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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 there is little evidence of poor risk-adjusted performance once we account for time-varying tax-dilution. To the extent that funds with a similar tax clienteles tend to gather into similar style classifications, we conclude that managers appear to pursue tax-driven dynamic strategies.

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 in the landmark study 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 funds 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 also that it actually influences the active management style of the funds themselves. Funds with particular tax clienteles fall into distinct management styles.

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 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 may have been misplaced. The apparent failure of the Japanese mutual fund industry may result from the tax structure, rather than factors specific to the financial industry[2]. We find that the poor relative performance of Japanese mutual funds can be explained by the fact that this performance represents the after-tax return of the average Japanese mutual fund investor, whereas U.S. returns are reported on a pretax basis. In fact, to the extent that the funds are actively managed to reduce 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. Only limited evidence exists that U.S. mutual fund managers pursue active strategies to maximize investor after-tax returns. In Japan, the tax effects are dramatic enough to explain a significant component of excess return. In other words, the Japanese experience provides a framework for policy makers around the world who are considering the potential consequences of simplifying their tax code. We show that there may be unforseen consequences of simplifying the rules for calculation of the basis for capital gains taxation. Not only is this simplification not revenue-neutral, it 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 many 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 postwar 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 since that date. 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)[3]. Despite their absolute size, in 1995 investment trust assets represent only 2.8% of the total financial assets held by all Japanese individual investors. The corresponding number for the U.S. is 8.2%. 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 from 79.5% in 1978 to 36.0% in 1994, due to the cancellation of many unit-type contracts. Over the same period, open-type funds with greater exposure to tax-dilution effects, increased from 24.1% to 64.0%.[4] These trends are particularly curious considering 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 pretax

returns on funds and on passive indices used for benchmarking fund performance, due to differential tax rates. In contrast, instead of pure pretax return data, Japanese mutual fund researchers only have potentially (sometimes very significantly) diluted returns which are approximately equal to after-tax returns realized by single-horizon new investors. The reason for this is that these taxes are assessed by source, and the basis in the transaction is normally not public information. Returns computed on this basis therefore do not correspond to pure pretax returns in the U.S. sense but correspond to after-tax returns for certain investors, as we subsequently show. Notice that the pre-tax returns computed for an average investor in the fund should be always lower than pure pretax returns, sometimes, very significantly, due to the tax dilution effect. On the other hand, return on benchmarks such as the TSE are computed on a pure pretax basis. Thus, the returns to benchmarks and funds are not comparable. In addition, as we will show, the size of the after-tax capital appreciation approximation is biased 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 an after-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. The investor who sells shares receives the after-tax sales proceeds.

Source withholding is common outside the United States, and averaging is

available as an option by the Internal Revenue Service for calculating the tax basis of mutual fund transactions. However 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[5].

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

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

where OP_τ is a contract offer price at past 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)[6].

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.[7] 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 $NAV_t > AP_t$ 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[8]. 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_t and AP_t 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)[9]. 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. 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_t) prevailed one day before the offering period, normally encompassing seven trading days, or the lowest OP_t 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[10]. 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

The analysis of tax-dilution effects should be straightforward given knowledge of NAV_t and AP_t. Unfortunately, the measure of AP_t is not public information, so we must address the tax dilution effect indirectly. CCY address this issue using an innovative simulation procedure. In this paper we use a management style analysis to achieve the same objective.

From this analysis of tax effects, their magnitude will depend on the frequency of trading, which will in turn determine the profitability of tax timing arbitrage strategies. Therefore, we should expect not only that tax dilution varies by style of management, but also that the management of tax implications may itself be construed as a "style." Modeling the tax effect is difficult at an individual fund level without detailed knowledge of the tax basis for all transactions. However, it is reasonable that the tax effects are of a similar magnitude for all funds that make similar investments and have similar investor clienteles. Consequently we may write the fund return as

$$R_{jt} = \alpha_{Jt} + \tau_{Jt} + \beta'_{Jt} I_t + \varepsilon_{jt}$$

where fund j belongs to style J, α_{J_t} is the "style alpha," τ_{J_t} is the style-specific tax effect and β_{J_t} is the possibly time-variant exposure to common factors. Collecting Jt terms, we have

$$R_{jt} = \mu_{Jt} + \varepsilon_{jt}$$

Since the cross-sectional mean at each point of time is a good estimate of the quantity μ_{J_t}, we have the immediate result that measuring performance relative to a style benchmark returns accounts for the tax dilution effect represented by τ_{J_t}. The only remaining problem is how to assign funds to styles unambiguously.

