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RANKING MUTUAL FUNDS ON AN AFTER-TAX BASIS

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ABSTRACT

This paper takes shareholder level taxes into account in determining the performance of growth and growth and income mutual funds over the 1963-1992 period. It ranks a sample of funds on a before and after-tax basis for investors in different income classes facing various investment horizons. The differences between the relative ranking of funds on a before and after-tax basis are dramatic, especially for middle and high income investors. For instance, one fund which ranks in the 19th percentile on a pre-tax basis ranks in the 61st percentile for an upper income, taxable investor.

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Ranking Mutual Funds on an After-Tax Basis

American households invest vast sums of money in U.S. equity markets through mutual funds. According to the Federal Reserve's *Flow of Funds Accounts*, investors purchased an additional $67.1 billion in corporate equity via mutual funds in 1992 alone. By the end of 1992, individual assets in equity mutual funds totalled $466.4 billion versus $181.7 billion just five years prior. The result has been a huge demand for information about the performance of mutual funds in all types of media. Magazines such as *Consumer Reports*, *Forbes*, *Fortune*, *Business Week*, and *Money Magazine* frequently feature mutual fund performance rankings. Newspapers and public television cover these matters, and a small industry has developed providing newsletters and tabulated data regarding mutual funds.

Are the media and the funds themselves providing the most relevant performance information for most investors? Our answer is "no." This negative response results because tax considerations matter a great deal for most mutual fund investors while almost all published performance measures and rankings ignore taxes. *Fortune* is the only publication which regularly publishes after-tax mutual fund returns, but these returns consider only one and three year investment horizons[1,2]. In this paper we document that taxes not only affect the level of returns of equity mutual funds for taxable investors, but also taxes dramatically affect the relative rankings of the funds.

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[1] The timing of capital gains realizations by competing equity funds over a short horizon might not be able to distinguish between tax-conscious and tax-ignorant investment policies.

[2] In addition to *Fortune*'s returns, Morningstar's CD-ROM mutual fund database contains a somewhat crude utility to calculate tax effects on a portfolio of mutual funds.

Many people need both pre-tax and post-tax performance information. Consider an equity investor who is accumulating money in a tax sheltered 401K pension plan and also investing after-tax income in an equity mutual fund outside the pension system. It matters a great deal which fund is used in each case, but the published information gives little, if any, guidance as to which funds have been most appropriate under each scenario. This paper provides a substantial amount of information which should be valuable to investors with both taxable and tax deferred mutual fund accounts.

Since the seminal work of Treynor (1965), Sharpe (1966), and Jensen (1968,1969,1972), there have been hundreds of academic papers on mutual fund performance and evaluation. One class of these papers (e.g., Kon and Jen (1978,1979), Lehmann and Modest (1987), Grinblatt and Titman (1993)) compares and contrasts the myriad ways to evaluate performance relative to some benchmark. The other class of papers on this topic (e.g., Chang and Lewellen (1984), Henriksson (1984), Ippolito (1989)) focuses more on the opportunity cost of mutual fund investing. Topics in the second class include whether mutual funds are able to "outperform" the market through timing and selection ability and whether mutual funds offer superior returns to the market as a whole in order to offset their expenses, fees, and load charges. In the context of academic research, only Jeffrey and Arnott (1993) adjusts mutual fund returns for shareholder level taxation in their study focusing on the relationship between turnover and net-of-tax performance.

A mutual fund's returns can be thought of in three separate ways. First, there is the return on the fund's underlying portfolio. Second, the gross-of-tax return (R) is the return on the fund's portfolio after fees, loads, and bid/ask spread losses due to a fund's turnover are taken

into account. This gross-of-tax return (usually without load adjustments) is the return reported by the funds themselves and used by academics and the popular press to determine mutual fund rankings. The third measure, and the one we argue is the relevant statistic for investors subject to shareholder level taxation, is the net-of-tax return (R_n). R_n equals the gross return, R, minus the amount of taxes that the shareholder must pay on dividend and realized capital gains distributions.

Table 1 shows that a significant portion of the total assets of growth and growth and income funds are subject to shareholder level taxation. As of December 31, 1991, at least 47.4 percent of the total assets of growth and growth and income funds were subject to shareholder level taxes. Taxable assets as reported in Table 1 are, in fact, substantially underestimated since institutional assets include those trust accounts, fiduciaries, and business organizations whose beneficiaries are responsible for taxes on any mutual fund distributions.

Instead of focusing solely on the pre-tax performance of mutual funds prevalent in both academic studies and the popular press, we will consider three different performance measures. The pre-tax return is relevant for those individual investors who enjoy tax-deferred status on their asset accumulations (e.g., IRA accounts). For individuals subject to shareholder level taxation, we compute post-tax returns by adjusting the pre-tax return for any required tax payments. Post-tax returns are calculated for individuals in three different tax brackets. We also calculate liquidation values for each of the three tax rates. The liquidation value is the amount that an individual would receive by selling all of her mutual fund shares and subtracting the required tax payments for previously unrealized capital gains.

The remainder of the paper proceeds as follows. Section II describes the data used in our analysis. Section III presents our basic methodology. Section IV demonstrates how startling mutual fund performance changes can be when shareholder taxes are considered. Section V discusses risk-adjusting the mutual fund returns. Section VI looks at the contention that a fund's turnover rate is related to its post-tax performance. Section VII concludes and summarizes.

I. Data

We compiled a data set of mutual funds using the following criteria. As of October 31, 1992, the fund must have been classified as a Growth or Growth and Income fund in the Morningstar Mutual Funds database. Since the tax effects which we wish to consider should compound over a long time horizon, we required the fund to have been in existence for at least ten years. All funds meeting these criteria were ranked on total net assets and the largest 150 were chosen[3]. Our largest fund is Fidelity Magellan with $20.55 billion in total assets. The 150th fund, Eaton Vance Stock, had total assets of $86.91 million as of 10/31/92.

After our data were compiled, three funds had to be deleted from our original list. First, in November, 1992, the Shearson Appreciation Portfolio Fund was merged into the Shearson Appreciation Fund. Second, data acquisition problems led to the deletion of the General Electric S&S Program Fund. Finally, Lexington Corporate Leaders is set up as a unit investment trust whose distributions contain non-taxable return of capital. Since our data does not breakdown

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[3] There is certainly a selection bias induced by choosing, ex-post, the 150 largest funds. Since our focus is how taxes change the relative rankings of mutual funds and not on quantifying the return of a representative fund over a particular horizon, this bias should not affect our basic conclusions.

the taxable and non-taxable portions of their payments to shareholders, we deleted Lexington Corporate Leaders from our list of funds. Our total sample, therefore, consists of 147 growth and growth and income funds. As of December 31, 1991, these funds had combined total net assets of $171,937.7 million, or 73.3 percent of the total reported in Table 1.

Investment Company Data Institute (ICDI) maintains a database of mutual fund disbursements dating back approximately thirty years. For each fund in our sample, we obtained from ICDI month-end net asset values (NAV), dividend and realized capital gains payments per share, "ex"-dates for the dividend and capital gains distributions, reinvestment prices for the distributions, and split dates and ratios[4]. NAVs are net of expenses and fees but not adjusted for any load charges. The data cover the entire history of the mutual fund or the thirty year span 1963-1992 for those funds in existence for more than thirty years[5]. Sixty-two of the 147 funds had data for the entire thirty year period, and 126 funds had been operating for at least twenty years.

II. Return Calculations

We define the monthly total return as the percentage change in value at the end of the current month of one mutual fund share purchased at the end of the previous month. Returns are calculated on both a pre-tax and a post-tax basis. Intuitively, the pre-tax measure reinvests

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[4] We are indebted to Bill Crawford, Sr. of ICDI for making this data available to us.

[5] ICDI data for four funds is only available quarterly from January, 1963, through September, 1967, and are not included in our analysis over that time period. These funds are A-C Growth and Income, CGM Capital Development, Nationwide Growth, and ProvidentMutual Investment Shares.

the entire distribution while the post-tax measure reinvests only the after-tax payment. In notational terms:

$$R_t = \frac{(shares_t * NAV_t - NAV_{t-1})}{NAV_{t-1}} \qquad (1)$$

where

$$pre\text{-}tax: \quad shares_t = 1 + \sum_{i=1}^{n_{dt}} \frac{Divs_{it}}{PD_{it}} + \sum_{j=1}^{n_{ct}} \frac{KGains_{jt}}{PKG_{jt}}$$

$$post\text{-}tax: \quad shares_t = 1 + \sum_{i=1}^{n_{dt}} \frac{(1-\tau_{dt})\, Divs_{it}}{PD_{it}} + \sum_{j=1}^{n_{ct}} \frac{(1-\tau_{ct})\, KGains_{jt}}{PKG_{jt}}$$

Returns are adjusted for splits as necessary. NAV_t is the fund's net asset value at the end of month t. Divs and KGains are the dividend and realized capital gains payments per share which are reinvested at prices PD and PKG respectively. There are n_{dt} dividend distributions and n_{ct} capital gains distributions in a given month. Dividends are taxed at the marginal rate on ordinary income, τ_{dt}, and realized capital gains are taxed at τ_{ct}. One provision of the tax code is that realized capital gains payments from mutual funds are taxed at the marginal rate applicable to long-term capital gains even though, at the time of the distribution, an individual might not have held the mutual fund shares for the length of time normally required to qualify for the preferential tax rate.

Since our data report "ex"-dates instead of actual payment dates, our methodology assumes that a distribution's "ex"-date and payment date fall within the same month. For the long

horizons we consider in this paper such an assumption should not adversely affect accumulations. In addition, the tax code currently states that any distribution announced in October, November, or December is treated as income in that calendar year even if the payment is not disbursed until January of the following calendar year. The tax code, therefore, treats any payment with a December "ex"-date, when many distributions are made, as if it were paid in December.

There are two additional assumptions embedded in (1). First, all distributions are taxed immediately. Second, for multiple distributions on different days within the month, we assume that the fund has already gone "ex." In other words, the new shares received from reinvesting one payment have no claim on any further distributions made within the same month.

Post-tax returns are computed for investors in three different tax brackets. Using the Internal Revenue Service's *Statistics of Income*, we calculate the median adjusted gross income (AGI) for each year between 1963 and 1989. Median AGI is assumed to grow at the rate of the consumer price index from 1990-1992. These calculations lead to a value of $21,314 for median AGI in 1992. We define a "low-tax" individual as having taxable income equal to the median AGI less the standard deduction for married persons and three exemptions. We feel that such an individual probably represents the low end of the mutual fund marketplace. A "middle-tax" and "high-tax" individual are similarly defined using three times median AGI and ten times median AGI respectively. Investors are assumed to retain their tax status (low, middle, high) throughout the analysis[6].

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[6] We consider only federal tax rates. Returns can differ even more when state and local taxes are taken into account.

Table 2 presents the annual marginal tax rates for ordinary income and long-term realized capital gains based on the taxable income of each of our three individuals. These rates are compiled from Pechman (1987) and various issues of IRS Publication 17. Throughout most of this period, the first $200 of dividend income could be excluded from taxation for married persons filing jointly. We assume that any dividends paid by the mutual funds in our analysis are not subject to the dividend exclusion.

Prior to the 1986 tax reform, an individual was allowed to exclude sixty percent of his realized long-term capital gains (fifty percent prior to November, 1978) from the ordinary income tax, and the marginal tax rate on gains was limited to a maximum of twenty-five percent for most investors. During the 1970's, however, gains in excess of $50,000 were subject to an additional tax on the excluded portion of the gain resulting in a higher marginal rate that varied with the amount of the realized gain (see Minarik (1981)). We assume that realized capital gains for each of our individuals total less than $50,000 annually over this period. Beginning in 1987, realized long-term capital gains are taxed at the maximum of the ordinary income rate or twenty-eight percent[7].

III. Results

We generate mutual fund returns under three different scenarios. The pre-tax return is relevant for investors whose assets are in tax deferred accounts (e.g., IRAs and Keoghs). The

[7] The reader should note that our post-tax return calculations discount realized capital gains distributions by the full marginal tax rate on long-term gains. This implicitly assumes that the taxpayer either does not realize capital losses on other assets or uses losses to offset realized gains from investments other than the mutual fund.

post-tax return is most relevant for those taxable investors with long holding periods or who plan to pass their assets through their estate[8]. The liquidation value is the amount of money an investor would receive if he were to liquidate his mutual fund position at the end of the holding period. This value best describes the opportunities for those investors divesting assets at the end of the period for a specified purpose (e.g., tuition payments, down payment for a house, purchasing a yacht). The liquidation value is calculated by the following formula:

$$L_T = I_0 \left[\prod_{t=1}^{T} R_t - \tau_{cT} \left(\prod_{t=1}^{T} R_t - basis_T \right) \right];$$

$$basis_T = 1 + \frac{1}{NAV_0} \left(\sum_{i=1}^{n_{dl}} (1-\tau_{dl}) Divs_{il} + \sum_{j=1}^{n_{cl}} (1-\tau_{cl}) KGains_{jl} \right) \qquad (2)$$

$$+ \frac{1}{NAV_0} \sum_{t=2}^{T} \left[\left(\prod_{k=1}^{t-1} shares_k \right) \left(\sum_{i=1}^{n_{dt}} (1-\tau_{dt}) Divs_{it} + \sum_{j=1}^{n_{ct}} (1-\tau_{ct}) KGains_{jt} \right) \right]$$

I_0 is the amount of money initially invested, R_t and $shares_k$ are the monthly post-tax return and shares calculated from equation (1), and NAV_0 is the share price of the fund at the beginning of the holding period. The number of shares are adjusted for splits as necessary. Equation (2) shows that the end-of-period liquidation value, L_T, is simply the accumulation of the post-tax returns less the amount of taxes that must be paid at the time of sale on previously unrealized

[8] Because of the step-up in basis at the time of death, any unrealized capital gains would not be taxed if an heir were to immediately liquidate a decedent's holdings.

capital gains[9].

Table 3 presents our results for the thirty year period 1963-1992 and three ten year subperiods (1963-72, 1973-82, 1983-92). This table shows the end-of-period value of a one dollar investment made at the beginning of the holding period. The top half of the table shows that the median result for the sixty-two mutual funds with thirty year returns was that one dollar in 1963 would have grown to a pre-tax $21.89 by the end of 1992. Over this period investing $1 in the S&P 500 index would have resulted in $22.13. The numbers for the median post-tax numbers are $16.45, $12.52 and $9.87 for the low, middle, and high income investors respectively. The median liquidation values are $15.95, $12.06, and $9.17 for taxable holders in our three different tax circumstances[10]. The differences in actual return over the thirty year period to a taxable investor is immediately evident. The high-tax investor who reinvests only after-tax distributions has an accumulated wealth per dollar invested on the order of forty-five percent of the amount published by the funds in their prospectuses and promotional material.

Table 3 also reports the value of a $1 investment in Treasury Bills (the risk-free investment in our analysis) over the relevant period[11]. Notice that over the thirty year period even the worst performer in our mutual fund sample did better than Treasury Bills. For tax free investors, the last place fund outdistanced T-Bills by twenty-two percent, the median fund

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[9] As shown in equation (2), the liquidation value would be greater than the post-tax value if the accumulated basis is greater than the post-tax value of the mutual fund at the time of liquidation. Implicitly this assumes full loss offsets.

[10] Table 3 presents results for the median fund within each category. Because of differences in the pre-tax and post-tax rankings, the median fund is not the same mutual fund under each case.

[11] S&P 500 and T-Bill returns are taken from Ibbotson (1993).

produced 217 percent more, and the best fund resulted in eleven times as much wealth per dollar invested as Treasury Bills. It seems ironic that what we usually term the risk free investment comes in absolutely last place over the thirty year horizon. These results make one wonder about the wisdom of individuals placing large amounts of their 401K pension investments in Treasury Bills and equivalent instruments[12].

The return multiples relative to T-Bills are larger for taxable investors since Treasury Bills are more heavily taxed than equity mutual funds, at least at the federal level. This is because T-Bill interest is taxed at full ordinary rates (as are dividends) while realized capital gains have usually been taxed at lower rates (See Table 2)[13]. Even if a high tax rate individual had the misfortune of investing in the worst of our funds, she would have eighty-four percent more money accumulated (seventy-seven percent if she were to liquidate her position) between 1963 and 1992 than if she had invested and accumulated with Treasury Bills. The median and best performing funds generate 3.9 and 16.5 times more wealth (3.6 and 13.6 times as much wealth upon liquidation) for the high-tax investor than T-Bills.

The bottom half of Table 3 reports the terminal value of a $1 investment in each of the three ten year subperiods. The results are qualitatively similar to those for the entire thirty year period. In the first two subperiods, the worst performing fund does worse than T-Bills on a pre-

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[12] Because of the selection bias in our data set, it is quite likely that the worst growth or growth and income mutual fund investment over this period involved an investment in a fund that was not included in our data. Data from Ibbotson (1993), however, shows that Treasury Bill accumulations have always been dominated by common stock accumulations between 1926-1992 for any holding period of twenty years or longer.

[13] The monthly post-tax return on Treasury Bills is $R_t = (1 - \tau_{dt})\ TBill_t$, where $TBill_t$ is the nominal, pre-tax T-Bill return in month t.

tax basis and over the 1973-82 period, the pre-tax median beats T-Bills by only 3.5 percent. As in the thirty year returns, however, taxes affect T-Bill investments more than investments in our growth and growth and income funds. In the first subperiod (1963-72), the liquidation value of the worst performing fund is still higher than the T-Bill value for our high-tax individual. In the second subperiod, the high-tax median is thirty percent higher than T-Bills (twenty-five percent upon liquidation).

Figure 1 illustrates the degree to which the pre- and post-tax rankings of our funds differ (for a high-tax investor) over the thirty year horizon. To facilitate comparisons across different horizons where the number of funds change, we report the rankings in terms of percentiles. The worst fund has a percentile rank of zero, and the best fund ranks at the 100 (1 - 1/n) percentile, where n is the number of funds ranked[14]. The numbers in the figure refer to the names of the funds for which we have thirty years of data. These funds are numbered and listed alphabetically in Appendix A[15].

