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# New Paradigm or Same Old Hype in Equity Investing?

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*The recent relative stock-price performance of six U.S. equity asset classes (classified by size and by value-versus-growth style) differs markedly from the historical pattern. Large-capitalization growth stocks have apparently taken the place of small-capitalization and value stocks in investors' hearts. Have the size and value premiums of the past vanished for good? We explore three explanations of recent market behavior—the “rational-asset-pricing” hypothesis, the “new-paradigm” viewpoint, and the “behavioral” or “institutional” explanation. In our study, we examined the operating performance of the equity classes to see which hypothesis accounts for the recent behavior of returns. Our findings provide the most support for the behavioral explanation.*

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A large body of research into U.S. equity returns over many years has found consistent differences among the returns of various equity classes. In particular, small-cap stocks have historically outperformed large-cap stocks and value stocks have had higher returns than growth stocks. **Table 1** shows annual returns beginning in 1970 for six equity asset classes—small, medium, and large companies (based on market value of equity) subdivided into growth and value categories. (Our classification procedure is detailed in the “Methodology” section.)

The part of the sample period from 1970 to 1990 has been the subject of intense study by academics, and the results are by now familiar: Small-cap stocks did well, and small-cap value stocks did particularly well in this period. In the 1980s, for example, as shown by Panel B, small-cap value stocks produced a geometric mean return of 21.7 percent a year whereas large-cap value stocks produced a mean return of 19.4 percent a year. Value stocks in general earned higher returns than growth stocks in this period. For example, large-cap value stocks outperformed their large-cap growth counterparts by 4.5 percentage points (pps) a year. Mid-cap value stocks earned 19.3 percent a year, whereas mid-cap growth stocks earned only

15.7 percent a year. Finally, small-cap value stocks outperformed small-cap growth stocks by 9 pps a year, on average, over the 1980s.

These patterns in historical returns have made a significant impact on research and practice in finance. The cumulative weight of the evidence up to the 1990s was enshrined in a highly influential paper by Fama and French (1992), in which size and book value to market value emerged as the leading explanatory variables for the cross-section of average returns. Investment strategies based on the “size anomaly” and the “value premium” caught investors' attention.<sup>1</sup>

Yet, even as the size and value effects were gaining academic respectability, as well as investor interest, the tables began to turn. The more recent experience has not been kind to the size effect. For the 15-year period from 1984 through 1998, the annual return on the Russell 1000 Index of large-cap stocks was 17.71 percent, compared with 11.22 percent for the Russell 2000 Index of small-cap stocks. In only four years out of 15 did the Russell 2000 beat the Russell 1000. The outperformance of large-cap stocks is even more striking if only the most recent period is considered. Table 1 shows that the average return on large-cap growth stocks over the five years up to 1998 was 28.3 percent, compared with 11.3 percent for small-cap growth stocks; for the three years up to 1998, the averages were, respectively, 34.0 percent and 10.4 percent.

The returns to value stocks have also faltered recently in comparison with those to growth stocks. For example, large-cap value stocks from 1990

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**Table 1. Annual Returns for Asset Classes by Growth versus Value and by Size, 1970–1998**

Period	Growth			Value			Standard Deviation
	Small	Medium	Large	Small	Medium	Large	
<i>A. Annual return</i>							
1970	-0.109	-0.042	-0.048	-0.001	0.080	0.143	0.092
1971	0.324	0.208	0.201	0.160	0.103	0.075	0.089
1972	0.049	0.221	0.240	0.087	0.087	0.189	0.081
1973	-0.353	-0.256	-0.174	-0.232	-0.176	-0.070	0.095
1974	-0.310	-0.308	-0.351	-0.180	-0.197	-0.205	0.073
1975	0.587	0.439	0.315	0.611	0.522	0.355	0.122
1976	0.411	0.266	0.100	0.522	0.434	0.308	0.149
1977	0.229	0.002	-0.126	0.227	0.021	-0.053	0.147
1978	0.198	0.088	0.070	0.213	0.072	0.057	0.070
1979	0.482	0.363	0.119	0.390	0.282	0.199	0.133
1980	0.535	0.432	0.208	0.310	0.254	0.367	0.120
1981	-0.081	-0.033	-0.096	0.159	0.082	-0.026	0.100
1982	0.264	0.215	0.177	0.360	0.308	0.198	0.070
1983	0.262	0.198	0.176	0.429	0.281	0.266	0.089
1984	-0.140	-0.036	0.052	0.060	0.072	0.113	0.092
1985	0.293	0.303	0.348	0.375	0.326	0.296	0.033
1986	0.102	0.138	0.159	0.137	0.194	0.225	0.044
1987	-0.124	0.031	0.059	-0.054	0.001	0.045	0.070
1988	0.149	0.145	0.165	0.293	0.210	0.175	0.056
1989	0.195	0.269	0.303	0.189	0.252	0.340	0.059
1990	-0.173	-0.052	0.058	-0.169	-0.160	-0.075	0.091
1991	0.557	0.441	0.378	0.440	0.414	0.180	0.124
1992	0.040	0.080	0.064	0.273	0.202	0.076	0.093
1993	0.134	0.110	-0.036	0.240	0.185	0.191	0.096
1994	-0.040	-0.030	0.033	0.019	-0.012	0.013	0.029
1995	0.324	0.300	0.397	0.300	0.363	0.399	0.046
1996	0.118	0.176	0.227	0.234	0.198	0.269	0.053
1997	0.118	0.207	0.391	0.407	0.373	0.304	0.116
1998	0.077	0.274	0.410	-0.012	0.060	0.270	0.162
<i>B. Geometric average return</i>							
1970–98	0.115	0.127	0.116	0.180	0.152	0.149	0.089
1986–98	0.100	0.153	0.191	0.163	0.164	0.178	0.080
1970–79	0.104	0.070	0.014	0.149	0.101	0.087	0.105
1980–89	0.127	0.157	0.149	0.217	0.193	0.194	0.073
1990–98	0.112	0.158	0.201	0.176	0.166	0.172	0.090
1994–98	0.113	0.179	0.283	0.178	0.186	0.244	0.081
1996–98	0.104	0.218	0.340	0.197	0.204	0.281	0.110
<i>C. Average Russell index return</i>							
1986–98	0.097	0.158	0.190	0.128	0.154	0.172	0.083
1990–98	0.106	0.158	0.201	0.141	0.155	0.170	0.088
1994–98	0.102	0.173	0.288	0.131	0.175	0.225	0.081
1996–98	0.083	0.193	0.346	0.144	0.193	0.262	0.107