Traditionally, there are understood to be three major investment styles in Japan. These are "Growth" funds that must hold more than 70% equity; "Income and Growth" which holds between 50% and 70% equity, and "Income," which holds less than 50% equity. Obviously, 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 says 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[11] that are important in relation to the dilution effect previously discussed. First, the funds in their "Limited" style are 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 some of the reinvested dividends, or (in certain 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[12].

The dilution effect also should be small for index funds since this style group prohibits block offers. Those in the other styles (except "Limited") are allowed to block-offer additional contract shares under certain conditions.[13] 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 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. 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.

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. Recall that if there are K such styles the *ex post* total return in period t for any fund can be represented as:

$$R_{jt} = \mu_{Jt} + \varepsilon_{jt}$$

where μ_{Jt} is the expected return for style J conditional upon the factor realization β_{Jt}. 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_{Jt} differs across styles. The GSC algorithm assigns funds to styles in such a way as to maximize the explanatory power

of this equation, allowing for time-varying and fund-specific residual return variance. Once funds are allocated to styles, it is possible to determine the source of returns by regressing the estimated style benchmark return $\hat{\mu}_{Jt}$ on proxies for factor realizations I_t and tax effects τ_{Jt}. This second step regression corresponds to 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.

$$\hat{\mu}_{Jt} = \alpha_{Jt} + \sum_{k=1}^{K} \beta_{Jk} I_{kt} + \beta_{JT} T_{Jt} + \varepsilon_{Jt}$$

$$s.t.$$

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

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

allowing (optionally) for a tax effect instrument T_{Jt}.

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.[14] 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 Estate," "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 really 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.

Comparison of GSC classifications with the expanded Morningstar-type classifications yields very similar results and leads to the tentative conclusion that the eight GSC groups can be identified as follows: "International (1)," "Growth and Income/Limited (2)," "Growth (3)," "General/Value-oriented (4)," "Industrial Sector-focused (5)," "Passive Income/Sector (6)," "Passive (7)," and "High-Tech (8)."

IV.1.2 Characteristic analysis of the GSC categories

Table 2 provides 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 2 assumes a twenty-four-month non-overlapping return interval for the 1980-95 period.

In this Table, 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 Table 1 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 passive 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.

Use of Japanese growth, value, large, and small equity benchmark indices based on the standard U.S. classifications did not add much to the analysis. These 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. The result using these benchmarks is however consistent with our previous style interpretation for the eight GSC groups.

IV.2 Performance evaluation

Table 3 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. These negative performance results are consistent with the CCY findings. The negative alphas are all statistically significant and range from -.24% per month to -.43% per month which annualizes to a magnitude of negative 3% to 5% per year. Interestingly enough, these negative performance results are about half the magnitude of those reported by CCY[15]. As noted before, one of the difficulties associated with any analysis of the tax-dilution story is the fact that the tax basis measured by the average purchase price AP_t is not public information. To circumvent this problem, CCY report a series of simulation experiments which measure the magnitude of the tax dilution effect for a range of assumed rates of fund inflows. They find that the average tax-dilution effect can range from anywhere between .336% to .424% per month for an assumed inflow rate of .1, although the effect could be smaller than this, depending on the rate of inflow. The negative performance results reported in Table 3 are thus well within the range of being explained by this tax-dilution effect.

The cross tabulation of Table 1 shows that 129 out of the 166 "Limited" funds falls

in the GSC 2 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 4 uses the same specification as Table 3 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 July 1980 through June 1995[16]. The average values and associated t-values of estimated coefficients are given in Table 4. 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 in three cases. What is also striking is that the economic significance of the tax dilution effect is identical for all fund groups except groups 2 and 8. In every case, inclusion of a tax dilution variable eliminates the negative

alpha[17].