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[14] We also considered another performance measure based on a fund's return relative to the median return. Fund X, for example, might have a pre-tax value twenty percent greater than the median pre-tax value while its post-tax value might be ten percent above the median post-tax value. We would then say Fund X lost ten percentage points relative to the median. This median performance measure, unlike the percentile rankings, might be able to distinguish large relative movements if funds' returns are tightly bunched. Because performance relative to the median is bounded below (-100%) but not bounded above, however, relative movements below the median are not easily comparable with relative movements above the median. In the text we report the percentile differences. Results for the median measure are available from the authors upon request.

[15] For enhanced exposition and clarity, the graphs in the rest of the paper will not number specific data points. We will identify particular outliers in addition to any funds discussed in the text. Interested readers can find all the data for each graph in the appendices.

Figure 1 plots a fund's after-tax percentile ranking versus its pre-tax percentile ranking. If tax considerations did not change the relative performance of these mutual funds, then the rankings would be unchanged and all funds would show up on the 45 degree line shown in Figure 1. One glance at the figure indicates that shareholder level taxes cause considerable changes in the relative ranking of funds. Obviously, funds appearing above the 45 degree line have a higher after-tax ranking than before-tax ranking and vice versa.

Table 4 presents summary statistics on the ranking differences shown in Figure 1. The movement of an average fund in our sample is plus or minus 9.7 percentile points. The maximum change in relative position was fund number 23 (Franklin Growth) which improved its rank by an enormous 41.9 points going from the 19.4 percentile on a pre-tax basis to the 61.3 percentile for a high-tax investor[16]. Our interpretation of Figure 1 is that the pre-tax rankings, which are published regularly in all of the major financial magazines, are inappropriate for providing necessary performance information to taxable investors.

Figures 2 and 3 are similar to Figure 1, except that the post-tax percentile rankings refer to mid-tax and low-tax investors, respectively. As shown in Table 4, the difference between the pre-tax and the post-tax rankings of funds over the thirty year horizon is still considerable for intermediate tax rate investors. The average absolute value percentile change between pre- and post-tax rankings is 6.2 points in Figure 2, with the maximum change still being Franklin Growth, which gained 25.8 percentiles. As one would expect, the difference between the pre- and post-tax rankings is not terribly great for low tax rate investors as shown in Figure 3.

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[16] Using the median measure discussed above, Franklin Growth gained 37.8 percentage points relative to the median over the 1963-1992 period. Franklin Growth performed 27.9% below the median on a pre-tax basis but ranked 9.9% higher than the median a high-tax investor.

The liquidation rankings are much closer to the post-tax rankings than the pre-tax rankings as shown in Figures 4 and 5 for high-tax and low-tax investors respectively[17]. Each figure contains two graphs. The first plots liquidation value ranking versus pre-tax ranking whereas the second plots liquidation ranking versus post-tax ranking. The mean absolute value change in ranking between liquidation and pre-tax rankings was 8.5 points for the high tax investor, 4.6 points for the mid-tax people, and only 2.2 percentiles for the low-tax investor. The average absolute value change in position between the liquidation ranking and the post-tax ranking was roughly three percentiles for both the high and middle tax rate investors but only 1.7 points for the low-tax asset holder.

Figures 1-5 and Table 4 show that the differences between the various after-tax rankings and the published pre-tax rankings are large over a thirty year horizon, particularly for middle and high income investors. A question that this information raises is whether it takes a thirty year period for this effect to become important. To provide the answer, we separately calculated mutual fund performance rankings for the three ten year subperiods within our thirty year data set. The summary statistics on the differences between the pre-tax and post-tax rankings (and between the liquidation rankings and both pre- and post-tax rankings) are given in Table 5.

Our conclusion is that the ranking differences are still considerable for ten year intervals. For example, the average absolute value change in rank for high tax investors between the post-tax and pre-tax rankings was roughly five percentile points for the first two ten year periods and 8.1 points for the most recent 1983-92 period. The performance rank changes over the most

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[17] The data points for the mid-tax investor are not shown but fall between those for the high-tax and low-tax asset holders.

recent decade, in fact, are not that much smaller than for the entire thirty year period. This fact is graphically illustrated in Figure 6 which plots the post-tax return rank for high tax investors against the pre-tax return rank for the 1983-92 period[18]. The largest change in rank between the two concepts was 35.4 percentiles (Fidelity Value) which is more than enough to be important information for taxable investors. Figures 7 and 8 have the comparable information for mid-tax and low-tax investors. Once again we see that the effect of shareholder taxation is quite important for the mid-tax investor but much less significant for the low-tax household.

The case of Vanguard's Index 500 Fund illustrates how a tax conscious fund could improve its relative performance. The Index 500 Fund follows the passive strategy of investing in the component stocks of the Standard and Poor's 500 (S&P 500) index in the same value-weighted proportions as the index. This fund realizes capital gains for three main reasons: constituent changes in the S&P 500, share repurchases of the 500 firms, and net redemptions by the fund's shareholders. The relatively passive investment approach of the Index 500 Fund resulted in the post-tax return ranking 6.1 percentiles higher than the pre-tax return (85.0 percentile post-tax versus 78.9 percentile pre-tax) for the high-tax investor over the 1983-1992 period. As depicted in Figure 6, if the Vanguard 500 portfolio could have deferred all of its realized capital gains (without sacrificing any pre-tax return), it would have ended up at the 91.8 percentile for the high-tax investor. We feel that managing such a fund so as to defer all capital gains realizations is feasible. It also should prove relatively costless in terms of average pre-tax return while closely tracking the S&P 500 index. Such a fund would also significantly improve returns to taxable investors. The creation and implementation of a tax sensitive "index" fund is the subject

[18] Results for each of the 147 funds can be found in Appendix B.

of ongoing research by the authors[19].

Figures 9 and 10 (and the corresponding information in Table 5) indicate that the correlation between the liquidation rankings and the post-tax rankings is reduced for the shorter holding period. For the longer thirty year holding period, the post-tax ranking is a more satisfactory substitute for the liquidation ranking than it is over a ten year horizon. The message is that for taxable individuals accumulating and then selling assets over a relatively short investment horizon, neither the pre-tax nor the post-tax rankings provides an accurate assessment of comparative performance.

Mutual fund rankings change dramatically not only for taxable versus non-taxable investors but also for high-tax versus low-tax investors. Table 6 clearly shows there is a considerable difference in the standings of the various funds in our sample for the two different types of investors. This table suggests that it not merely sufficient to choose one tax rate to measure after-tax returns. Individual taxable investors, instead, should be able to determine relative rankings based on their own marginal rates.

IV. Risk-Adjusted Returns

All of the above rankings consider only the average return over the ten and thirty year horizons and do not take risk into account. We recognize that investors are risk averse and, in general, would be willing to trade some expected return for increased safety. Since our focus

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[19] A tax conscious fund that tracks the S&P 500 would not be an index fund in the usual sense since the fund would likely have to deviate slightly from the true portfolio weights in order to offset realized capital gains with capital losses. If new money flows into the fund faster than its redemptions and exchanges, then the market weights can easily be re-established (subject to wash-sale rules).

is on the relative rankings when shareholder taxation is taken into account, any risk-adjusting measure we use must allow for straightforward comparisons on both a pre- and post-tax basis.

The usual starting point when one risk-adjusts mutual fund returns is the method first employed by Jensen (1968). Jensen uses the capital asset pricing model (CAPM) as a benchmark to determine whether or not a mutual fund manager is able engage in successful stock selection and market timing activities. The assumptions underlying the CAPM approach are that the investor holds the market portfolio, is only interested in the riskiness of the entire portfolio, and, therefore, needs to ascertain the contribution of each asset to the riskiness of the total portfolio. One problem with this approach is that many mutual fund investors are not nearly this diversified. For many mutual fund investors their entire equity portfolio is a particular diversified mutual fund, and the riskiness of their portfolio is given by the variance (or standard deviation) of that fund's returns[20].

A second problem for our analysis is that the usual CAPM model of riskiness does not take shareholder level taxation into account. In order to adjust post-tax mutual fund returns for risk, however, we would need to make some statement about the realized capital gains of the market portfolio. This calls for some knowledge of the effective tax rate on accrued gains, and we do not think it is straightforward to make such a calculation.

One possibility might be to use one of our funds, the Vanguard Index 500, as a measure of the before-tax and after-tax market returns. Since the investment strategy of the Index 500 is

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[20] An additional problem is that of horizon. It is not at all clear why a long horizon investor, such as someone saving for retirement, should be concerned solely with the monthly variability of return. Except in very special cases, monthly return variability will be a very poor proxy for return variability over much longer horizons.

to track the S&P 500 (the benchmark portfolio in many empirical CAPM studies), its performance is an obvious candidate for a market portfolio. Two potential difficulties, however, come to mind. First, consider a fund which, at all times, holds the same stocks and makes the same trades as the benchmark portfolio. On a pre-tax basis, the familiar CAPM ß will equal unity (and α will equal zero), as expected. On an after-tax basis, though, the estimates of alpha and beta will differ from zero and one respectively if the sole difference between this fund and the benchmark fund is the months in which distributions are made[21].

One way to partially alleviate the problem of different distribution dates would be to use annual returns. The Vanguard Index 500 was first introduced in August, 1976, and was the first index fund to track the S&P 500. Risk-adjusting in this manner, therefore, is not possible over the entire thirty year period of our sample because of the lack of an after-tax market portfolio prior to creation of the Index 500. Because of these difficulties applying the CAPM framework to risk-adjust post-tax mutual fund performance, we decided not to employ a variation of Jensen's (1968) methodology[22].

Another possible risk-adjusting method would be to use the consumption CAPM (CCAPM). The argument for such an approach is that the riskiness individuals are really concerned about should be the variability of their total wealth including such assets as human capital, Social

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[21] This result rings true for any mutual fund relative to the benchmark. If the fund under consideration makes taxable distributions in different months than the benchmark fund, then the estimates of α and ß will depend on the month in which distributions are made in addition to actual differences in stock selection and market timing abilities or "riskiness" of the mutual fund.

[22] We should mention two other caveats in using a mutual fund as an after-tax benchmark. The realized capital gains close to a fund's inception may not be the realized capital gains on the true "market" portfolio because of differences in average holding periods. Also, gains incurred through net redemptions may not represent true realized gains of the "market."

Security wealth (and other government programs such as welfare and unemployment insurance), and housing. The principal advantages of the CCAPM are that, with this broad definition of wealth, almost everyone is somewhat well diversified, and, consumption, by definition, is an after-income tax concept. As with the market portfolio CAPM, however, the CCAPM does not allow for easy comparisons since the after-tax consumption portfolio would also have to be used as the pre-tax benchmark in order to consider changes in relative performance. In addition, the CCAPM has not fared well in most empirical tests of the model's implications.

The risk measures we do calculate is Sharpe's (1966) reward-to-variability measure, which is simply the ratio of the average monthly excess return of the mutual fund to the standard deviation of its monthly excess returns. This measure is admittedly crude. Implicitly, it assumes that the mutual fund is the whole portfolio of the investor or, at least, that its riskiness is assessed separately from that of other assets. While this sounds extreme, it may not be further from the truth than the assumptions of the standard CAPM involving the level of diversification in the investor's portfolio. The main advantage of the reward-to-variability measure, however, is that it can easily be calculated on a post-tax basis as well as on a pre-tax basis, allowing relative comparisons to be made.

The results of our reward-to-variability measure are shown in Figure 11 for high-tax investors and a thirty year holding period. Each point on the graph represents the average after-tax monthly excess return (over Treasury Bills) and the monthly standard deviation of excess returns for a particular mutual fund. Individual results can be found in Appendix C. The importance of adjusting returns for risk can be seen by the considerable horizontal spread in the funds (their monthly standard deviations range from roughly 3.5 percent to 7.5 percent). We

assume that investors have the opportunity to invest in Treasury Bills (and also to borrow at that rate).

The optimal fund for all investors is the one with the largest ratio of average excess return to standard deviation. If you consider running a line from each point in Figure 11 to the origin, the highest ranked fund will be the one whose corresponding line has the steepest slope. Every high-tax investor, regardless of their degree of risk aversion, should choose this fund in preference to all others[23]. The line through the fund represents the opportunities that investors have by choosing different combinations of this fund and Treasury Bills.

For illustrative purposes, Figure 11 shows a particular investor's indifference curve between risk and average excess return. For this individual, the optimal investment would have been a combination of Treasury Bills and the Mutual Shares fund, with a portfolio allocation given by the relative distance from point A[24] to the origin and point B, which is the fund itself. As drawn, this investor would put roughly seventy percent of assets into the mutual fund and thirty percent in Treasury Bills. With such a strategy, the investor would have achieved an average excess return well above that of the median fund and a level of riskiness well below that offered by any of the funds in our sample.

Figure 12 shows that our earlier story that taxes dramatically affect relative rankings is still true when the rankings are risk adjusted. The top half of the figure plots pre-tax average excess return against pre-tax standard deviation, whereas the bottom half plots both concepts for an

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[23] We are, of course, using ex-post returns and make no claim about future performance.

[24] Point A is defined as the point of tangency between the indifference curve and the opportunity set.

upper income, taxable investor. The largest improvement in ranking due to tax considerations is Franklin Growth. The top half of the figure shows that roughly eighty percent of the funds offered a better opportunity set (when combined with Treasury Bills) than does Franklin Growth. However, the bottom half of the figure shows that only about thirty-five percent of the funds offered a better after-tax opportunity set than Franklin Growth. Tax considerations caused it to "pass" more than half of the funds that ranked higher on a pre-tax basis.

The amount by which the risk-adjusted rankings vary from tax effects are virtually unchanged from the non-risk-adjusted returns. For the thirty year horizon, the average absolute value change in the high-tax, risk-adjusted rankings was 9.2 percentiles compared to 9.7 percentiles shown in Table 4 for the non-risk-adjusted case. In the ten year subperiod from 1983-1992, the average change was 7.7 percentiles for the reward-to-variability ratios versus 8.3 percentiles for the average returns (see Table 5). The mid-tax and low-tax ranking differences are even smaller between the risk and no-risk cases[25].

A quick glance at Appendix C suggests that shareholder level taxation for high tax rate individuals results in post-tax excess returns which vary relatively more than sample variances when compared with the corresponding pre-tax estimates. This fact implies that fund movements should be consistent with the previously discussed rank changes for funds based solely on post-tax return. Furthermore, at least for the reward-to-variability measure, conclusions about the effects of taxation on mutual fund rankings should not differ whether or not returns were risk-adjusted.

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[25] Tables for the risk-adjusted case which correspond to Tables 4 and 5 are available from the authors upon request.

V. After-Tax Returns and Turnover

We have shown that shareholder level taxation can dramatically change the relative rankings of mutual funds. An important issue for taxable investors deciding between the plethora of funds available is whether a fund's future relative post-tax performance movements might be inferred from its investment policies. Our basic intuition is that the amount a fund "turns over" its portfolio should be related to the amount of its taxable distributions to shareholders. Many of our funds churn their portfolios significantly over a single year (100 percent is not uncommon), possibly realizing capital gains as they accrue and, thus, subjecting their shareholders to tax liabilities. Those funds that do not turnover their portfolios and more closely adhere to a buy-and-hold strategy, the argument continues, realize less of their accrued gains, allowing their investors to defer capital gains taxes into the future.

The relationship between turnover and mutual fund performance has been discussed by a couple of authors. Ippolito (1989) presents evidence of no relationship between turnover and pre-tax performance net of fees and expenses. In other words, Ippolito finds that funds with high turnover rates earn sufficiently greater risk-adjusted returns to offset the costs (other than taxes) associated with increased turnover. Jeffrey and Arnott (1993) consider the relationship between turnover and after-tax returns. Assuming a thirty-five percent marginal tax rate for realized capital gains over the 1982-1991 period, they report a statistically significant correlation coefficient of approximately 0.4 between a fund's average turnover and the amount of taxes due from its capital gains distributions.

Jeffrey and Arnott (1993) conclude that taxable investors should consider funds with relatively passive investment strategies (i.e., low turnover) to avoid large tax liabilities. A

conclusion that high turnover funds may be unwise for shareholders subject to taxation, however, does not immediately follow. Consider a mutual fund with a high turnover rate that is successful at stock selection and market timing activities. A higher pre-tax return (assuming a dividend yield commensurate with other funds) implies there are more capital gains to realize. Hence, this fund will most likely impose a larger capital gains tax burden on its shareholders relative to other funds. However, if its pre-tax return is sufficiently large, taxable investors may still want to invest in this fund even if the shareholders will have to pay large amounts of realized capital gains taxes.

There is another reason why turnover rates might not be sufficient to determine appropriate investments for those shareholders subject to taxation. Since marginal tax rates on dividends were typically much higher than the marginal rates on realized capital gains over our sample period, a low turnover fund with a high dividend yield would be a very poor after-tax performer. Only since 1987, as a result of the Tax Reform Act of 1986, have dividends and realized capital gains been taxed at somewhat similar rates.

To consider the effect of turnover on after-tax performance, we computed average annual turnover rates for each of our funds over the ten year period 1983-1992 from Morningstar. These calculations are reported in Appendix B[26]. Consistent with our intuition, the fund with the lowest average turnover (Franklin Growth -- 3.2 percent) jumped from the 40.8 pre-tax percentile to the 74.2 percentile for a high-tax investor over the 1983-1992 period. The fund with the highest average turnover (Fidelity Value -- 296 percent), however, also dramatically

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[26] Turnover data for 1992 were not yet available for twenty-seven of our funds. We computed the nine-year average turnover rate for these cases.

improved its post-tax performance, jumping 35.4 percentiles (the largest increase over this period).

Table 7 reports sample correlation coefficients between average turnover rates and the ratio of post-tax value (liquidation) to pre-tax value[27]. The numbers in parentheses are p-values under the null hypothesis of zero correlation between after-tax performance and average turnover. We use ratios of post-tax to pre-tax measures instead of rank changes since the best performing funds typically outdistance other funds by large amounts, and their rankings may not change even if their post-tax to pre-tax ratios are lower than those of most other funds.

If our intuition is correct, we would expect negative correlations between turnover rates and the post-tax to pre-tax performance ratios. While Table 7 shows the correlations for our sample of mutual funds are mostly negative, none of the results are significant at the five percent level. Only the correlations between turnover and the ratio of liquidation value to pre-tax value for low- and mid-tax rate investors in growth funds are significant at the ten percent level. The liquidation correlations for the growth and income category are even of the wrong sign, though not significant. Similar to Ippolito's (1989) finding of no relationship between turnover and pre-tax returns, there seems to be no significant correlation between the amount a fund turns over its portfolio and the percentage of its pre-tax value that must be paid in taxes.