*Note:* The sample comprised all domestic common stocks on the NYSE, Amex, and Nasdaq with coverage in the CRSP and Compustat databases and with available data. At the end of June each year from 1968 to 1996, stocks were sorted by market value of equity into one of three size groups: the largest 200 stocks, the next 800 (medium) stocks, and the 2,000 (small) stocks with size ranks below 1,000. Within each size category, stocks were sorted by book value to market value of equity from highest to lowest (assuming a reporting delay of four months from the end of the fiscal year before the book value of equity was known). Out of the ranked stocks, the top half by equity market capitalization was considered the value stocks and the remaining half was considered the growth stocks. Stocks within each of the six groups were value weighted. Buy-and-hold returns were calculated for each portfolio beginning in January 18 months after stocks were assigned to groups and ending in the following December. The indexes are the Russell 2000 Growth (Value) corresponding to the small-cap size class, the Russell Midcap Growth (Value) corresponding to the mid-cap class, and the Russell Top 200 Growth (Value) corresponding to the large-cap category.

through 1998 (see Panel B) earned a mean return of 17.2 percent, falling short of large-cap growth stocks by 2.9 pps a year on average. Small-cap and mid-cap value stocks, however, kept their advantage against their growth counterparts on average. Overall, value stocks were outpaced by growth stocks (in each case combining large-cap, mid-cap, and small-cap stocks in proportion to their market values) by 1.1 pps a year on average over 1990–1998. The average underperformance was 1.6 pps for 1994–1998 and 3.3 pps for 1996–1998. Performance in 1998 was notably disastrous for both small-cap and value stocks. In that year, large-cap growth stocks experienced their highest return (41 percent) of the 29 years covered in Table 1. In contrast, small-cap value stocks earned a return of –1.2 percent while mid-cap value stocks were earning a meager 6 percent. The returns on the Russell indexes for the 1986–98 period (see Panel C) tell a similar story. Clearly, the price performance record of small-cap and value stocks has taken a serious beating, at least in the last five years.

For another perspective on the behavior of the equity classes in recent years, the last column of Table 1 reports the cross-sectional standard deviation of the returns across the six groups for each period. As Panel A shows, the dispersion across the asset classes' returns as of the end of 1998 stood at an unprecedented level, 16 percent.

Have the apparent size and value premiums vanished for good? On the one hand, the recent experience may represent a long-lasting shift in how equities are valued. On the other hand, the recent past may be unusual and the situation will revert to the long-term pattern. To distinguish between these possibilities, a search must be made for some explanation for the stock-price performance of the various equity classes. We explored three possible explanations for the relative performance of the different size and growth-versus-value style classes in the late 1990s. As a plausibility check on each hypothesis, we tested whether it is consistent with recent growth rates in underlying fundamentals—sales and earnings.

