	**0.2494**
	Std. Dev	0.0094		0.2292	0.0135	0.365	0.2312

Table 6: Mean alpha and portfolio weights allowing for alpha and a tax effect: 9 month non-overlapping data 1980-95

GSC Classification	*Alpha*	*Money Market*	*Domestic Bonds*	*Domestic Equity*	*Foreign Equity*	*Tax Effect*
1	-0.0034	0.3359	0.1085	0.0309	0.5247	
	(-3.55)	(6.36)	(2.72)	(2.79)	(12.73)	
	0.0015	0.3477	0.1098	0.0305	0.5120	-0.0437
	(0.36)	(5.67)	(2.64)	(2.88)	(11.12)	(-1.34)
2	-0.0020	0.3516	0.0511	0.5230	0.0744	
	(-2.63)	(7.93)	(2.84)	(16.41)	(3.84)	
	0.0057	0.3484	0.0685	0.5184	0.0648	-0.0353
	(1.12)	(7.02)	(2.75)	(15.28)	(3.55)	(-1.50)
3	-0.0029	0.1520	0.0142	0.7171	0.1168	
	(-1.99)	(3.93)	(1.35)	(17.58)	(3.73)	
	0.0056	0.1712	0.0080	0.7227	0.0981	-0.0537
	(1.10)	(4.21)	(1.30)	(17.04)	(3.74)	(-2.08)
4	-0.0020	0.1327	0.0910	0.6095	0.1668	
	(-0.81)	(2.62)	(2.52)	(10.82)	(4.86)	
	0.0229	0.1733	0.0436	0.6254	0.1577	-0.0697
	(2.26)	(3.51)	(2.02)	(12.44)	(3.90)	(-2.27)
5	-0.0021	0.1345	0.0477	0.6841	0.1337	
	(-1.45)	(3.53)	(1.58)	(10.69)	(3.85)	
	0.0179	0.1421	0.0642	0.6601	0.1336	-0.0700
	(1.42)	(4.02)	(2.16)	(10.64)	(3.59)	(-1.56)
6	-0.0029	0.0772	0.1648	0.7374	0.0207	
	(-1.80)	(2.17)	(3.21)	(14.10)	(2.50)	
	0.0136	0.1195	0.1381	0.7212	0.0212	-0.0796
	(1.80)	(2.90)	(3.02)	(13.78)	(2.55)	(-2.76)
7	-0.0026	0.0923	0.0352	0.7969	0.0756	
	(-2.08)	(2.77)	(1.58)	(18.70)	(2.96)	
	0.0066	0.1139	0.0314	0.7914	0.0632	-0.0621
	(0.94)	(3.15)	(1.48)	(18.01)	(3.60)	(-2.99)
8	-0.0021	0.2056	0.0029	0.5809	0.2106	
	(-0.71)	(3.29)	(1.29)	(6.76)	(3.50)	
	0.0055	0.2182	0.0042	0.5905	0.1870	-0.0978
	(1.04)	(3.34)	(1.00)	(6.77)	(3.28)	(-2.77)

This table gives the average values and associated t-values of coefficients estimated using 9 month non-overlapping periods 1980-1995. These coefficients are estimated using the model

$$R_{Jt} = \alpha_{Jt} + \sum_{k=1}^{4} \beta_{Jk} I_{kt} + \beta_{J5} T_{Jt} + \varepsilon_{Jt}$$

for fund j belonging to style J, where I_{kt} is the return on the k^{th} benchmark with the constraint that the benchmark return coefficients be non-negative and sum to one. The tax effect variable T_{Jt} is the previous month end style J benchmark value in excess of the previous 24 month average style benchmark value, where benchmark values are normalized to 1.00 as of month end January 1978.