Table 7 is certainly not a formal test of the relationship between turnover and relative post-tax performance. It does intimate, however, that funds with higher turnover rates may still be good investments for the tax conscious investor. This point is further illustrated by the example

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[27] Because of the problems associated with risk-adjusting after-tax returns discussed in the previous section, we do not consider the relationship between turnover and risk-adjusted performance. This analysis is consistent with Jeffrey and Arnott (1993).

of Vanguard's Index 500 Fund discussed earlier. If this fund were able to defer all capital gains disbursements to its shareholders, it would have performed even better on an after-tax basis. Deferring capital gains relative to the S&P 500 index, however, necessarily implies that the fund would turnover its portfolio at a greater rate.

VI. Conclusion

Mutual funds seem to pay very little attention to shareholder level taxes. Funds publish long-term performance statistics which ignore taxes, and the financial press ranks them on these pre-tax measures. Many funds, perhaps most, realize large fractions of their accrued capital gains each year. This type of investment policy eliminates an investor's opportunity to defer taxes on accrued capital gains and adversely affects after-tax returns to a fund's shareholders.

We have calculated both pre- and post-tax mutual fund returns for individuals in different tax brackets over various investment horizons. While it is not surprising that taxes lower the accumulations that one can achieve with mutual fund investments over all holding periods, our calculations show that the relative rankings of funds on a post-tax basis (and on our liquidation basis) differ quite dramatically from the published pre-tax rankings. That is, taxable investors cannot easily and reliably determine which of two funds would have offered them a better after-tax return with the publicly available information. While we feel that more work is necessary to satisfactorily account for risk, this consideration does not dampen our main conclusion that after-tax performance rankings are very different from pre-tax performance rankings.

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Table 1

Mutual Fund Asset Composition
Growth and Growth and Income Funds
Year-end 1991
(millions of dollars)

Growth and Growth and Income Funds	
Total Net Assets	234,461.0
IRA Assets	47,681.8
Self-employed Retirement Plan Assets	5,823.0
Institutional Assets (est.)	67,799.1
Taxable Assets	111,157.1 (47.4%)

Source: Investment Company Institute (1992).

Institutional assets include fiduciaries, foundations and institutions, business organizations, and other institutional investors not classified.

Institutional assets were not available by investment objective. At the end of 1991, institutional assets represented 29.77 percent of the total assets of equity, bond, and income funds. The estimate of institutional assets, therefore, is taken to be 29.77 percent of the total net assets within each classification.

Table 2
Marginal Tax Rates for Three Investor Types

Year	Low Tax Rate		Middle Tax Rate		High Tax Rate	
	Income	K Gains	Income	K Gains	Income	K Gains
1963	20	10	26	13	59	25
1964	17.5	8.75	27	13.5	53.5	25
1965	16	8	25	12.5	50	25
1966	17	8.5	25	12.5	50	25
1967	17	8.5	25	12.5	53	25
1968	18.275	9.1375	26.875	13.4375	56.975	25
1969	18.7	9.35	30.8	15.4	58.3	25
1970	19.475	9.7375	28.7	14.35	56.375	25
1971	17	8.5	28	14	55	25
1972	19	9.5	28	14	55	25
1973	19	9.5	28	14	58	25
1974	19	9.5	32	16	58	25
1975	19	9.5	32	16	58	25
1976	19	9.5	32	16	60	25
1977	19	9.5	36	18	60	25
1978	19	**	36	**	62	**
1979	18	7.2	37	14.8	64	25
1980	18	7.2	43	17.2	64	25
1981	17.775	7.11	42.4625	16.985	63.2	25
1982	16	6.4	39	15.6	50	20
1983	15	6	35	14	50	20
1984	16	6.4	33	13.2	49	19.6
1985	16	6.4	33	13.2	49	19.6
1986	16	6.4	33	13.2	49	19.6
1987	15	15	28	28	38.5	28
1988	15	15	28	28	33	28
1989	15	15	28	28	33	28
1990	15	15	28	28	33	28
1991	15	15	28	28	31	28
1992	15	15	28	28	31	28

** The marginal tax rate on long-term capital gain realizations in 1978 is the lesser of 50% of the income rate or 25% for realizations made from January through October. For November and December capital gains realizations, the marginal rate is the lesser of 40% of the income rate or 25%.

Source: Pechman (1987) and Internal Revenue Service, *Statistics of Income* (*SOI*), various years.

Taxable income for the low tax rate individual is computed as the median adjusted gross income (AGI) (computed from *SOI*) less the standard deduction for married couples and less three exemptions. Taxable incomes for the middle and high tax rate individuals are comparably calculated using three times median AGI and ten times median AGI respectively. Median AGI for 1990-1992 is held constant (in real terms) at the 1989 level.

Table 3
Mutual Fund Returns
30 Year and 10 Year Periods (1963-1992)
(Nominal value of $1 investment)

Method	Regime	30 Year horizon (1963-1992) Number of Funds = 62 (Pre-tax S&P 500 = 22.13) TBills	Min	Median	Max	Std Dev
Pre-Tax	N/A	6.91	8.45	21.89	76.03	12.91
Post-Tax Values	Low Tax	4.97	7.06	16.45	61.72	10.06
	Mid Tax	3.69	5.98	12.82	51.22	8.18
	High Tax	2.53	4.66	9.87	41.84	6.61
Liquidation Values	Low Tax	4.97	6.59	15.95	56.21	9.28
	Mid Tax	3.69	5.29	12.06	42.41	6.88
	High Tax	2.53	4.48	9.17	34.50	5.51

		Subperiod #1 (1963-72) Number of Funds = 62 (Pre-tax S&P 500 = 2.58)					Subperiod #2 (1973-82) Number of Funds = 126 (Pre-tax S&P 500 = 1.91)					Subperiod #3 (1983-92) Number of Funds = 147 (Pre-tax S&P 500 = 4.50)				
Method	Tax Rate	TBills	Min	Med	Max	StdDev	TBills	Min	Med	Max	StdDev	TBills	Min	Med	Max	StdDev
Pre-Tax	N/A	1.57	1.31	2.72	5.40	0.73	2.25	1.18	2.33	7.31	1.19	1.96	2.48	3.78	6.44	0.64
Post-Tax Values	Low	1.45	1.24	2.53	5.14	0.71	1.94	1.11	2.15	6.90	1.10	1.77	2.25	3.35	5.38	0.58
	Mid	1.39	1.21	2.43	5.00	0.70	1.67	1.06	1.98	6.50	1.01	1.60	2.05	2.96	4.80	0.55
	High	1.23	1.12	2.20	4.66	0.68	1.38	0.99	1.79	6.01	0.93	1.49	2.01	2.81	4.64	0.53
Liquidation Values	Low	1.45	1.29	2.49	4.88	0.65	1.94	1.12	2.12	6.60	1.05	1.77	2.21	3.25	5.23	0.51
	Mid	1.39	1.28	2.38	4.63	0.61	1.67	1.07	1.92	5.81	0.90	1.60	1.99	2.83	4.32	0.41
	High	1.23	1.24	2.12	4.00	0.52	1.38	1.02	1.73	5.18	0.79	1.49	1.94	2.67	4.18	0.40

Table 4
Percentile Differences of Rankings
30 Year Period (1963-1992)
Number of Funds = 62
(absolute deviations)

Comparison	Tax Regime	Max (-)	Med	Max (+)	Mean
Post-Tax v. Pre-Tax	Low	11.3	1.6	12.9	3.0
	Mid	21.0	4.8	25.8	6.2
	High	24.2	8.1	41.9	9.7
Liquidation v. Pre-Tax	Low	8.1	1.6	6.5	2.2
	Mid	12.9	4.0	12.9	4.6
	High	21.0	8.1	22.6	8.5
Liquidation v. Post-Tax	Low	6.5	1.6	4.8	1.7
	Mid	14.5	1.6	9.7	3.1
	High	19.4	1.6	9.7	3.2

Max(-) reports the percentile point reduction for the fund with the largest relative ranking decrease. Med is the median absolute value difference among the sample of funds. Max(+) gives the percentile point increase for the fund with the largest relative ranking increase. Mean is the average absolute percentile change within the sample.

Table 5
Percentile Differences of Rankings
10 Year Subperiods (1963-1992)
(absolute deviations)

Comparison	Tax Rate	Subperiod #1 (1963-72) Number of Funds= 62				Subperiod #2 (1973-82) Number of Funds = 126				Subperiod #3 (1983-92) Number of Funds = 147			
		Max(-)	Med	Max(+)	Mean	Max(-)	Med	Max(+)	Mean	Max(-)	Med	Max(+)	Mean
Post-Tax v. Pre-Tax	Low	6.5	1.6	6.5	1.9	7.1	1.6	7.1	1.7	16.3	2.7	20.4	3.6
	Mid	11.3	1.6	9.7	3.0	10.3	2.4	10.3	3.3	29.9	4.8	31.3	6.9
	High	17.7	3.2	14.5	4.9	15.9	4.8	16.7	5.2	29.3	6.1	35.4	8.1
Liquidation v. Pre-Tax	Low	6.5	0.0	9.7	1.0	5.6	0.8	4.0	1.2	5.4	1.4	7.5	1.4
	Mid	8.1	1.6	11.3	1.5	8.7	1.6	7.9	2.3	9.5	2.0	11.6	2.7
	High	9.7	1.6	14.5	3.1	11.9	3.6	15.0	4.0	15.7	3.4	21.8	4.6
Liquidation v. Post-Tax	Low	6.5	1.6	6.5	1.4	4.0	0.0	3.2	0.6	12.9	2.0	14.3	2.7
	Mid	8.1	1.6	8.1	2.0	5.6	0.8	4.0	1.3	21.1	3.4	24.5	5.1
	High	11.3	1.6	9.7	2.9	5.6	1.2	6.4	1.5	23.1	3.4	22.5	4.9

Max(-) reports the percentile point reduction for the fund with the largest relative ranking decrease. Med is the median absolute value difference among the sample of funds. Max(+) gives the percentile point increase for the fund with the largest relative ranking increase. Mean is the average absolute percentile change within the sample.

Table 6
High-Tax v. Low-Tax Percentile Differences
30 Year Period and 10 Year Subperiods
(Absolute Deviations)

30 Year Horizon (1963-1992)
Number of Funds = 62

	Max (-)	Median	Max (+)	Mean
Post-Tax Return	19.4	6.5	29.0	7.0
Liquidation Return	16.1	6.5	16.1	6.6

10 Year Subperiods

	Subperiod #1 (1963-72) Number of Funds= 62				Subperiod #2 (1973-82) Number of Funds = 126				Subperiod #3 (1983-92) Number of Funds = 147			
	Max(-)	Med	Max(+)	Mean	Max(-)	Med	Max(+)	Mean	Max(-)	Med	Max(+)	Mean
Post-Tax Return	11.3	1.6	8.1	3.1	10.3	3.2	12.7	3.6	17.0	3.4	22.5	4.9
Liquidation Return	6.5	1.6	8.1	2.3	9.5	2.4	11.1	2.9	10.9	2.7	14.3	3.6

Max(-) reports the percentile point reduction for the fund with the largest relative ranking decrease. Med is the median absolute value difference among the sample of funds. Max(+) gives the percentile point increase for the fund with the largest relative ranking increase. Mean is the average absolute percentile change within the sample.

Table 7
Turnover Correlations
10 Year Subperiod (1983-92)
(p-values in parenthese)

		Growth	Growth & Inc	Overall
No. of Funds		96	51	147
Avg Turnover (%)		84.83	65.99	78.29
Post-Tax Value over Pre-Tax Value	Low	-0.11 (0.294)	-0.22 (0.119)	-0.10 (0.234)
	Mid	-0.11 (0.275)	-0.22 (0.113)	-0.10 (0.227)
	High	-0.11 (0.278)	-0.23 (0.110)	-0.09 (0.287)
Post-Tax Liquid. over Pre-Tax Value	Low	-0.17 (0.100)	0.05 (0.746)	-0.08 (0.334)
	Mid	-0.17 (0.098)	0.08 (0.580)	-0.07 (0.415)
	High	-0.17 (0.106)	0.02 (0.870)	-0.05 (0.499)

Average turnover is the annual average of turnover percentages reported by Morningstar. Turnover data for 1992 were not yet available and a nine-year average was computed for twenty seven of the funds in our sample.

The numbers in the table refer to the correlation across the sample of funds between a fund's average turnover and its ratio of post-tax value (liquidation) to pre-tax value over the ten year sample period. The numbers in parentheses represent p-values under the null hypothesis of zero correlation.

Figure 1
Pre-Tax v. High-Tax Percentile Ranks
30 Year Period (1963-1992)

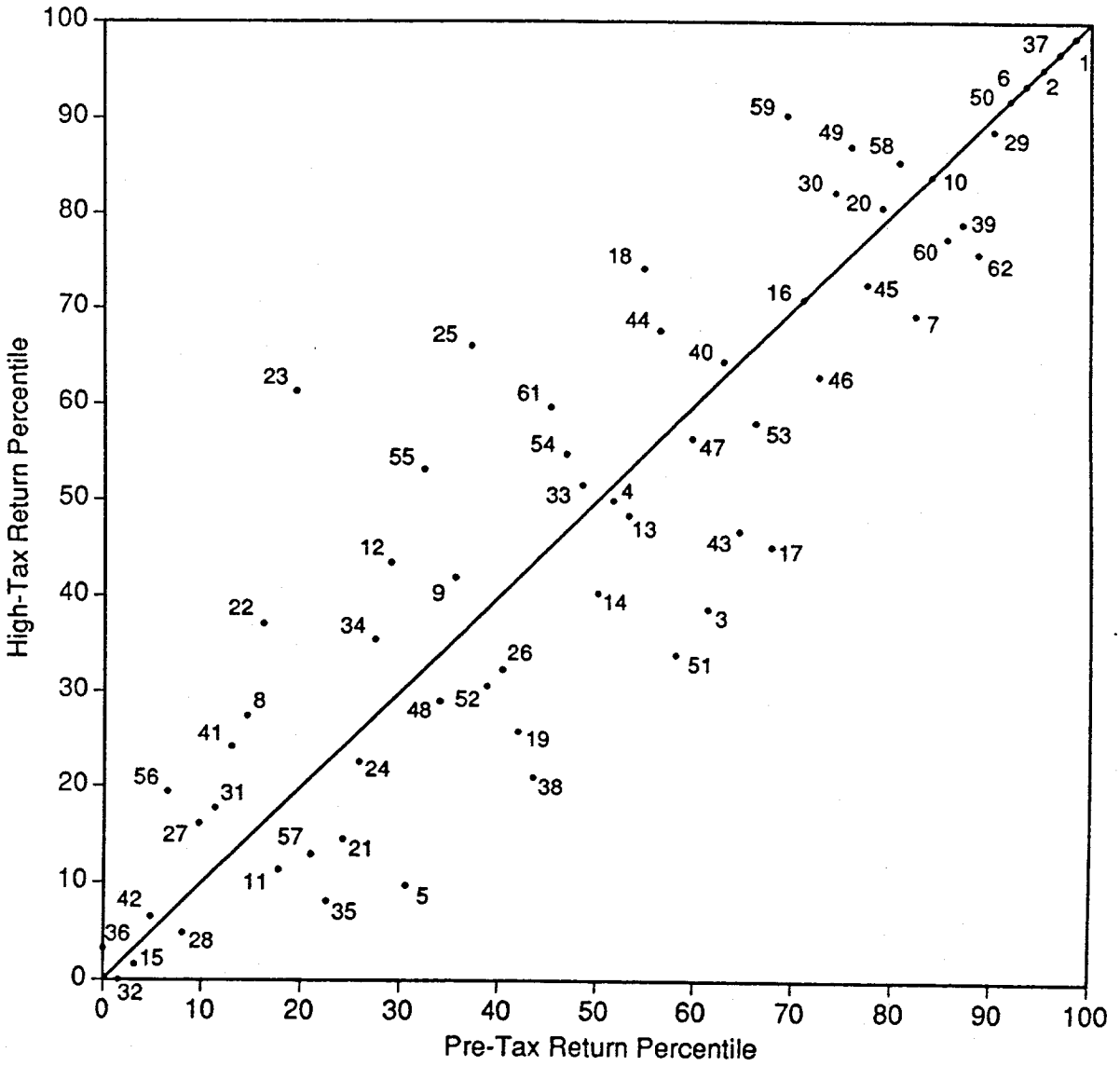


Figure 2
Pre-Tax v. Mid-Tax Percentile Ranks
30 Year Period (1963-1992)