The small negative tax effect coefficient for GSC 2 is explained by the preponderance of "Limited" funds in this classification. Treating the "Limited" funds as their own style category actually yields a positive (though statistically insignificant) tax effect of .017. "Limited" funds did not come into existence until about half way through our sample. To check whether the different tax effect was an artefact of the small sample period, we then examined the difference in tax effect between "Limited" funds and the average tax effect across all funds for a coincident time period. The average fund over the same period of time had a tax effect of -.0235, significantly less than that of the "Limited" funds (with a t-value of 2.25). Another group of funds that can be expected to suffer from limited dilution effects is the "Money Pooled" group due to limited capital appreciation in this type of fund. Again, taking the "Money Pooled" funds in the GSC 1 as their own style yields a larger positive though statistically insignificant tax effect of .07. The coexistence of these funds with the "International" group is harder to explain, but may be due to the low degree of cancellation for funds in this sector.

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. Furthermore, the average change

in alpha across all funds is .447%, almost identical to the upper bound on the tax dilution effect of .424% obtained by CCY through simulation experiments. 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). However one would then need to explain why use of momentum strategies is significantly associated with the tax treatment of the fund. This explanation would also need to address why all funds other than "Limited" and "Money Pooled" funds are exposed in a similar way to this momentum factor, 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 5 reports the out-of-sample prediction of subsequent annual fund returns 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 j 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 U.S. 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: 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 k^{th} benchmark with the constraint that the benchmark return coefficients be non-negative and sum less than or equal to 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 Securities Company 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 3: Implied Portfolio Weights on Alternative Asset Class Data 6 Month Non-Overlapping Periods January 1980-June 1995 (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 4: Mean Alpha and Portfolio Weights Allowing for Alpha and a Tax Effect: 9 Month Non-overlapping Periods July 1980 - June 95

GSC Classification	*Alpha*	*Money Market*	*Domestic Bonds*	*Domestic Equity*	*Foreign Equity*	*Tax Effect*
1	-0.0036	0.3572	0.1190	0.0279	0.4959	
	(-3.39)	(5.93)	(2.74)	(1.63)	(14.63)	
	-0.0002	0.3737	0.1198	0.0390	0.4675	-0.0456
	(-0.04)	(6.70)	(3.15)	(2.15)	(11.47)	(-1.09)
2	-0.0027	0.2875	0.1131	0.5124	0.0870	
	(-3.52)	(6.48)	(2.85)	(15.90)	(4.29)	
	0.0028	0.3174	0.0895	0.5276	0.0654	-0.0234
	(0.63)	(7.18)	(2.74)	(16.20)	(3.69)	(-0.98)
3	-0.0030	0.1270	0.0248	0.7134	0.1349	
	(-2.07)	(4.00)	(1.21)	(17.71)	(3.99)	
	0.0079	0.1441	0.0159	0.7308	0.1093	-0.0426
	(1.20)	(3.55)	(1.33)	(17.39)	(3.51)	(-1.59)
4	-0.0027	0.0974	0.1208	0.6428	0.1390	
	(-1.12)	(3.16)	(2.46)	(11.56)	(4.12)	
	0.0125	0.1099	0.1181	0.6519	0.1201	-0.0407
	(1.42)	(3.49)	(2.41)	(12.55)	(3.43)	(-1.94)
5	-0.0027	0.1044	0.0800	0.6898	0.1257	
	(-1.88)	(3.74)	(2.25)	(11.34)	(3.89)	
	0.0035	0.1532	0.0826	0.654	0.1102	-0.0680
	(0.62)	(4.25)	(1.99)	(9.43)	(3.65)	(-1.97)
6	-0.0024	0.0739	0.1763	0.7311	0.0188	
	(-1.58)	(2.28)	(3.93)	(14.16)	(3.18)	
	0.0041	0.1263	0.1276	0.7317	0.0144	-0.0465
	(0.82)	(3.01)	(3.00)	(13.80)	(2.84)	(-1.34)
7	-0.0030	0.0665	0.0497	0.8112	0.0727	
	(-2.20)	(2.59)	(2.26)	(20.96)	(3.52)	
	0.0001	0.0563	0.0581	0.7968	0.0887	-0.048
	(0.03)	(2.26)	(2.34)	(20.30)	(4.17)	(-3.29)
8	-0.0037	0.1412	0.0101	0.6069	0.2418	
	(-1.08)	(2.62)	(1.39)	(8.11)	(4.07)	
	0.0040	0.1817	0.0080	0.6189	0.1914	-0.1253
	(0.36)	(2.71)	(1.00)	(8.20)	(3.70)	(-2.89)