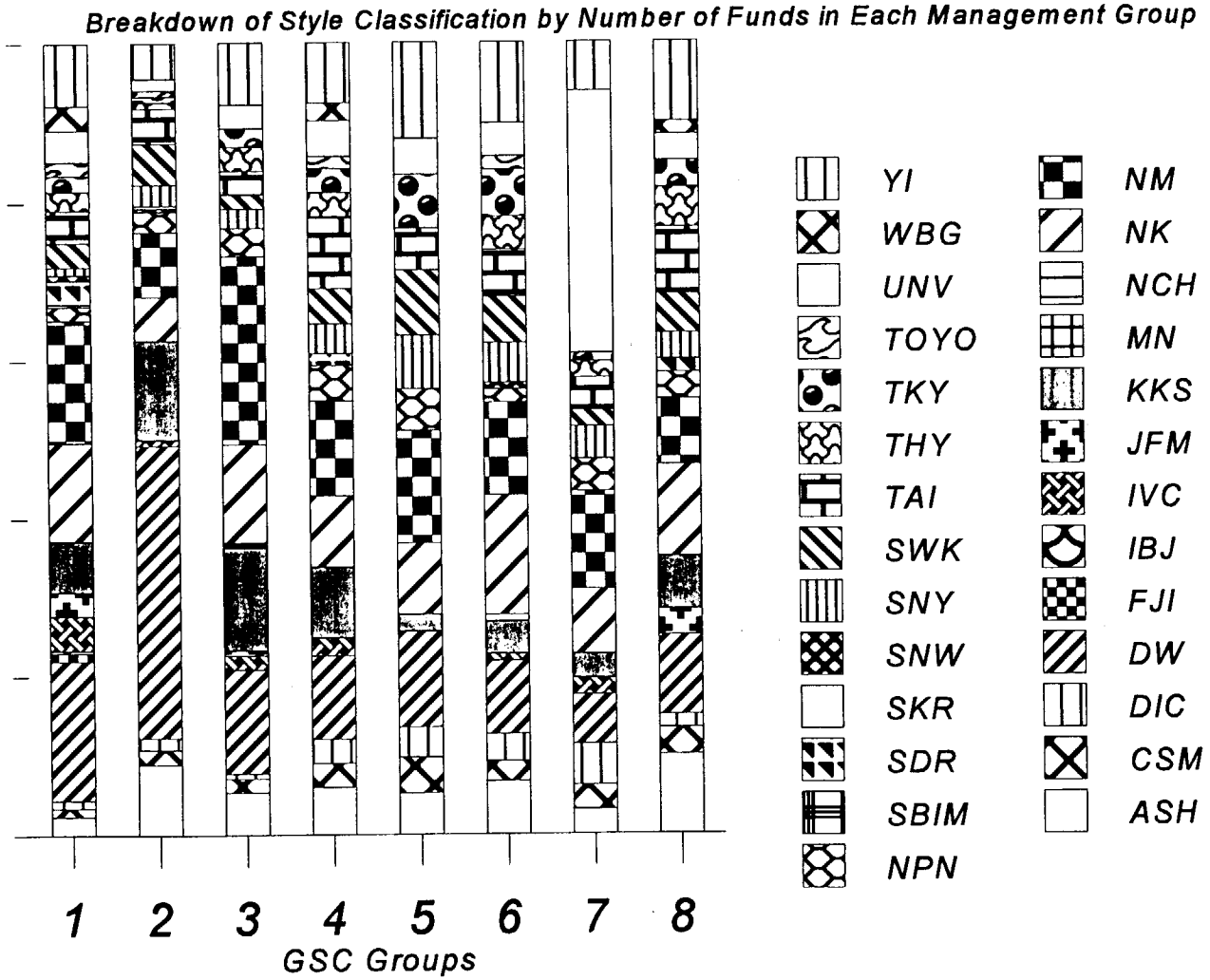
Table 7: Regression of Style Classifications and Implied Portfolio Weights on Subsequent Fund Returns

	Style Classifications			Implied Portfolio Weights		
	GSC	*BARRA/NIKKO*	*J-MIX*	*GSC*	*BARRA/NIKKO*	*J-MIX*
1982	0.1382	0.105	0.0827	0.1801	0.2336	0.2438
1983	0.5244	0.3346	0.5007	0.3282	0.4859	0.5677
1984	0.0862	0.1295	0.076	0.1377	0.194	0.0699
1985	0.3705	0.3508	0.0472	0.4865	0.4485	0.1822
1986	0.3594	0.109	0.2351	0.3868	0.1601	0.5551
1987	0.116	0.0347	0.1394	0.0779	0.1532	0.1081
1988	0.4536	0.3352	0.3764	0.415	0.4294	0.4901
1989	0.399	0.0756	0.1678	0.3761	0.2939	0.3753
1990	0.6764	0.3876	0.5727	0.6687	0.6833	0.7111
1991	0.2175	0.1825	0.2433	0.2368	0.2756	0.2419
1992	0.757	0.5962	0.525	0.7522	0.7705	0.7346
1993	0.1115	0.0593	0.1126	0.1485	0.0692	0.1811
1994	0.3865	0.2776	0.4552	0.4404	0.4179	0.455
Mean	0.3536	0.229	0.2719	0.3565	0.355	0.3782
Median	0.3705	0.1825	0.2351	0.3761	0.2939	0.3753
Std. Dev.	0.2162	0.1662	0.1898	0.2037	0.2095	0.2246

This Table reports the R^2 of the cross-sectional regression of subsequent annual fund return on prior fund classifications and implied portfolio weights estimated on the basis of the previous 24 months of fund data. The fund classifications are represented as a matrix of dummy variables $\{d_{Ik}\}$ which equal 1 if fund I belongs to classification k, and zero otherwise, where there were 5 possible classifications. The GSC classifications were determined on the basis of the iterative relocation algorithm described by Brown and Goetzmann [1997] using 5 classifications. The BARRA/NIKKO and J-MIX classifications were based on the largest implied portfolio weight. The BARRA/NIKKO weights were determined

on the basis of Large Equity, Small Equity, Value and Growth benchmarks, allowing for an "Other" category, and the J-MIX weights were based on Money Market, Domestic Equity, Domestic Fixed Income and Foreign Equity benchmarks, also allowing for an "Other" category. The Implied Portfolio Weight regressions regressed the cross-section of subsequent annual fund returns on the implied portfolio weights of the first four benchmarks. In the case of the GSC results, the benchmarks were defined using the style benchmarks generated by the GSC procedure.