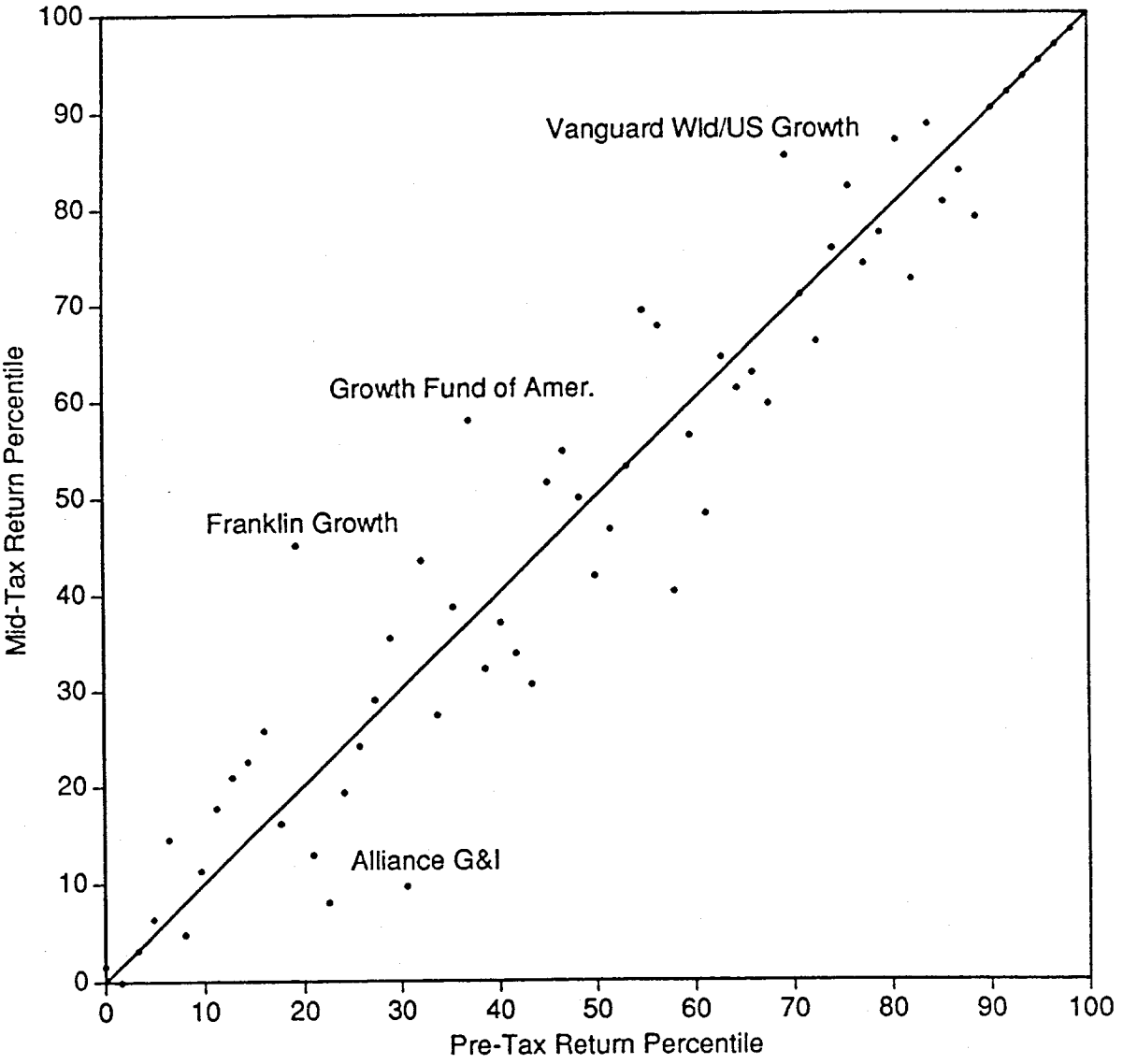


Figure 3
Pre-Tax v. Low-Tax Percentile Ranks
30 Year Period (1963-1992)

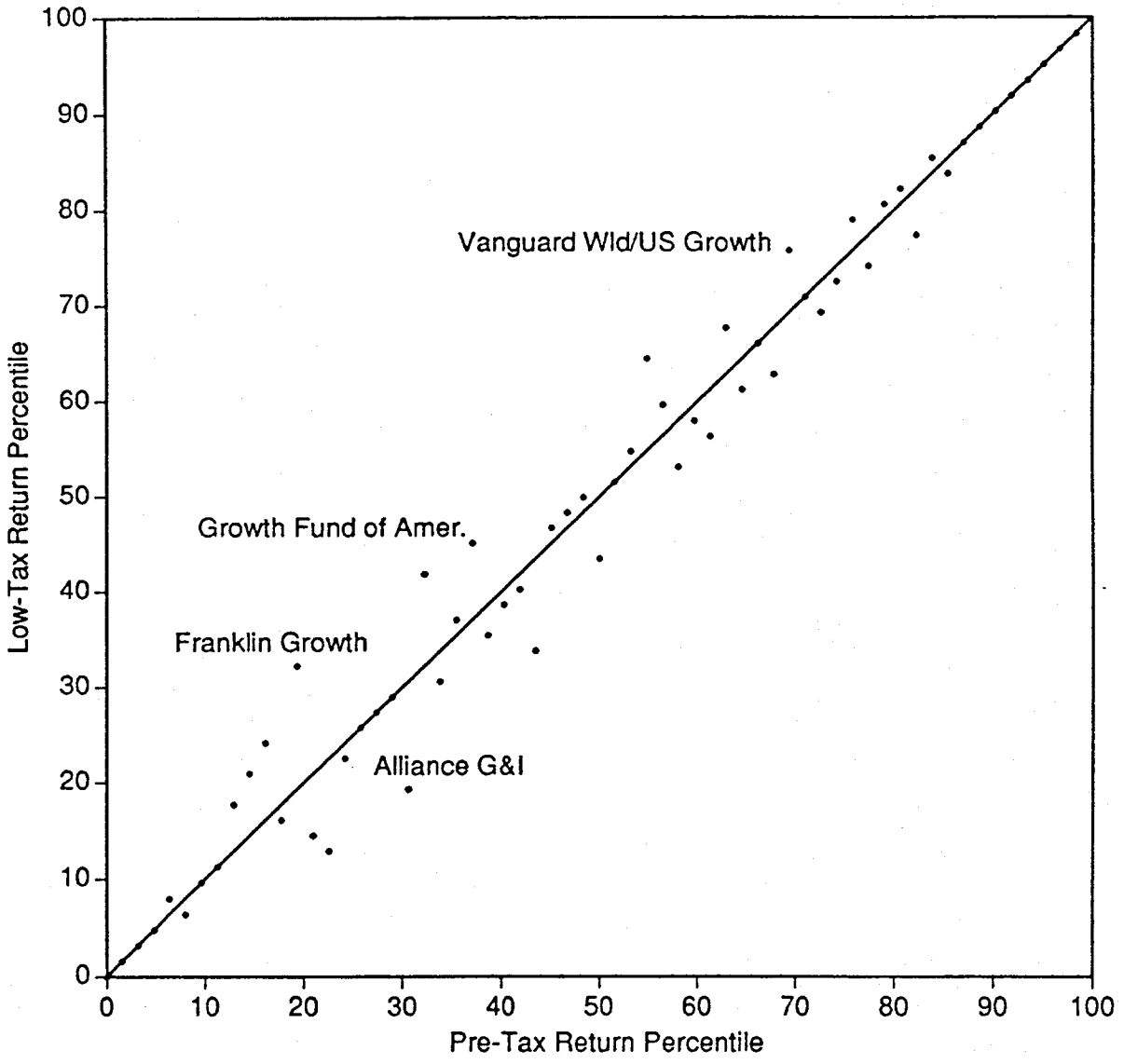


Figure 4
Rank Comparisons With High-Tax Liquidation Values
30 Year Period (1963-1992)

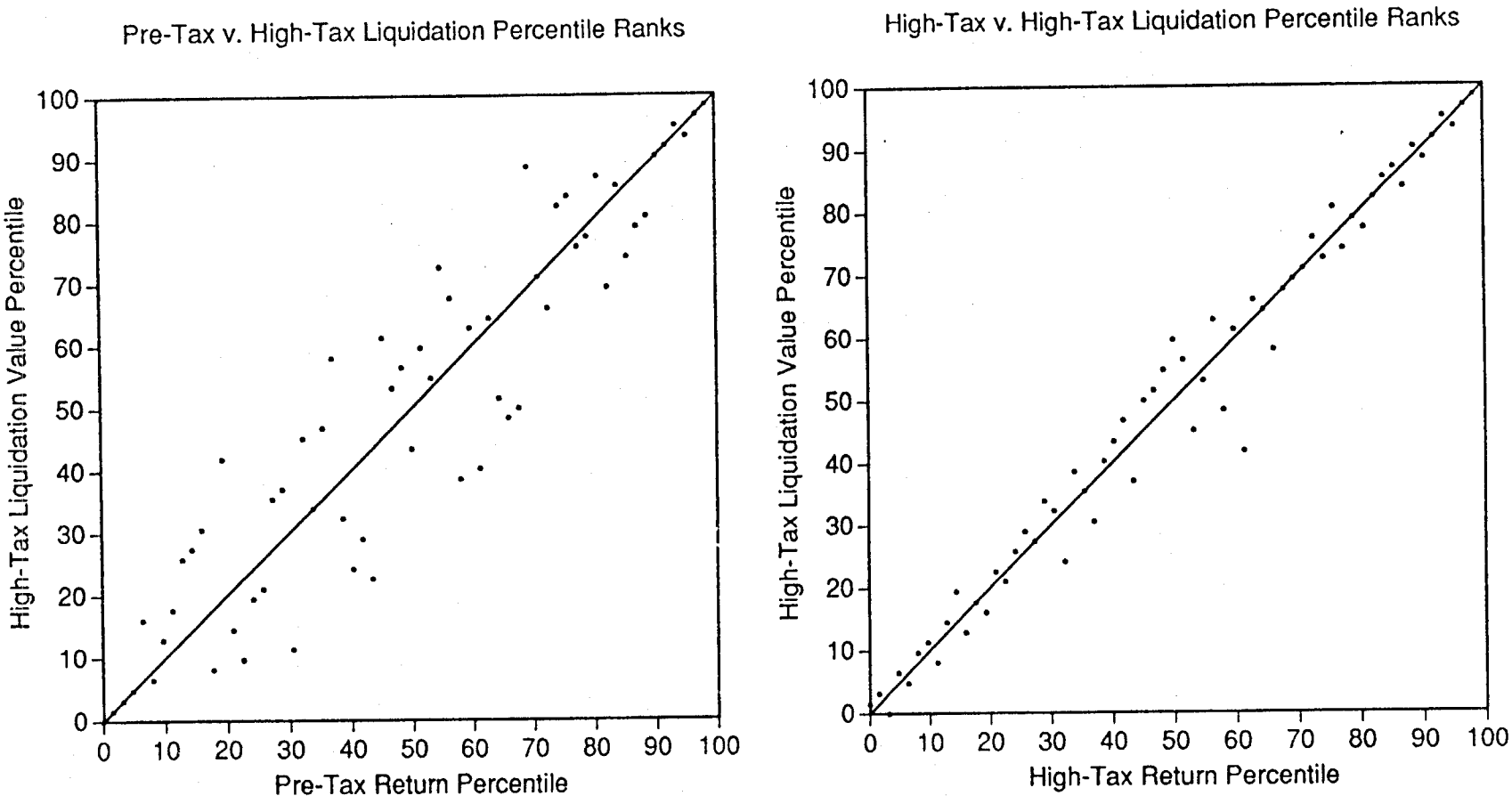


Figure 5
Rank Comparisons With Low-Tax Liquidation Values
30 Year Period (1963-1992)

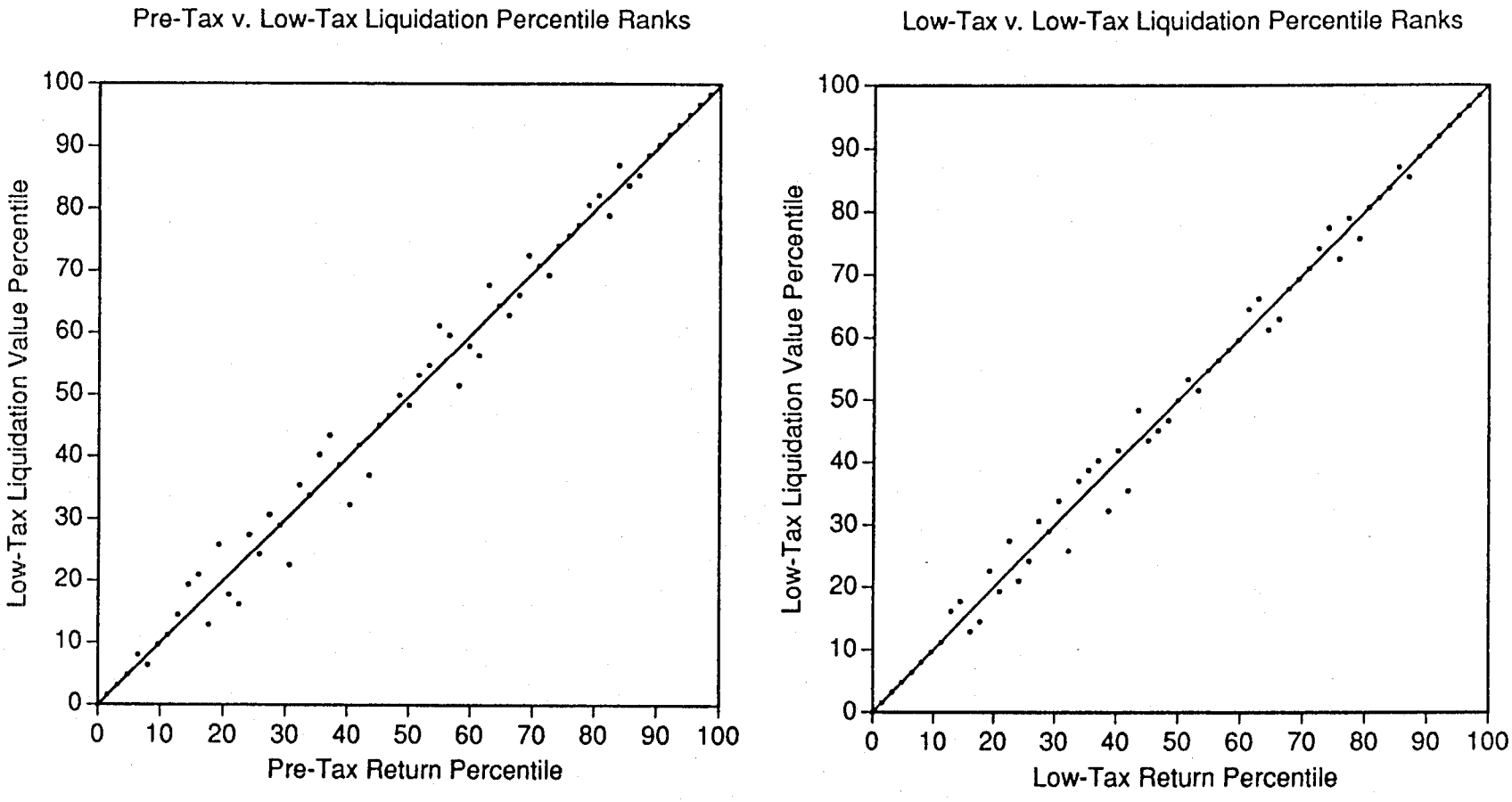


Figure 6
Pre-Tax v. High-Tax Percentile Ranks
10 Year Subperiod (1983-1992)

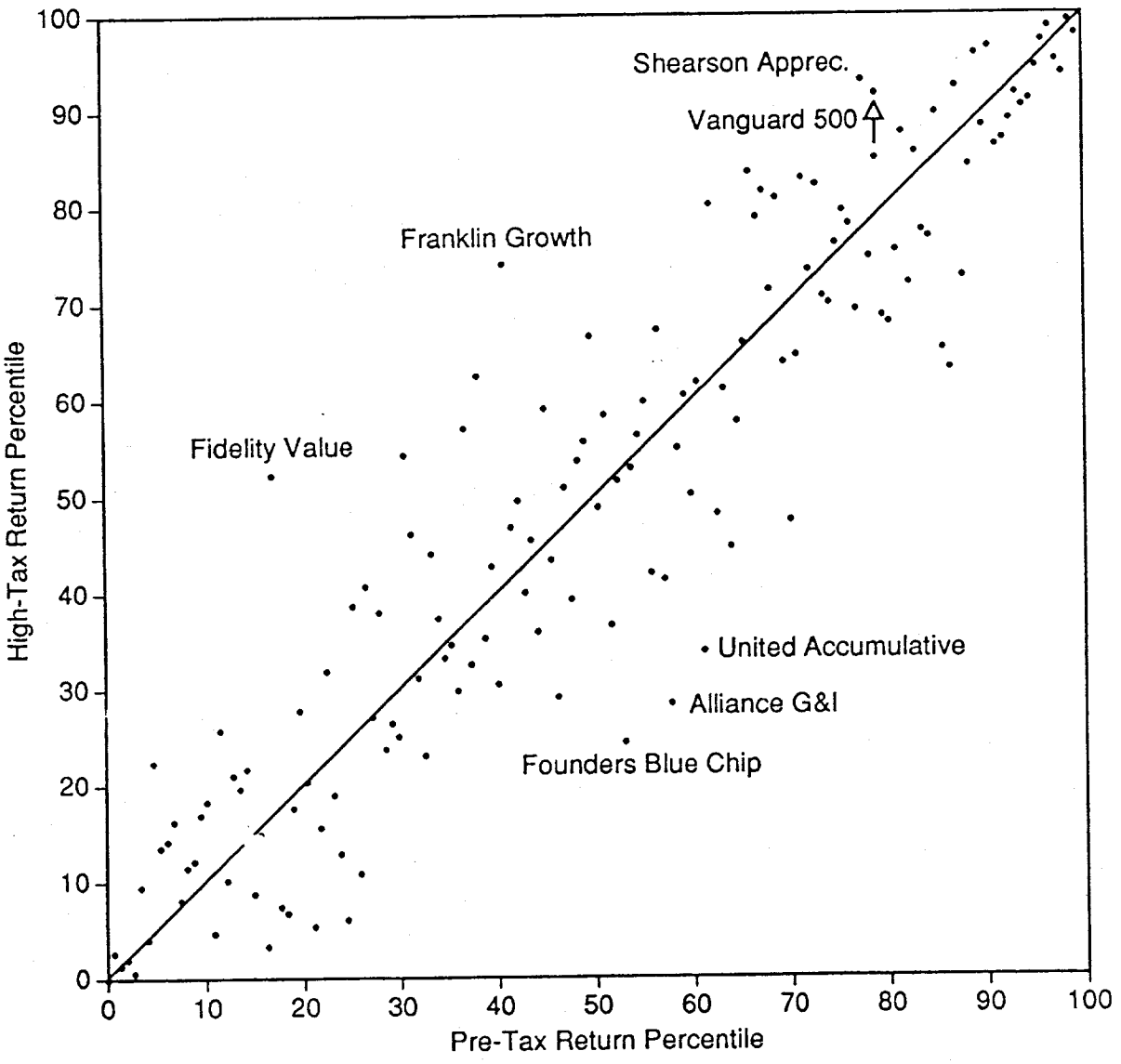


Figure 7
Pre-Tax v. Mid-Tax Percentile Ranks
10 Year Subperiod (1983-1992)