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

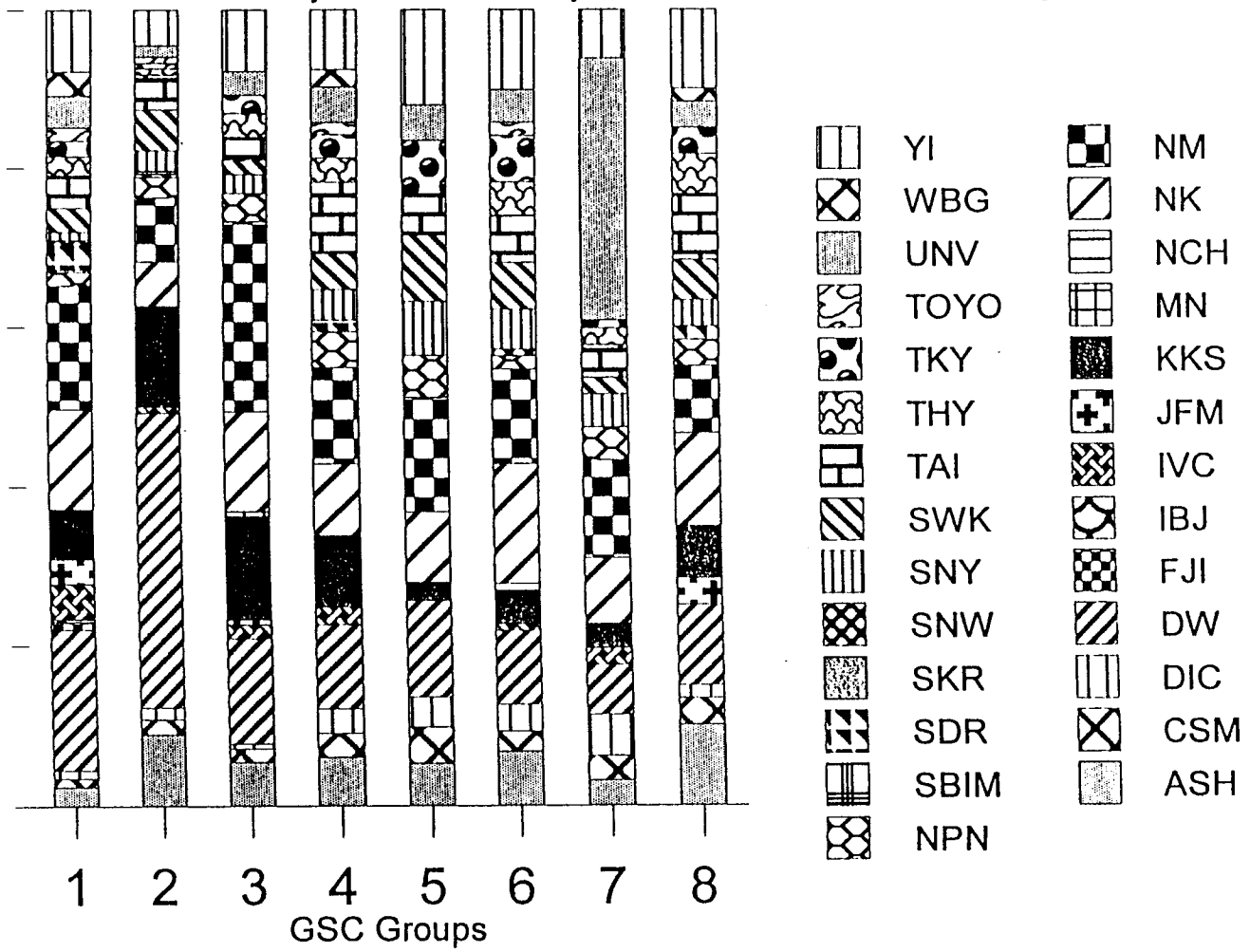
	Style Classifications			Implied Portfolio Weights		
	GSC	*BARRA/NIKKO*	*J-MIX*	*GSC*	*BARRA/NIKKO*	*J-MIX*
1982	0.1382	0.105	0.0827	0.1801	0.2336	0.2438
1983	0.5244	0.3346	0.5007	0.3282	0.4859	0.5677
1984	0.0862	0.1295	0.076	0.1377	0.194	0.0699
1985	0.3705	0.3508	0.0472	0.4865	0.4485	0.1822
1986	0.3594	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 $\{d_{jk}\}$ which equal 1 if fund *j* belongs to classification *k*, and zero otherwise, where there are 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