Figure 1: Management Companies by Style



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Notes

1.Cai, Chan, and Yamada (1997) and The *Economist* (January 28, 1994 and most recently June 28, 1997). A special issue on Investment Trusts by *Security Analysts Journal* (May 1995, Vol. 33 No. 5 in Japanese, pp. 1- 52) contained five articles touching on the poor performance of investment trust funds in Japan.

2.The Ministry of Finance is not unaware of the implications of tax structure on the measurement of returns, and has set up a professional commission to study this issue. In October 1997 this commission released a proposal to the Ministry of Finance.

3.All numbers in this paragraph are taken from various issues of *The Monthly Report of Investment Trusts*, The Investment Trusts Association, Tokyo, Japan. (The U.S. figure does not include closed-end funds. Japanese yen and French franc terms are converted into US dollars by using the end-of-the year exchange rates.)

4.Although the net cash outflow of 1,721 (856) billion dollars exists for the existing open-type equity funds, this is fully offset by sales of the newly introduced fund of 949 (1,424) billion dollars in 1995 (1994). See: *Annual Report of Investment Trust*, 1996, the Investment Trusts Association. The proportion of foreign assets to the total net asset value of open-type equity funds is recently a little more than ten percent.

5.These expressions for *AP* and *OP* are taken from Takeyama [1995].

6. This bias is not discussed in Cai, Chan and Yamada (1997), and possibly unrecognized. The authors also do not indicate that they are approximating after-tax returns.

7.Indeed, commissions for cancellation are very high at 2 to 5 percent of the net asset value. However, this does not seem to stop cancellation when the market is extremely bullish. In 1989, for example, the amount of cancellation was suddenly doubled to 6,823 billion yen, then a historic high, from the previous year's level of 3,486 billion yen for open-type equity funds (*1996 Annual Report of Investment Trust*, The Investment Trusts Association).

8.See previous Note

9.Alternatively, pre-event investor wealth can be compared with the post-event wealth assuming than his/her contract is cancelled at NAV (with tax and commission) and purchased again at the (lower) offer price. In either case, sales-anticipated cancellation is reasonably expected.

10.KDS classifies funds into sub-categories in each broad category: "**Domestic Equity**" into "General"; "large stock"; "Small and medium stock"; "OTC stock," "Industry/Sector selective"; "Million"; and "**Money Pooled**," "**International**," into "**General International**; "North America"; "Asia and Oceania"; "Europe"; and "Latin America," "**index**" into "Nikkei 225"; "TOPIX"; "Nikkei 300"; and "Other index," and "**Industry/Sector index**" into "construction and real estate"; "pharmaceutical and food"; "chemical, textile, and paper"; "petroleum and nonferrous"; "steel and shipbuilding"; electric and precision machinery"; "automotive and machinery"; "commerce"; "Financial"; and "public utility." The rest ("**Balanced**"; "**convertible**"; "**derivatives**"; and "**limited**") of the eight broad categories do not have sub-categories. As a result, there are thirty-one sub-categories. The "**Million**" (salary-withdrawn), "**Savings**" (called *zaikei* which is also salary-withdrawn with some institutionalize tax merit), and "**Money Pooled**" are by and large procedure-oriented within the (broad) "Domestic Equity" category. These detailed KDS categories are approximately consistent with the official classifications made by *ITA*.

11.Our sample includes 166 funds of the Limited style. However, prior to 1988 there was only one fund of this type, with 7 in 1988 and 16 by 1990.

12.Block offers are allowed only if the fund contract provides for this possibility. Recently, the practice has been abolished in the industry.

13. The number of categories is determined through a procedure analogous to the AIC criterion for time-series analysis. For a complete description, the reader is refered to Brown and Goetzmann (1997).

14.This is about half the scale of underperformance found by CCY over a slightly different time period, 1981 through 1992 for a subset of the funds we consider. At least some of the difference may also be ascribed to the fact that we allow for time-varying exposure to benchmarks.

15. The major difference between Tables 5 and 6 is use of a 9 month estimation period to allow for inclusion of a tax-effect proxy. Reducing the number of non-overlapping intervals reduces the statistical significance of alpha estimated without the tax effect (first line in each block of Table 6), but does not affect the magnitude of the estimated alpha.