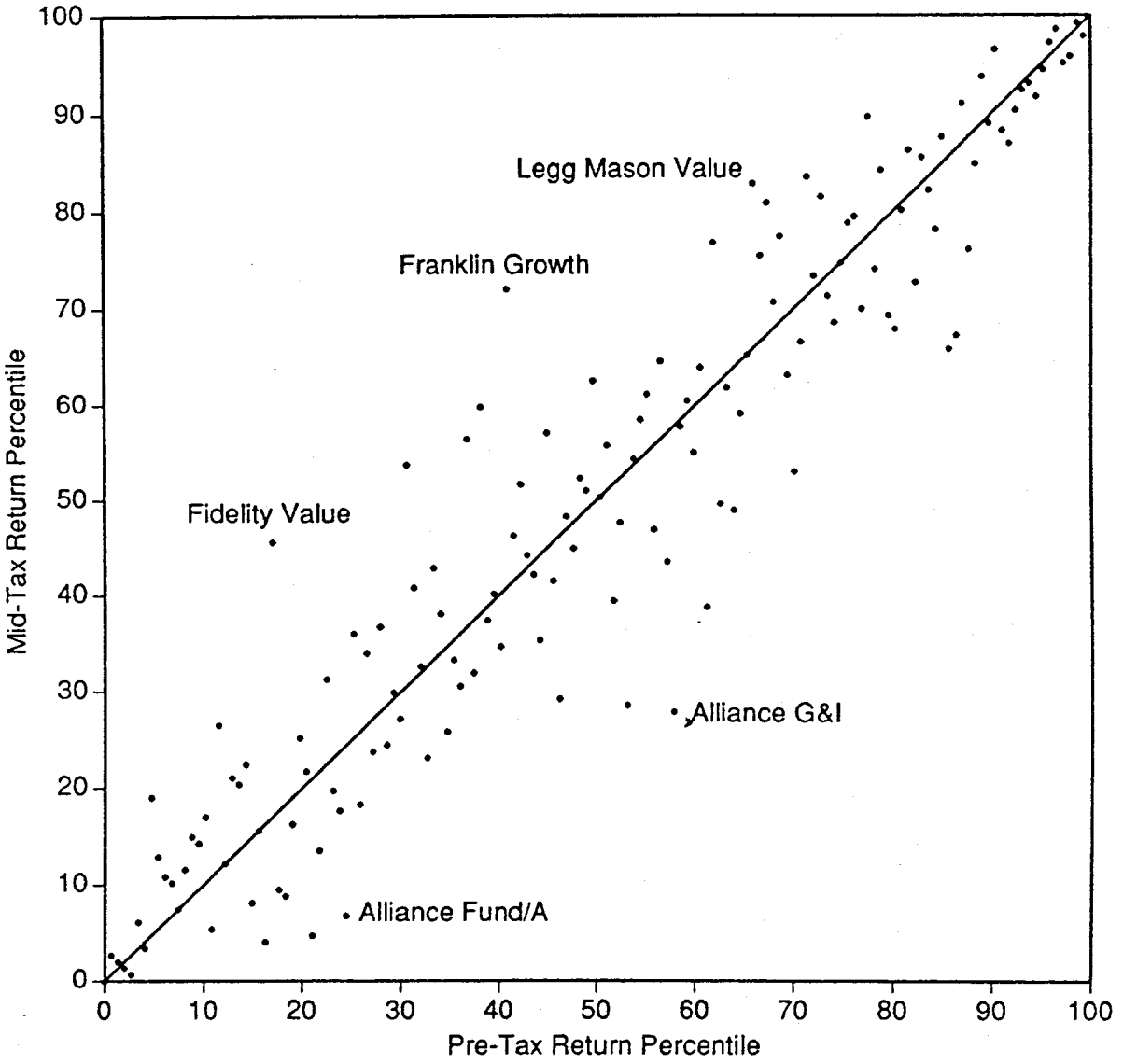


Figure 8
Pre-Tax v. Low-Tax Percentile Ranks
10 Year Subperiod (1983-1992)

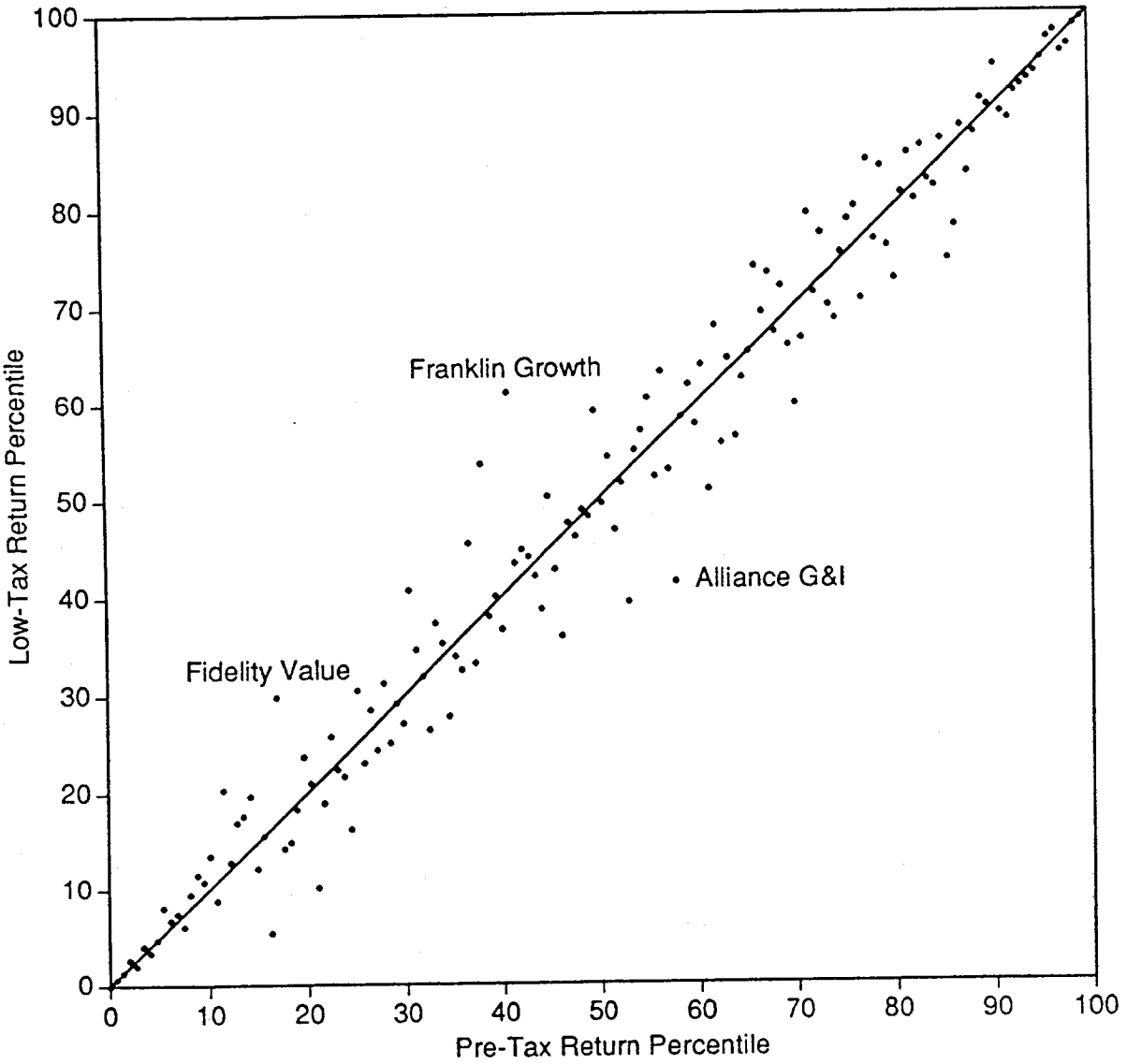


Figure 9
Rank Comparisons with High-Tax Liquidation Values
10 Year Subperiod (1983-1992)

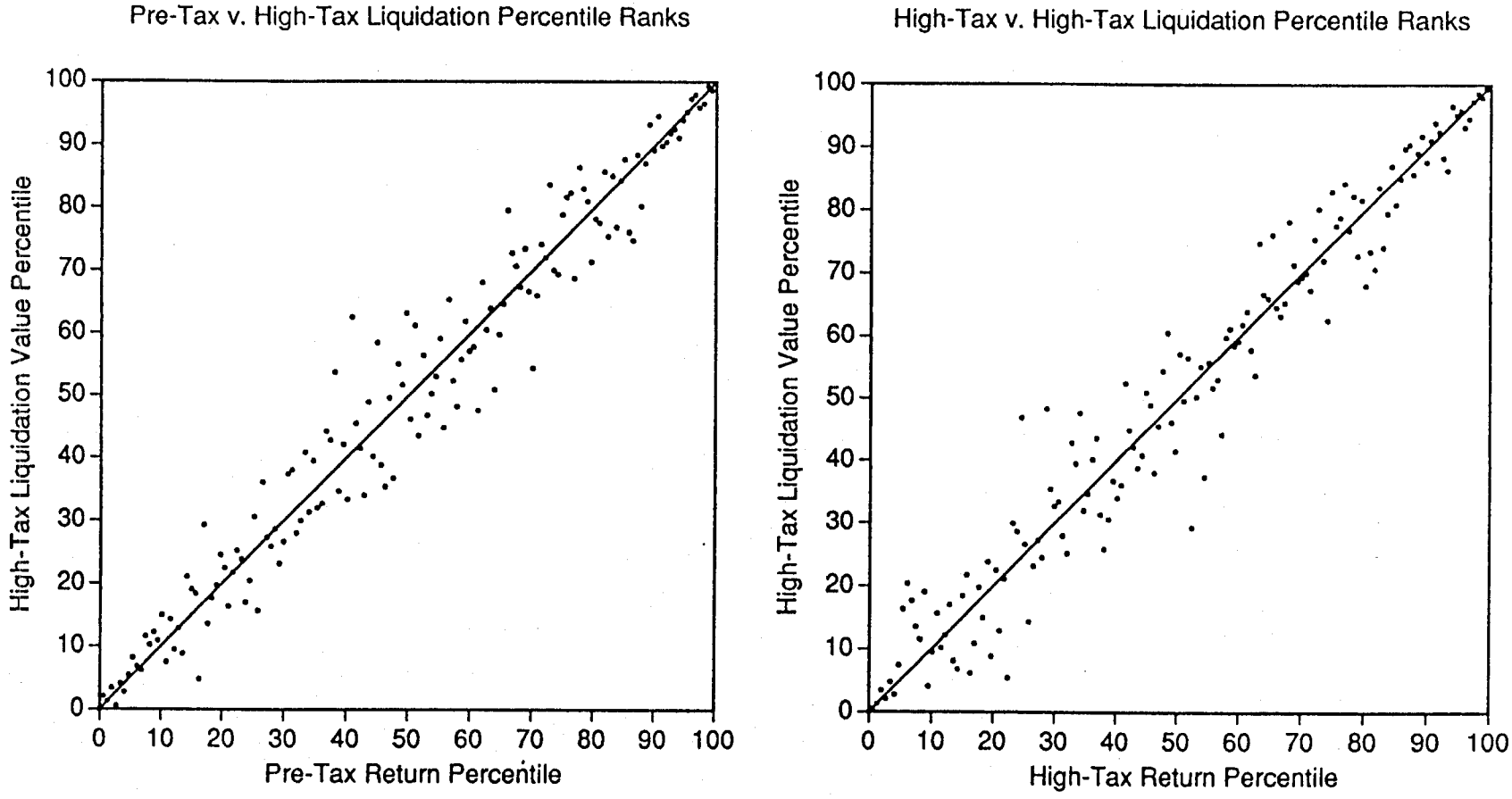
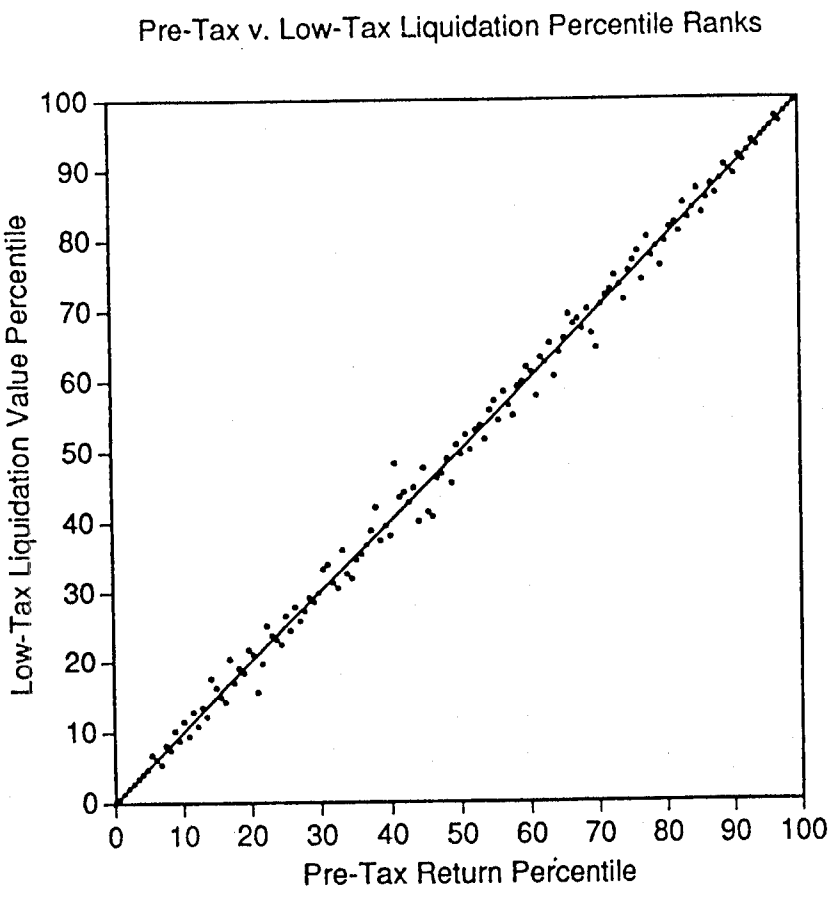


Figure 10
Rank Comparisons with Low-Tax Liquidation Values
10 Year Subperiod (1983-1992)



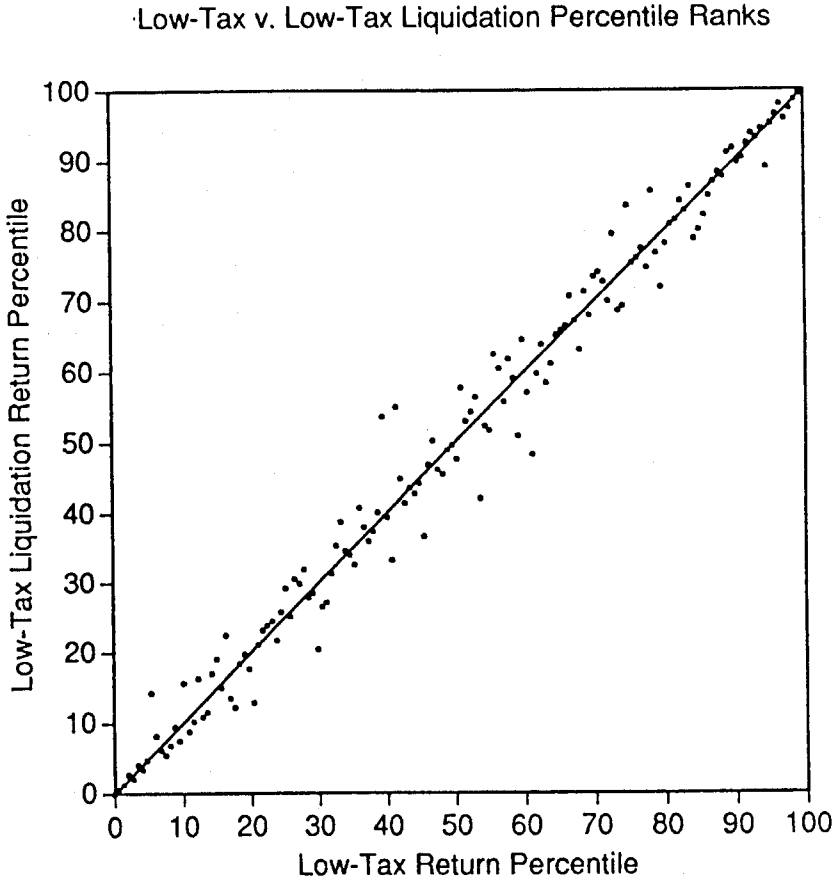


Figure 11
High-Tax Return v. Standard Deviation
30 Year Period (1963-1992)