Breakdown of Style Classification by Number of Funds in Each Management Group



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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 for 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 U.S. 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.Open-type investment trust realized gains are taxed and source-withheld as dividend income (National Income Tax Law 24). At termination, the difference between the average price (AP) and the net asset value (NAV), is taxed as ordinary dividends. This (overly) simplified taxation method has been in place since 1961. This practice has been under serious review since November 1996 by a task force committee organized under the direction of the Ministry of Finance . This committee is responsible for revising the rules for investment trust taxation to make them more in line with international standards (Investment Trusts Association 1996, p.4). The source-withholding rate is 20 percent, consisting of 15 percent national income and 5 percent local income tax rates. These rates apply to all (individual and corporate) investors in open-type investment trusts (Tax Special Treatment Law 8.2, National Income Tax Law 182 and 213, and Local Tax Law 7.5 and 7.7). It is important to note that the realized gains are not considered capital gains. The reasoning is that the taxable difference between AP and NAV at termination is considered to be contributed by both income and capital gains and is further complicated by cash inflows and outflows to the fund.

An alternative procedure is for the asset management company to buy back the contract claim upon investor's request, in which the securities transaction tax is imposed at the .50 percent rate prior to April 1, 1989 and then the .30 percent rate through the end of our sample period (Securities Transaction Law 10). In this case a 20 percent of the surplus (the difference between the NAV and the AP) is used to deduce the tax base from the NAV. We do not consider this alternative tax procedure in our paper because the tax procedure we describe usually provides the (individual as well as corporate) investors with higher after-tax proceeds than the buy-back alternative (see pp. 172, Takahashi 1997 and p. 111, Nikko Securities, Co., 1988).

An additional complicating detail is that the fund can avoid dilution by issuing a special dividend without tax withheld if cash inflows in excess of the AP from the newly contracted investors are the source of the dividend (National Income Tax Law 9.1.12). There is no data to indicate how frequently this anti-dilution mechanism is employed in our sample period.

6.These expressions for *AP* and *OP* are taken from Takayama [1995].

7. 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.

8.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).

9.See previous note.

10.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.

11.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-withheld), "Savings" (called *zaikei* which is also salary-withheld with some institutionalized 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*.

12.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.

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

14.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).

15.As we note, this is however 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. To examine this issue, we identify 55 Domestic Equity funds that had at least 97 months of data in the CCY period (their selection criterion) and estimate the model holding weights constant through the sample period, and find an average alpha of -.567% per month, almost exactly what CCY report using different benchmarks(-.568%). The "International" funds have an average alpha of -.547% estimated in the same way, which is close to the -.425% reported by CCY. We then estimated the 9 month non-overlapping variable portfolio weight results reported on Table 4 for the "Domestic Equity" classification, and find an average alpha of -.134% per month, much smaller than CCY find. However, the implied portfolio weights in short term cash investments and equity are very interesting. It seems that in the period around 1987 these portfolios were very heavily invested in cash, at a time when the market was increasing. Therefore, relative to the adjusted cash and equity benchmark they did fine, although relative to a market benchmark they would have done very badly. Therefore, the extreme underperformance reported by CCY can at least in part be attributed to their failure to allow for time-varying exposure to benchmarks.

16. The major difference between Tables 3 and 4 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

4), but does not affect the magnitude of the estimated alpha.

17.Except for GSC 1, where the alpha is numerically indistinguishable from zero.