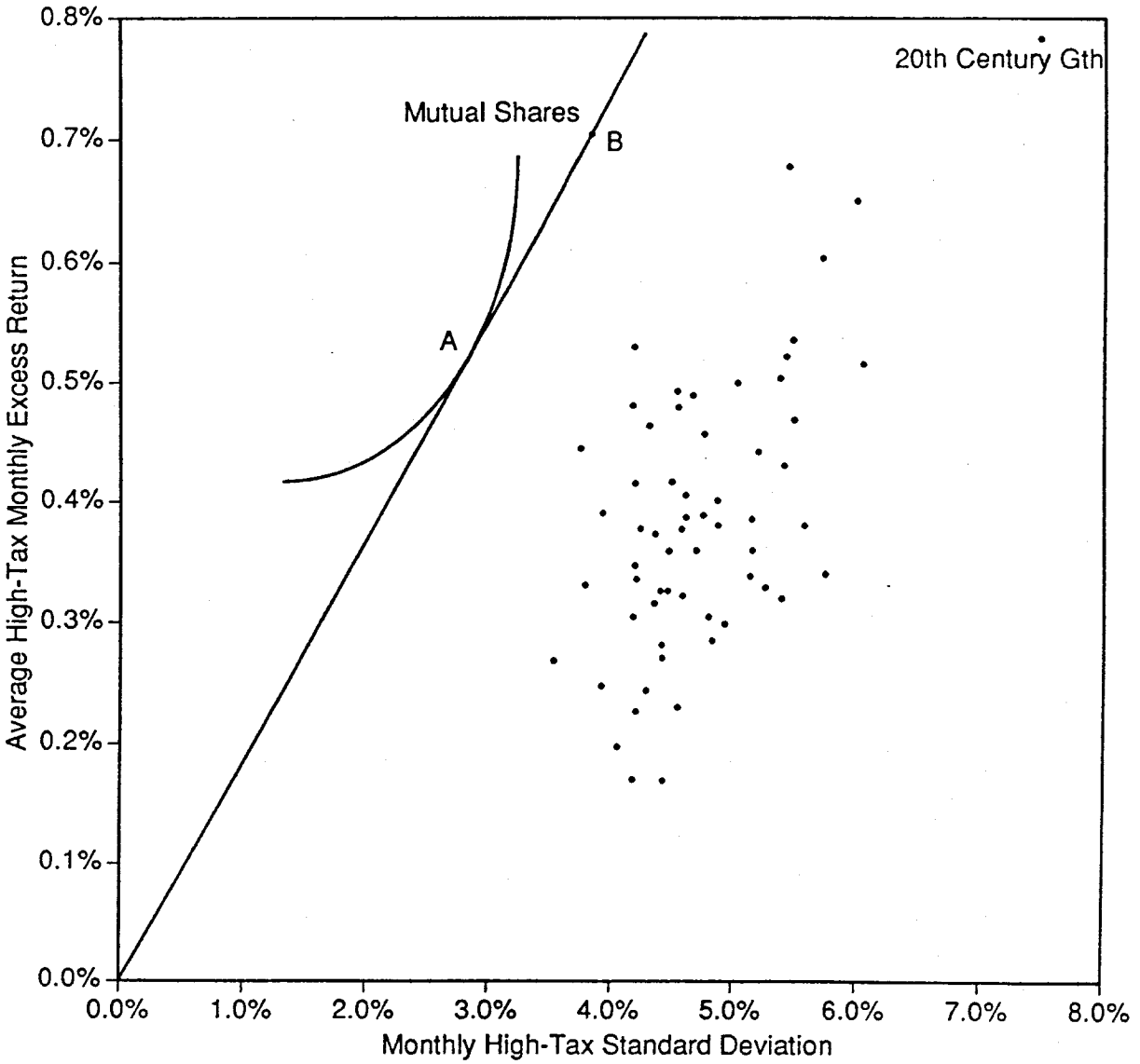
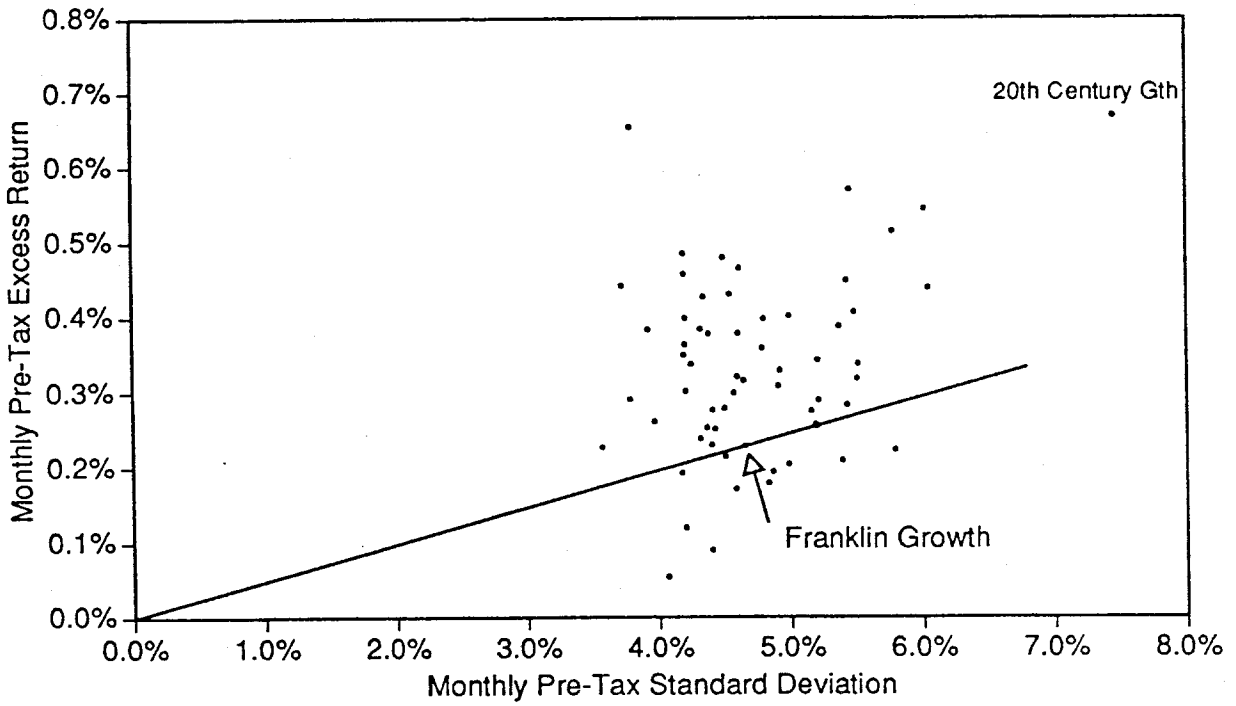
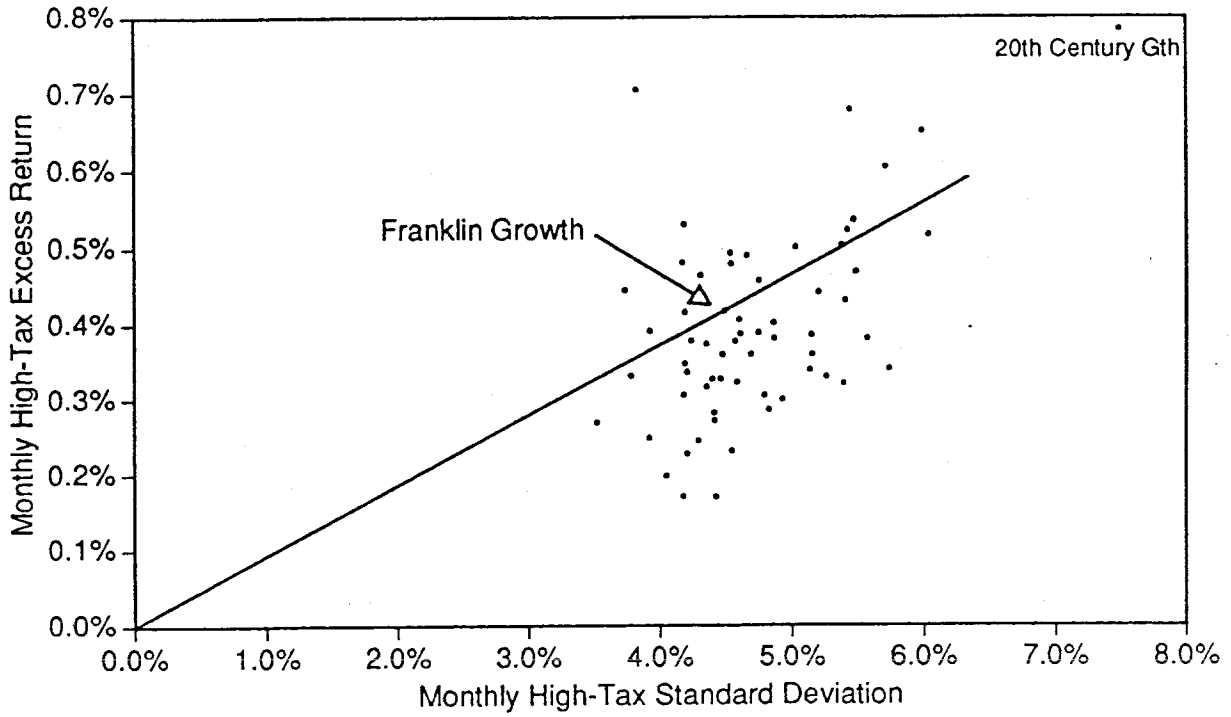


Figure 12
High-Tax v. Pre-Tax Risk Adjusted Returns
30 Year Period (1963-1992)





APPENDIX A
30 year returns and percentile rankings (1963-1992)
(Value of $1000 invested at beginning of period)

Code	Fund Name	Type	Pre-Tax		High Tax Bracket				Middle Tax Bracket				Low Tax Bracket			
					Post-Tax		Liquidation		Post-Tax		Liquidation		Post-Tax		Liquidation	
			Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile
1	20th Century Growth	G	76,026	98.4	41,837	98.4	34,501	98.4	51,218	98.4	42,405	98.4	61,721	98.4	56,208	98.4
2	20th Century Select	G	53,271	95.2	28,698	95.2	23,869	93.5	35,769	95.2	29,868	95.2	42,705	95.2	39,136	95.2
3	Affiliated Fund	GI	25,496	61.3	8,800	38.7	8,438	40.3	12,747	48.4	12,248	51.6	17,555	56.5	17,216	56.5
4	Alliance Fund (A)	G	22,600	51.6	9,919	50.0	9,915	59.7	12,636	46.8	12,672	56.5	16,567	51.6	16,576	53.2
5	Alliance G&I (A)	GI	17,712	30.6	6,172	9.7	6,439	11.3	8,485	9.7	8,845	17.7	11,950	19.4	12,190	22.6
6	A-C Enterprise Fund (A)	G	48,806	93.5	26,056	93.5	23,937	95.2	30,984	93.5	28,640	93.5	38,243	93.5	36,877	93.5
7	American Mutual	GI	33,677	82.3	12,469	69.3	11,230	69.3	17,855	72.6	16,149	72.6	23,842	77.4	22,713	79.0
8	Babson Growth	G	15,025	14.5	8,172	27.4	7,605	27.4	9,751	22.6	9,137	21.0	11,973	21.0	11,618	19.4
9	Boston Co. Capital Apprec	G	18,874	35.5	9,192	41.9	8,921	46.8	11,309	38.7	11,039	41.9	14,414	37.1	14,286	40.3
10	Capstone US Trend	G	34,672	83.9	15,431	83.9	14,405	85.5	20,502	88.7	19,207	88.7	26,146	85.5	25,321	87.1
11	Colonial Fund/A	GI	15,671	17.7	6,645	11.3	5,912	8.1	9,144	16.1	8,152	11.3	11,673	16.1	11,024	12.9
12	Colonial Grth Shares/A	G	17,511	29.0	9,213	43.5	8,297	37.1	11,178	35.5	10,081	30.6	13,638	29.0	12,969	29.0
13	Dreyfus Fund	GI	23,219	53.2	9,822	48.4	9,414	54.8	12,991	53.2	12,503	54.8	17,150	54.8	16,827	54.8
14	Eaton Vance Growth Fund	G	21,972	50.0	9,187	40.3	8,867	43.5	12,142	41.9	11,705	45.2	16,041	43.5	15,734	48.4
15	Eaton Vance Stock Fund	GI	10,667	3.2	4,680	1.6	4,634	3.2	6,087	3.2	6,020	3.2	7,889	3.2	7,841	3.2
16	Elfun Trusts	G	28,892	71.0	13,033	71.0	11,593	71.0	16,877	71.0	15,086	71.0	21,773	71.0	20,621	71.0
17	Fidelity Fund	GI	27,411	67.7	9,651	45.2	9,254	50.0	13,905	59.7	13,348	62.9	19,074	62.9	18,677	66.1
18	Fidelity Trend	G	23,392	54.8	13,604	74.2	11,740	72.6	16,169	69.3	14,032	67.7	19,148	64.5	17,862	61.3
19	Financial Indus. Fund	G	20,279	41.9	8,048	25.8	7,711	29.0	11,092	33.9	10,633	38.7	14,739	40.3	14,422	41.9
20	Fortis Capital Fund	G	32,328	79.0	14,796	80.7	13,066	77.4	19,097	77.4	16,906	75.8	24,517	80.7	23,063	80.7
21	Founders Blue Chip	GI	17,120	24.2	6,969	14.5	7,068	19.4	9,205	19.4	9,383	24.2	12,343	22.6	12,477	27.4
22	Franklin Equity Fund	G	15,545	16.1	8,610	37.1	7,876	30.6	10,467	25.8	9,608	25.8	12,596	24.2	12,080	21.0
23	Franklin Growth	G	15,780	19.4	10,851	61.3	8,693	41.9	12,560	45.2	10,095	32.3	13,822	32.3	12,402	25.8
24	Fundamental Investors	GI	17,220	25.8	7,863	22.6	7,108	21.0	10,326	24.2	9,345	22.6	13,004	25.8	12,379	24.2
25	Growth Fund of America	G	19,153	37.1	11,845	66.1	9,882	58.1	13,817	58.1	11,553	43.5	16,050	45.2	14,701	43.5
26	J Hancock Sovergn Invest	GI	19,640	40.3	8,288	32.3	7,387	24.2	11,239	37.1	10,044	27.4	14,478	38.7	13,698	32.3
27	IDS Equity Plus	GI	13,974	9.7	7,056	16.1	6,515	12.9	8,720	11.3	8,074	8.1	10,908	9.7	10,494	9.7
28	IDS Stock Fund Inc	GI	13,865	8.1	5,738	4.8	5,646	6.5	7,513	4.8	7,399	6.5	10,067	6.5	9,989	6.5
29	Investment Co. of America	GI	39,260	90.3	16,946	88.7	14,722	90.3	22,876	90.3	19,980	90.3	29,273	90.3	27,401	90.3
30	Ivy Growth Fund	G	29,227	74.2	15,205	82.3	13,884	82.3	18,686	75.8	17,197	79.0	23,143	72.6	22,280	74.2
31	Keystone K-2	G	14,477	11.3	7,420	17.7	6,962	17.7	9,172	17.7	8,625	16.1	11,338	11.3	10,988	11.3
32	Keystone S-1	GI	9,611	1.6	4,659	0.0	4,485	1.6	5,983	0.0	5,754	1.6	7,467	1.6	7,315	1.6
33	Keystone S-3	G	21,811	48.4	9,930	51.6	9,505	56.5	12,897	50.0	12,362	53.2	16,521	50.0	16,166	50.0
34	Mass. Invsts Growth Stock	G	17,340	27.4	8,547	35.5	8,127	35.5	10,566	29.0	10,075	29.0	13,376	27.4	13,052	30.6
35	Mass. Investors Trust	GI	16,298	22.6	6,096	8.1	6,130	9.7	8,393	8.1	8,426	12.9	11,398	12.9	11,415	16.1
36	Mutual Beacon Fund	G	8,450	0.0	5,150	3.2	4,484	0.0	6,060	1.6	5,287	0.0	7,055	0.0	6,594	0.0
37	Mutual Shares Fund	G	71,675	96.8	31,498	96.8	27,883	96.8	41,374	96.8	36,858	96.8	53,458	96.8	50,601	96.8
38	National Stock	G	20,444	43.5	7,560	21.0	7,352	22.6	10,643	30.6	10,377	33.9	14,360	33.9	14,176	37.1
39	Neuberger Guardian	GI	36,767	87.1	14,669	79.0	13,190	79.0	20,082	83.9	18,127	83.9	26,572	87.1	25,260	85.5
40	Neuberger Selected Sector	G	26,885	62.9	11,301	64.5	10,436	64.5	14,984	64.5	13,895	66.1	19,750	67.7	19,040	67.7
41	Oppenheimer Fund	G	14,762	12.9	8,012	24.2	7,469	25.8	9,725	21.0	9,111	19.4	11,755	17.7	11,393	14.5
42	Oppenheimer Total Return	GI	12,864	4.8	5,795	6.5	5,359	4.8	7,592	6.5	7,026	4.8	9,631	4.8	9,264	4.8
43	Penn Square Mutual	GI	26,946	64.5	9,803	46.8	9,282	51.6	13,951	61.3	13,232	61.3	18,879	61.3	18,386	64.5
44	Phoenix Growth Fund Ser.	G	23,708	56.5	12,344	67.7	10,942	67.7	15,229	67.7	13,555	64.5	18,766	59.7	17,731	59.7
45	Pioneer Fund	GI	32,012	77.4	13,390	72.6	12,477	75.8	17,999	74.2	16,878	74.2	23,398	74.2	22,709	77.4
46	Putnam Growth Income/A	GI	28,911	72.6	11,245	62.9	10,765	66.1	15,086	66.1	14,483	69.3	20,552	69.3	20,143	69.3

APPENDIX A
30 year returns and percentile rankings (1963-1992)
(Value of $1000 invested at beginning of period)

Code	Fund Name	Type	Pre-Tax		High Tax Bracket: Post-Tax		High Tax Bracket: Liquidation		Middle Tax Bracket: Post-Tax		Middle Tax Bracket: Liquidation		Low Tax Bracket: Post-Tax		Low Tax Bracket: Liquidation	
			Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile
47	Putnam Investors	G	25,143	59.7	10,205	56.5	10,193	62.9	13,180	56.5	13,190	59.7	17,715	58.1	17,728	58.1
48	Salomon Brothers Investrs	GI	18,709	33.9	8,178	29.0	8,126	33.9	10,522	27.4	10,484	37.1	13,819	30.6	13,809	33.9
49	Scudder Capital Growth	G	29,960	75.8	16,500	87.1	14,363	83.9	19,989	82.3	17,475	82.3	23,985	79.0	22,469	75.8
50	Security Equity	G	43,779	91.9	22,096	91.9	20,259	91.9	26,880	91.9	24,813	91.9	34,053	91.9	32,781	91.9
51	Seligman Common Stock	GI	24,267	58.1	8,475	33.9	8,386	38.7	12,009	40.3	11,888	46.8	16,636	53.2	16,536	51.6
52	Seligman Growth Fund	G	19,639	38.7	8,268	30.6	8,048	32.3	10,649	32.3	10,392	35.5	14,387	35.5	14,195	38.7
53	Sentinel Common Stock	GI	27,302	66.1	10,270	58.1	9,086	48.4	14,701	62.9	13,041	58.1	19,477	66.1	18,363	62.9
54	State Street Investment	G	21,545	46.8	10,152	54.8	9,284	53.2	13,025	54.8	11,959	48.4	16,370	48.4	15,717	46.8
55	SteinRoe Stock Fund	G	18,622	32.3	10,113	53.2	8,900	45.2	12,346	43.5	10,900	40.3	14,965	41.9	14,056	35.5
56	T. Rowe Price Growth Stk	G	13,258	6.5	7,558	19.4	6,819	16.1	8,979	14.5	8,143	9.7	10,768	8.1	10,268	8.1
57	United Accumulative	G	15,857	21.0	6,710	12.9	6,605	14.5	8,751	12.9	8,624	14.5	11,621	14.5	11,529	17.7
58	Value Line Fund	G	33,411	80.7	16,112	85.5	14,466	87.1	20,201	87.1	18,208	85.5	25,531	82.3	24,282	82.3
59	Vanguard World-US Grth	G	27,917	69.3	17,286	90.3	14,573	88.7	20,106	85.5	17,050	77.4	23,526	75.8	21,686	72.6
60	Washington Mutual Inv.	GI	35,607	85.5	14,196	77.4	12,273	74.2	19,943	80.7	17,329	80.7	26,026	83.9	24,296	83.9
61	William Blair Grth Shares	G	21,029	45.2	10,684	59.7	9,990	61.3	12,966	51.6	12,166	50.0	16,153	46.8	15,661	45.2
62	Windsor	GI	38,541	88.7	14,125	75.8	13,485	80.7	19,482	79.0	18,691	87.1	26,998	88.7	26,483	88.7

APPENDIX B
10-year returns and percentile rankings (1983-1992)
(Value of $1000 invested at beginning of period)

Fund Name	Type	Avg TO (%)	Pre-Tax		High Tax Bracket: Post-Tax		High Tax Bracket: Liquidation		Middle Tax Bracket: Post-Tax		Middle Tax Bracket: Liquidation		Low Tax Bracket: Post-Tax		Low Tax Bracket: Liquidation	
			Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile
20th Century Growth	G	104.6	4,553	87.1	3,731	92.5	3,256	88.4	3,856	91.2	3,366	88.4	4,182	88.4	3,899	87.8
20th Century Select	G	99.1	3,777	49.7	3,151	66.7	2,813	63.3	3,226	62.6	2,884	57.1	3,480	59.2	3,289	51.0
Affiliated Fund	GI	41.0	3,909	55.8	2,730	42.2	2,646	44.9	2,924	46.9	2,837	51.7	3,373	52.4	3,322	54.4
AIM Charter Fund	GI	137.4	3,960	59.2	3,024	60.5	2,790	61.9	3,169	60.5	2,924	61.2	3,536	61.9	3,390	59.9
AIM Growth Fund/C	G	55.2	3,265	15.0	2,325	8.8	2,373	19.1	2,452	8.2	2,502	17.7	2,821	12.2	2,850	16.3
AIM Weingarten Fund	G	91.0	5,235	96.6	4,381	98.6	3,720	98.0	4,547	98.6	3,863	98.0	4,874	98.0	4,485	97.3
Alliance Fund (A)	G	62.7	3,412	24.5	2,284	6.1	2,385	20.4	2,434	6.8	2,537	21.1	2,872	16.3	2,923	22.4
Alliance G&I (A)	GI	51.5	3,959	57.8	2,569	28.6	2,667	48.3	2,724	27.9	2,828	50.3	3,266	41.5	3,327	55.1
AMCAP	G	17.3	3,622	36.7	2,937	57.1	2,644	44.2	3,036	56.5	2,735	38.8	3,307	45.6	3,137	36.7
A-C Comstock/A	G	52.0	3,221	12.9	2,468	21.1	2,330	12.9	2,586	21.1	2,441	12.2	2,879	17.0	2,795	13.6
A-C Enterprise Fund (A)	G	92.4	3,544	32.6	2,502	23.1	2,500	29.9	2,631	23.1	2,627	29.9	3,042	26.5	3,036	30.6
A-C Growth & Income	GI	61.7	3,196	12.2	2,353	10.2	2,293	9.5	2,501	12.2	2,436	10.9	2,823	12.9	2,781	10.9
A-C Pace Fund (A)	G	40.3	3,056	6.1	2,392	14.3	2,272	6.8	2,481	10.9	2,358	6.1	2,745	6.8	2,677	6.1
American Leaders	GI	45.7	4,024	64.6	2,946	57.8	2,777	59.9	3,133	59.2	2,957	63.3	3,544	62.6	3,443	64.0
American Mutual	GI	20.4	3,895	54.4	2,904	56.5	2,701	53.1	3,086	58.5	2,875	55.1	3,460	57.1	3,340	55.8
American National Growth	G	50.2	2,795	2.0	2,097	2.0	2,109	3.4	2,179	1.4	2,190	2.7	2,461	2.7	2,465	2.0
Analytic Optioned Equity	GI	62.9	2,837	2.7	2,019	0.7	2,045	0.7	2,149	0.7	2,179	1.4	2,461	2.0	2,479	2.7
Babson Growth	G	26.3	3,267	15.7	2,396	15.0	2,371	18.4	2,520	15.7	2,495	16.3	2,860	15.7	2,843	15.0
Berger 100	G	130.8	4,763	90.5	4,115	96.6	3,423	94.6	4,145	96.6	3,449	89.8	4,427	94.6	4,032	89.1
Boston Co. Capital Apprec	G	75.0	3,632	37.4	2,625	32.6	2,638	42.9	2,749	32.0	2,765	42.9	3,148	33.3	3,160	38.8
Burnham Fund	GI	100.4	3,539	32.0	2,608	31.3	2,489	27.9	2,763	32.6	2,641	31.3	3,118	32.0	3,048	31.3
Capstone US Trend	G	63.8	3,240	14.3	2,471	21.8	2,391	21.1	2,605	22.4	2,519	19.7	2,903	19.7	2,851	17.7
Cardinal Fund Inc	GI	15.8	4,172	72.1	3,303	73.5	2,966	72.1	3,459	73.5	3,111	73.5	3,792	71.4	3,596	72.8
CGM Capital Development	G	218.1	6,440	99.3	4,294	98.0	4,079	98.6	4,527	98.0	4,296	98.6	5,380	99.3	5,234	99.3
Colonial Fund/A	GI	35.3	3,966	60.5	3,062	61.9	2,747	57.8	3,239	64.0	2,912	59.2	3,580	64.0	3,395	61.2
Colonial Grth Shares/A	G	68.9	3,769	49.0	2,896	55.8	2,696	51.7	2,970	51.0	2,767	43.5	3,329	48.3	3,212	45.6
Columbia Growth	G	143.2	3,860	52.4	2,831	51.7	2,743	56.5	2,951	47.6	2,859	53.7	3,361	51.7	3,305	53.1
Dean Witter Amer. Value	G	157.6	3,516	30.6	2,892	54.4	2,578	37.4	3,003	53.7	2,677	34.7	3,245	40.8	3,059	33.3
Dean Witter Div. Growth	GI	6.6	4,089	67.3	3,441	81.6	2,935	70.8	3,570	81.0	3,051	68.7	3,818	73.5	3,528	68.7
Dodge & Cox Stock	GI	10.7	4,411	83.0	3,551	85.7	3,106	85.0	3,730	85.7	3,267	86.4	4,055	86.4	3,793	85.0
Dreyfus Fund	GI	103.4	3,429	25.9	2,364	10.9	2,354	15.7	2,558	18.4	2,542	23.1	2,959	23.1	2,943	24.5
Dreyfus Grth Opportunity	G	83.8	3,419	25.2	2,694	38.8	2,501	30.6	2,817	36.0	2,617	27.9	3,097	30.6	2,980	26.5
Dreyfus Third Century	G	59.5	3,562	34.0	2,687	37.4	2,505	31.3	2,837	38.1	2,645	32.0	3,174	35.4	3,058	32.6
Eaton Vance Growth Fund	G	63.6	3,706	43.5	2,760	45.6	2,667	49.0	2,890	42.2	2,792	46.3	3,268	42.2	3,210	44.9
Eaton Vance Stock Fund	GI	45.8	3,851	51.7	2,685	36.7	2,643	43.5	2,862	39.5	2,819	48.3	3,308	46.9	3,283	50.3
Elfun Trusts	G	19.1	4,571	87.8	3,281	72.8	3,031	80.3	3,497	76.2	3,233	83.7	3,993	83.7	3,837	86.4
Evergreen Total Return	GI	90.1	3,700	42.9	2,703	40.1	2,539	34.0	2,914	44.2	2,743	40.1	3,281	44.2	3,183	42.9
Federated Stock Trust	GI	47.0	4,241	74.8	3,355	76.2	3,028	78.9	3,488	74.8	3,155	75.5	3,836	75.5	3,653	75.5
Fidelity Fund	GI	221.9	3,674	40.1	2,591	30.6	2,532	33.3	2,788	34.7	2,722	37.4	3,197	36.7	3,155	38.1
Fidelity Contrafund	G	259.8	5,161	95.9	4,247	97.3	3,607	97.3	4,426	97.3	3,760	96.6	4,779	97.3	4,400	95.9
Fidelity Destiny Plan I	G	86.6	5,432	98.0	3,790	93.9	3,603	96.6	4,027	95.9	3,829	97.3	4,663	96.6	4,547	98.0
Fidelity Magellan	G	110.0	6,017	98.6	4,641	99.3	4,178	99.3	4,797	99.3	4,324	99.3	5,351	98.6	5,086	98.6
Fidelity Trend	G	67.5	3,919	56.5	3,157	67.3	2,849	65.3	3,258	64.6	2,943	62.6	3,563	63.3	3,383	58.5
Fidelity Value Fund	G	296.0	3,273	17.0	2,836	52.4	2,497	29.3	2,919	45.6	2,572	24.5	3,092	29.9	2,898	20.4
Financial Indus. Fund	G	121.6	3,155	8.8	2,380	12.2	2,315	12.2	2,517	15.0	2,447	12.9	2,818	11.6	2,776	10.2
Fortis Capital Fund	G	78.0	4,050	65.3	3,126	66.0	2,846	64.6	3,267	65.3	2,973	64.6	3,633	65.3	3,460	66.0

APPENDIX B
10-year returns and percentile rankings (1983-1992)
(Value of $1000 invested at beginning of period)

Fund Name	Type	Avg TO (%)	Pre-Tax		High Tax Bracket				Middle Tax Bracket				Low Tax Bracket			
					Post-Tax		Liquidation		Post-Tax		Liquidation		Post-Tax		Liquidation	
			Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile
Fortis Growth Fund	G	81.5	4,497	85.0	3,661	89.8	3,181	87.8	3,791	87.8	3,293	87.1	4,124	87.1	3,838	87.1
Founders Blue Chip	GI	52.3	3,862	53.1	2,536	24.5	2,658	46.9	2,729	28.6	2,858	53.1	3,236	39.5	3,310	53.7
Founders Growth Fund	G	159.3	3,681	41.5	2,804	46.9	2,654	45.6	2,921	46.3	2,764	42.2	3,276	43.5	3,184	43.5
FPA Paramount	GI	125.5	4,498	85.7	3,114	65.3	3,013	76.2	3,288	66.0	3,185	78.9	3,830	74.8	3,768	83.7
Franklin Equity Fund	G	57.9	3,561	33.3	2,742	44.2	2,604	40.8	2,891	42.9	2,745	40.8	3,205	37.4	3,121	36.0
Franklin Growth	G	3.2	3,680	40.8	3,334	74.2	2,794	62.6	3,402	72.1	2,854	52.4	3,534	61.2	3,235	48.3
Fundamental Investors	GI	17.2	4,419	84.3	3,375	76.9	3,094	84.3	3,536	78.2	3,246	85.0	3,941	82.3	3,777	84.3
Gateway Index Plus	GI	80.3	2,875	4.1	2,155	4.1	2,108	2.7	2,265	3.4	2,215	3.4	2,547	3.4	2,516	4.1
Growth Fund of America	G	21.3	4,086	66.7	3,395	78.9	2,968	72.8	3,492	75.5	3,056	69.4	3,770	69.4	3,525	68.0
Guardian Park Avenue	G	60.8	4,992	94.6	3,681	91.2	3,403	93.9	3,882	91.8	3,592	94.6	4,389	93.9	4,221	94.6
J Hancock Growth Fund	G	65.7	3,530	31.3	2,778	46.3	2,590	38.1	2,871	40.8	2,677	35.4	3,173	34.7	3,062	34.0
J Hancock Sovergn Invest	GI	41.1	4,266	76.9	3,203	69.4	2,909	68.7	3,384	70.1	3,080	72.1	3,789	70.8	3,615	74.2
IAI Regional Fund	G	111.9	4,377	80.3	3,176	68.0	3,026	78.2	3,335	68.0	3,178	77.5	3,807	72.8	3,714	79.6
IAI Stock Fund	GI	75.6	3,437	27.2	2,549	27.2	2,488	27.2	2,662	23.8	2,599	26.5	3,013	24.5	2,978	25.9
IDS Equity Plus	GI	79.0	3,584	35.4	2,653	34.7	2,527	32.0	2,785	33.3	2,652	33.3	3,155	34.0	3,073	34.7
IDS Growth Fund	G	40.8	3,573	34.7	2,631	33.3	2,601	39.5	2,676	25.9	2,646	32.6	3,070	27.9	3,052	32.0
IDS New Dimensions	G	95.5	5,091	95.2	3,794	94.6	3,453	95.2	3,986	94.6	3,627	95.2	4,495	95.2	4,282	95.2
IDS Progressive	G	104.5	2,756	1.4	2,071	1.4	2,062	1.4	2,189	2.0	2,178	0.7	2,453	1.4	2,445	1.4
IDS Stock Fund Inc	GI	75.6	3,732	46.3	2,579	29.3	2,562	35.4	2,733	29.3	2,714	36.7	3,186	36.0	3,173	40.8
Investment Co. of America	GI	13.4	4,387	81.0	3,354	75.5	3,025	77.5	3,544	80.3	3,201	81.0	3,937	81.6	3,740	81.6
Ivy Growth Fund	G	95.9	3,965	59.9	2,812	50.3	2,745	57.1	3,031	55.1	2,959	64.0	3,464	57.8	3,423	61.9
Janus	G	185.9	4,693	88.4	3,525	84.3	3,173	87.1	3,711	85.0	3,343	87.8	4,159	87.8	3,944	88.4
Kemper Growth Fund	G	133.3	4,368	79.6	3,193	68.7	2,941	71.4	3,380	69.4	3,111	74.2	3,839	76.2	3,668	76.2
Keystone K-2	G	80.2	3,667	39.5	2,737	42.9	2,634	42.2	2,868	40.1	2,760	41.5	3,237	40.1	3,170	39.5
Keystone S-1	GI	76.3	3,048	5.4	2,389	13.6	2,285	8.2	2,506	12.9	2,398	6.8	2,759	8.2	2,698	6.8
Keystone S-3	G	94.1	3,165	10.2	2,422	18.4	2,353	15.0	2,534	17.0	2,462	15.0	2,827	13.6	2,784	11.6
Legg Mason Value Trust	G	31.6	4,058	66.0	3,521	83.7	3,030	79.6	3,611	83.0	3,114	74.8	3,822	74.2	3,548	69.4
Lexington G&I	GI	78.7	3,309	17.7	2,321	7.5	2,332	13.6	2,463	9.5	2,475	15.7	2,845	14.3	2,851	17.0
Lindner Fund	G	25.0	3,757	47.6	2,699	39.5	2,571	36.7	2,917	44.9	2,781	44.9	3,307	46.3	3,227	46.9
Lutheran Brotherhood	GI	78.6	3,789	50.3	2,809	49.0	2,654	46.3	2,964	50.3	2,803	47.6	3,346	49.7	3,255	49.7
Mass. Invsts Growth Stock	G	48.7	3,503	29.9	2,543	25.2	2,487	26.5	2,684	27.2	2,622	28.6	3,061	27.2	3,019	29.9
Mass. Investors Trust	GI	28.3	4,017	62.6	2,807	48.3	2,779	60.5	2,963	49.7	2,935	61.9	3,437	55.8	3,424	62.6
Mathers	G	174.3	3,269	16.3	2,128	3.4	2,255	4.8	2,306	4.1	2,438	11.6	2,738	5.4	2,812	14.3
Merrill Lynch Bas Value-A	G	21.6	3,903	55.1	3,011	59.9	2,757	59.2	3,182	61.2	2,917	59.9	3,517	60.5	3,367	57.1
Merrill Lynch Capital-A	GI	86.9	4,127	69.4	3,089	64.0	2,886	66.7	3,234	63.3	3,025	66.7	3,641	66.0	3,521	66.7
MFS Capital Development	G	88.1	2,746	0.7	2,114	2.7	2,101	2.0	2,192	2.7	2,179	2.0	2,445	0.7	2,438	0.7
MFS Research Fund	G	97.4	3,450	28.6	2,524	23.8	2,490	28.6	2,664	24.5	2,626	29.3	3,026	25.2	3,002	29.3
Mutual Beacon Fund	G	60.0	3,663	38.1	3,069	62.6	2,712	53.7	3,147	59.9	2,784	45.6	3,384	53.7	3,183	42.2
Mutual Omaha Growth Fund	G	69.9	3,988	61.9	3,414	80.3	2,905	68.0	3,498	76.9	2,978	65.3	3,731	68.0	3,438	63.3
Mutual Qualified Fund	GI	81.2	4,869	92.5	3,660	89.1	3,337	91.8	3,854	90.5	3,521	92.5	4,320	91.8	4,132	92.5
Mutual Shares Fund	G	79.0	4,904	93.2	3,689	91.8	3,378	92.5	3,885	92.5	3,564	93.9	4,355	92.5	4,173	93.9
National Stock	G	74.5	3,410	23.8	2,381	12.9	2,363	17.0	2,546	17.7	2,527	20.4	2,943	21.8	2,927	23.1
Nationwide Fund	GI	18.8	4,226	74.2	3,205	70.1	2,913	69.4	3,351	68.7	3,050	68.0	3,753	68.7	3,580	71.4
Nationwide Growth Fund	G	49.1	4,020	63.3	3,038	61.2	2,830	64.0	3,210	61.9	2,992	66.0	3,587	64.6	3,459	65.3
Neuberger Guardian Fund	GI	58.3	4,411	82.3	3,252	72.1	3,000	75.5	3,434	72.8	3,170	76.2	3,884	81.0	3,728	81.0
Neuberger Manhattan Fund	G	112.0	4,716	89.1	3,844	95.9	3,394	93.2	3,953	93.9	3,494	91.8	4,305	91.2	4,050	90.5

APPENDIX B
10-year returns and percentile rankings (1983-1992)
(Value of $1000 invested at beginning of period)

Fund Name	Type	Avg TO (%)	Pre-Tax		High Tax Bracket: Post-Tax		High Tax Bracket: Liquidation		Middle Tax Bracket: Post-Tax		Middle Tax Bracket: Liquidation		Low Tax Bracket: Post-Tax		Low Tax Bracket: Liquidation	
			Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile
Neuberger Partners Fund	G	171.6	3,960	58.5	2,895	55.1	2,742	55.8	3,067	57.8	2,907	58.5	3,479	58.5	3,386	59.2
Neuberger Selected Sector	G	51.3	3,729	45.6	2,740	43.5	2,594	38.8	2,883	41.5	2,731	38.1	3,270	42.9	3,181	41.5
New York Venture	G	64.8	5,328	97.3	3,797	95.2	3,527	95.9	3,999	95.2	3,716	95.9	4,603	95.9	4,431	96.6
Nicholas	G	21.6	4,387	81.6	3,640	87.8	3,129	85.7	3,761	86.4	3,237	84.3	4,054	85.7	3,758	82.3
Oppenheimer Fund	G	99.3	2,477	0.0	2,006	0.0	1,944	0.0	2,054	0.0	1,991	0.0	2,247	0.0	2,212	0.0
Oppenheimer Special	G	90.7	3,195	11.6	2,544	25.9	2,334	14.3	2,680	26.5	2,458	14.3	2,925	20.4	2,795	12.9
Oppenheimer Time Fund	G	105.5	3,831	51.0	2,948	58.5	2,780	61.2	3,031	55.8	2,861	54.4	3,391	54.4	3,294	52.4
Oppenheimer Total Return	GI	155.4	3,874	53.7	2,864	53.1	2,687	50.3	3,006	54.4	2,823	49.0	3,399	55.1	3,292	51.7
Penn Square Mutual	GI	26.8	3,665	38.8	2,667	35.4	2,551	34.7	2,832	37.4	2,711	36.0	3,215	38.1	3,144	37.4
Phoenux Growth Fund Ser.	G	189.2	4,785	91.2	3,611	86.4	3,304	89.8	3,802	88.4	3,483	91.2	4,262	89.8	4,079	91.8
Pilgrim Magnacap Fund	G	86.5	4,118	68.7	3,419	81.0	2,976	73.5	3,526	77.5	3,073	70.8	3,804	72.1	3,552	70.1
Pioneer Fund	GI	15.0	3,342	20.4	2,457	20.4	2,400	22.4	2,597	21.8	2,538	21.8	2,938	21.1	2,904	21.1
Pioneer II	GI	27.4	3,341	19.7	2,561	27.9	2,432	24.5	2,673	25.2	2,541	22.4	2,979	23.8	2,905	21.8
Princor Cap Appreciation	G	25.7	4,152	70.8	3,099	64.6	2,876	66.0	3,294	66.7	3,061	70.1	3,698	66.7	3,563	70.8
Provident Mutual Growth	G	20.9	3,434	26.5	2,723	40.8	2,565	36.0	2,785	34.0	2,627	30.6	3,078	28.6	2,991	27.9
Provident Mutual Invest	G	27.9	3,096	7.5	2,322	8.2	2,309	11.6	2,436	7.5	2,425	10.2	2,739	6.1	2,739	8.2
Prudential Equity (B)	G	70.6	4,179	72.8	3,482	82.3	3,090	83.7	3,573	81.6	3,175	76.9	3,854	77.5	3,633	74.8
Putnam Growth Income/A	GI	130.7	4,128	70.1	2,806	47.6	2,730	54.4	3,002	53.1	2,921	60.5	3,507	59.9	3,456	64.6
Putnam Investors	G	70.6	3,350	21.1	2,271	5.4	2,357	16.3	2,368	4.8	2,456	13.6	2,798	10.2	2,845	15.7
Putnam Vista Fund	G	154.4	3,592	36.0	2,589	29.9	2,530	32.6	2,737	30.6	2,673	34.0	3,129	32.6	3,089	35.4
Quest for Value Fund Inc	G	47.9	4,258	76.2	3,392	78.2	3,058	82.3	3,542	79.6	3,195	80.3	3,883	80.3	3,684	78.2
Safeco Growth	G	39.4	3,139	8.2	2,370	11.6	2,295	10.2	2,485	11.6	2,405	7.5	2,785	9.5	2,736	7.5
Saloman Brothers Investrs	GI	47.3	3,319	18.4	2,302	6.8	2,363	17.7	2,454	8.8	2,518	19.1	2,845	15.0	2,881	19.1
Saloman Brothers Opport.	G	23.9	4,247	75.5	3,400	79.6	3,056	81.6	3,541	78.9	3,188	79.6	3,871	78.9	3,671	76.9
Scudder Capital Growth	G	62.8	4,291	78.2	3,347	74.8	3,066	83.0	3,469	74.2	3,180	78.2	3,847	76.9	3,681	77.5
Security Action	G	102.4	2,945	4.8	2,499	22.4	2,268	5.4	2,559	19.1	2,326	4.8	2,735	4.8	2,607	4.8
Security Equity	G	103.2	4,021	64.0	2,749	44.9	2,690	51.0	2,956	49.0	2,888	57.8	3,440	56.5	3,393	60.5
Selected American Shares	GI	42.6	4,762	89.8	3,650	88.4	3,269	89.1	3,834	89.1	3,439	89.1	4,267	90.5	4,042	89.8
Seligman Common Stock	GI	51.8	3,937	57.1	2,724	41.5	2,698	52.4	2,910	43.5	2,883	56.5	3,376	53.1	3,359	56.5
Seligman Growth Fund	G	60.0	3,407	23.1	2,432	19.1	2,423	23.8	2,578	19.7	2,565	23.8	2,956	22.4	2,941	23.8
Sentinel Common Stock	GI	11.8	4,220	73.5	3,228	70.8	2,915	70.1	3,399	71.4	3,074	71.4	3,781	70.1	3,596	73.5
Sequoia	G	35.9	4,919	93.9	3,675	90.5	3,311	91.2	3,913	93.2	3,529	93.2	4,382	93.2	4,158	93.2
Shearson Apprec Fund/A	G	39.1	4,271	77.5	3,762	93.2	3,170	86.4	3,852	89.8	3,251	85.7	4,051	85.0	3,719	80.3
Smith Barney Inc & Gro/A	GI	38.1	3,490	29.3	2,548	26.5	2,401	23.1	2,737	29.9	2,582	25.2	3,087	29.3	2,999	28.6
State Farm Growth	G	10.5	4,158	71.4	3,486	83.0	2,982	74.2	3,627	83.7	3,107	72.8	3,882	79.6	3,589	72.1
State Street Investment	G	10.7	3,736	46.9	2,823	51.0	2,670	49.7	2,952	48.3	2,794	46.9	3,310	47.6	3,221	46.3
SteinRoe Special Fund	G	77.2	4,837	91.8	3,617	87.1	3,307	90.5	3,773	87.1	3,453	90.5	4,257	89.1	4,066	91.2
SteinRoe Stock Fund	G	99.0	3,445	27.9	2,689	38.1	2,483	25.9	2,820	36.7	2,601	27.2	3,113	31.3	2,982	27.2
Strong Total Return Fund	GI	285.8	3,684	42.2	2,812	49.7	2,626	41.5	2,971	51.7	2,779	44.2	3,301	44.9	3,194	44.2
T. Rowe Price Growth Stk	G	46.4	3,398	22.4	2,622	32.0	2,476	25.2	2,738	31.3	2,587	25.9	3,042	25.9	2,954	25.2
TNE Growth Fund	G	186.6	3,761	48.3	2,882	53.7	2,742	55.1	2,972	52.4	2,827	49.7	3,332	49.0	3,249	49.0
TNE Retirement Eqty Fund	GI	148.6	3,328	19.1	2,409	17.7	2,384	19.7	2,526	16.3	2,497	17.0	2,891	18.4	2,872	18.4
Trustees Commingled USA	GI	70.5	3,177	10.9	2,264	4.8	2,275	7.5	2,408	5.4	2,421	8.8	2,760	8.8	2,765	9.5
United Accumulative	G	252.5	3,974	61.2	2,633	34.0	2,662	47.6	2,850	38.8	2,877	55.8	3,358	51.0	3,368	57.8
United Retirement Shares	GI	81.4	3,222	13.6	2,436	19.7	2,286	8.8	2,583	20.4	2,425	9.5	2,882	17.7	2,788	12.2
United Vanguard	G	152.0	3,159	9.5	2,400	17.0	2,301	10.9	2,510	14.3	2,407	8.2	2,810	10.9	2,749	8.8

APPENDIX B

10-year returns and percentile rankings (1983-1992)

(Value of $1000 invested at beginning of period)

Fund Name	Type	Avg TO (%)	Pre-Tax		High Tax Bracket: Post-Tax		High Tax Bracket: Liquidation		Middle Tax Bracket: Post-Tax		Middle Tax Bracket: Liquidation		Low Tax Bracket: Post-Tax		Low Tax Bracket: Liquidation	
			Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile	Value	Pctile
USAA Growth Fund	G	85.7	2,840	3.4	2,353	9.5	2,155	4.1	2,418	6.1	2,216	4.1	2,614	4.1	2,497	3.4
Value Line Fund	G	113.9	3,077	6.8	2,399	16.3	2,270	6.1	2,470	10.2	2,337	5.4	2,747	7.5	2,669	5.4
Vanguard Index 500	GI	17.8	4,307	78.9	3,536	85.0	3,048	81.0	3,710	84.3	3,203	81.6	3,997	84.3	3,712	78.9
Vanguard World-US Grth	G	60.1	4,096	68.0	3,229	71.4	2,901	67.3	3,387	70.8	3,043	67.3	3,726	67.3	3,524	67.3
Vanguard/Morgan Growth	G	42.3	3,708	44.2	2,677	36.0	2,603	40.1	2,816	35.4	2,738	39.5	3,221	38.8	3,170	40.1
Washington Mutual Inv.	GI	16.2	4,416	83.7	3,385	77.5	3,023	76.9	3,592	82.3	3,213	82.3	3,980	83.0	3,762	83.0
William Blair Grth Shares	G	27.1	3,381	21.8	2,397	15.7	2,394	21.8	2,509	13.6	2,505	18.4	2,898	19.1	2,889	19.7
Windsor	GI	33.8	4,537	86.4	3,076	63.3	2,993	74.8	3,312	67.3	3,227	83.0	3,867	78.2	3,818	85.7
WPG Tudor Fund	G	97.3	3,718	44.9	2,949	59.2	2,752	58.5	3,037	57.1	2,836	51.0	3,349	50.3	3,235	47.6

APPENDIX C
30 year risk-adjusted returns and percentile rankings (1963-1992)
Results for the high-tax investor

		Pre-Tax Measures				High-Tax Measures			
Fund Name	Type	Monthly Excess Return	Monthly Std Dev	Return / Std Dev	Pctile Rank	Monthly Excess Return	Monthly Std Dev	Return / Std Dev	Pctile Rank
20th Century Growth	G	0.668%	7.457%	0.0896	79.0	0.783%	7.491%	0.1046	80.7
20th Century Select	G	0.570%	5.458%	0.1044	90.3	0.678%	5.451%	0.1244	95.2
Affiliated Fund	GI	0.364%	4.202%	0.0865	74.2	0.348%	4.192%	0.0829	53.2
Alliance Fund (A)	G	0.329%	4.920%	0.0670	48.4	0.381%	4.873%	0.0782	41.9
Alliance G&I (A)	GI	0.262%	3.970%	0.0659	46.8	0.248%	3.923%	0.0633	19.4
A-C Enterprise Fund (A)	G	0.545%	6.025%	0.0904	80.7	0.651%	5.996%	0.1085	88.7
American Mutual	GI	0.442%	3.729%	0.1186	96.8	0.445%	3.744%	0.1189	93.5
Babson Growth	G	0.215%	4.505%	0.0478	16.1	0.327%	4.464%	0.0732	33.9
Boston Co. Capital Apprec	G	0.279%	4.497%	0.0620	37.1	0.359%	4.474%	0.0803	46.8
Capstone US Trend	G	0.449%	5.430%	0.0827	67.7	0.504%	5.381%	0.0937	69.3
Colonial Fund/A	GI	0.227%	3.573%	0.0636	41.9	0.269%	3.529%	0.0763	38.7
Colonial Grth Shares/A	G	0.258%	5.192%	0.0497	21.0	0.360%	5.160%	0.0698	27.4
Dreyfus Fund	GI	0.337%	4.248%	0.0794	62.9	0.378%	4.240%	0.0892	66.1
Eaton Vance Growth Fund	G	0.322%	4.597%	0.0701	51.6	0.360%	4.694%	0.0767	40.3
Eaton Vance Stock Fund	GI	0.120%	4.203%	0.0285	3.2	0.171%	4.180%	0.0409	1.6
Elfun Trusts	G	0.398%	4.800%	0.0830	69.3	0.457%	4.757%	0.0961	71.0
Fidelity Fund	GI	0.384%	4.321%	0.0889	75.8	0.374%	4.358%	0.0857	61.3
Fidelity Trend	G	0.338%	5.521%	0.0613	35.5	0.469%	5.492%	0.0854	58.1
Financial Indus. Fund	G	0.299%	4.568%	0.0655	43.5	0.322%	4.585%	0.0703	29.0
Fortis Capital Fund	G	0.431%	4.543%	0.0948	82.3	0.493%	4.536%	0.1087	90.3
Founders Blue Chip	GI	0.252%	4.428%	0.0569	30.6	0.282%	4.413%	0.0639	22.6
Franklin Equity Fund	G	0.224%	5.791%	0.0386	8.1	0.341%	5.745%	0.0593	11.3
Franklin Growth	G	0.229%	4.654%	0.0492	19.4	0.406%	4.605%	0.0882	64.5
Fundamental Investors	GI	0.253%	4.364%	0.0580	33.9	0.316%	4.354%	0.0727	30.6
Growth Fund of America	G	0.284%	5.433%	0.0522	22.6	0.431%	5.414%	0.0796	43.5
J Hancock Sovergn Invest	GI	0.291%	3.786%	0.0769	61.3	0.331%	3.785%	0.0875	62.9
IDS Equity Plus	GI	0.194%	4.861%	0.0400	11.3	0.286%	4.831%	0.0591	9.7
IDS Stock Fund Inc	GI	0.193%	4.176%	0.0462	14.5	0.228%	4.207%	0.0541	6.5
Investment Co. of America	GI	0.485%	4.194%	0.1156	95.2	0.531%	4.186%	0.1268	96.8
Ivy Growth Fund	G	0.402%	4.995%	0.0804	64.5	0.500%	5.034%	0.0994	77.4
Keystone K-2	G	0.204%	4.985%	0.0409	12.9	0.299%	4.932%	0.0607	14.5
Keystone S-1	GI	0.090%	4.399%	0.0205	1.6	0.170%	4.428%	0.0384	0.0
Keystone S-3	G	0.319%	5.513%	0.0578	32.3	0.381%	5.577%	0.0683	25.8
Mass. Invsts Growth Stock	G	0.255%	5.207%	0.0490	17.7	0.339%	5.141%	0.0659	24.2
Mass. Investors Trust	GI	0.239%	4.318%	0.0553	27.4	0.245%	4.293%	0.0570	8.1
Mutual Beacon Fund	G	0.055%	4.066%	0.0134	0.0	0.198%	4.055%	0.0488	3.2
Mutual Shares Fund	G	0.654%	3.795%	0.1723	98.4	0.705%	3.830%	0.1840	98.4
National Stock	G	0.302%	4.203%	0.0718	53.2	0.305%	4.181%	0.0730	32.3
Neuberger Guardian	GI	0.466%	4.619%	0.1009	88.7	0.490%	4.664%	0.1050	82.3
Neuberger Selected Sector	G	0.378%	4.385%	0.0863	72.6	0.417%	4.494%	0.0929	67.7
Oppenheimer Fund	G	0.209%	5.392%	0.0388	9.7	0.320%	5.400%	0.0594	12.9
Oppenheimer Total Return	GI	0.172%	4.585%	0.0374	6.5	0.231%	4.548%	0.0507	4.8
Penn Square Mutual	GI	0.379%	4.607%	0.0822	66.1	0.378%	4.575%	0.0825	51.6
Phoenix Growth Fund Ser.	G	0.343%	5.211%	0.0658	45.2	0.442%	5.208%	0.0849	56.5

APPENDIX C
30 year risk-adjusted returns and percentile rankings (1963-1992)
Results for the high-tax investor

		------ Pre-Tax Measures ------				------ High-Tax Measures ------			
Fund Name	Type	Monthly Excess Return	Monthly Std Dev	Return / Std Dev	Pctile Rank	Monthly Excess Return	Monthly Std Dev	Return / Std Dev	Pctile Rank
Pioneer Fund	GI	0.427%	4.344%	0.0983	87.1	0.464%	4.310%	0.1077	87.1
Putnam Growth Income/A	GI	0.399%	4.204%	0.0948	83.9	0.416%	4.191%	0.0992	75.8
Putnam Investors	G	0.359%	4.786%	0.0751	59.7	0.389%	4.749%	0.0819	48.4
Salomon Brothers Investrs	GI	0.277%	4.408%	0.0628	38.7	0.327%	4.401%	0.0742	35.5
Scudder Capital Growth	G	0.407%	5.489%	0.0742	58.1	0.522%	5.431%	0.0962	72.6
Security Equity	G	0.514%	5.781%	0.0889	77.4	0.605%	5.718%	0.1057	85.5
Seligman Common Stock	GI	0.350%	4.192%	0.0834	71.0	0.336%	4.209%	0.0800	45.2
Seligman Growth Fund	G	0.290%	5.216%	0.0555	29.0	0.330%	5.265%	0.0626	17.7
Sentinel Common Stock	GI	0.383%	3.924%	0.0976	85.5	0.391%	3.928%	0.0995	79.0
State Street Investment	G	0.316%	4.647%	0.0680	50.0	0.387%	4.612%	0.0840	54.8
SteinRoe Stock Fund	G	0.275%	5.161%	0.0533	25.8	0.386%	5.155%	0.0749	37.1
T. Rowe Price Growth Stk	G	0.179%	4.833%	0.0371	4.8	0.305%	4.797%	0.0636	21.0
United Accumulative	G	0.230%	4.402%	0.0523	24.2	0.271%	4.420%	0.0614	16.1
Value Line Fund	G	0.439%	6.052%	0.0725	56.5	0.516%	6.046%	0.0854	59.7
Vanguard World-US Grth	G	0.388%	5.375%	0.0722	54.8	0.536%	5.481%	0.0978	74.2
Washington Mutual Inv.	GI	0.457%	4.196%	0.1090	93.5	0.481%	4.173%	0.1153	91.9
William Blair Grth Shares	G	0.309%	4.907%	0.0629	40.3	0.402%	4.868%	0.0825	50.0
Windsor	GI	0.479%	4.496%	0.1066	91.9	0.480%	4.543%	0.1056	83.9