A decision among the competing explanations has important implications for portfolio allocation decisions. The recent poor price performance of small-cap and value stocks has left scars on active money managers. Compared with a widely followed benchmark such as the S&P 500 Index, which is dominated by large-cap growth stocks, many investment managers are tilted toward mid-cap stocks and are less growth oriented. As a result, their performance compares highly unfavorably with such benchmarks as the S&P 500. Value-oriented money managers in particular are coming under

pressure to become more growth oriented. Moreover, some disappointed plan sponsors have given up on their active portfolio managers and shifted to indexing. If the recent record denotes a break from historical patterns in relative equity valuations, these shifts are justifiable responses and small-cap managers as well as value money managers may be endangered species. If, however, the recent past is a string of temporary shocks, the shift toward large-cap growth stocks will be counterproductive; it may actually exacerbate the eventual adjustment back to the long-term pattern. In this case, small-cap and value investors might be vindicated and make a successful comeback.

## Competing Explanations

Three possibilities have been put forward to account for the recent relative price performance of the different equity classes—the “rational-asset-pricing” explanation, the “new-paradigm” explanation, and the “behavioral” or “institutional” explanation.

Rational-asset-pricing models look to shifts in expected cash flows or discount rates as reasons for changes in equity valuations. The underlying assumptions are that investors make rational, informed decisions and markets are informationally efficient. In this view, large-cap growth stocks had a sequence of unanticipated positive shocks, possibly the results of technological innovations, changes in corporate control mechanisms, or other revisions in investors' expectations of future profits. As a result, these stocks have performed unexpectedly well in recent years. Along the same lines, this view posits that small-cap stocks have done poorly because of prolonged negative surprises to current or expected future profitability. Fama and French's 1995 article is an example of work in this vein; the authors were trying to find reasons for the price performance of small-cap stocks that were based on growth in their earnings.

If a string of unexpected temporary shocks is the correct explanation for the relatively poor price performance of small-cap and value stocks, then the future should more closely resemble the long-term past than the late 1990s. Accordingly, unless a shift has occurred in relative riskiness, small-cap stocks and value stocks will outperform large-cap stocks and growth stocks in the future. Investors holding small-cap and value stocks will be rewarded for bearing the higher risk of such stocks.

In the new-paradigm view, recent large-scale and widespread technological advances have rendered obsolete the conventional approach to valuation in selected industries. Companies that are in

the forefront of innovation and that have exhibited dazzling growth rates in the past will continue to soar, in defiance of the low average returns they have historically earned. The implications of this thesis are that the technology sector represents an attractive investment and investors should not be deterred by valuations that are high by historical standards. Additionally, this view maintains that investing in large companies provides benefits because of their economies of scale. In a global market, large companies have an edge because they can transcend national boundaries and extend their production and marketing efforts to capture profits anywhere in the world.

One connotation of the new-paradigm argument is that market prices have not fully incorporated all the future benefits from technological innovation. Unlike the rational-asset-pricing view, the new-paradigm view suggests that the superior returns of large-cap growth stocks will persist for some time in the future. Given the market's slow response to information, money is still on the table. Hence, investors should continue to chase cutting-edge companies in the computer, Internet, and networking sectors, despite their high current valuations.

A third possible explanation for the recent returns on the various equity classes rests on behavioral and institutional considerations. This explanation accepts that a remarkable spate of technological innovations has marked recent years and these advances have helped fuel the dazzling rise in stock prices in some sectors. The behavioral/institutional explanation is that the market's response, once under way, fed on itself.<sup>2</sup> It is perhaps natural for investors to get excited about successful companies and companies in innovative fields, such as electronic commerce. In this view, as certain equity classes took off and others fell out of favor in the 1990s, investors overreacted, thereby pushing returns away from their long-term patterns.

Several factors could have contributed to the overreaction. Many investors were lured into stocks by the market's seemingly unstoppable ascent in recent years, and an increasing portion of the public has become educated about the long-term benefits of investing in stocks.<sup>3</sup> The expanding availability of around-the-clock financial news coverage and online information have amplified investor interest. The shift of funds to stocks has also been encouraged by the growing popularity of 401(k) plans. An easy way to channel this massive inflow of funds is to invest the money in large-cap stocks because of their high liquidity. In short, the initial success of large-cap growth stocks

aroused investor enthusiasm, which has pushed valuations even higher.

Similar bubbles fueled by investor sentiment in various equity classes have occurred in the past. Notable examples are the railroads and radio stocks of the early 20th century and the biotechnology stocks of the 1980s. Such cases of severe mispricing would be eliminated if arbitrageurs had complete freedom to exploit all opportunities, but as Shleifer and Vishny (1997) noted, in practice, arbitrageurs' actions have limitations. Therefore, prices can exhibit large and persistent departures from fundamental values that can last several years. One illustration of the limits to arbitrage in the present context is the collapse of many hedge funds in 1998, which reduced the money available for arbitrage activities.

If the market's overoptimism about large-cap growth stocks is puffing up these stocks' recent performance, then the behavioral explanation predicts rosier times ahead for investors holding small-cap and value stocks. As investors' romance with the large-cap growth stocks wanes, the prices of stocks that have fallen out of favor will recover. Moreover, the long period of time in which they have been severely mispriced may give a temporary boost to their returns, relative to the other equity asset classes, during the recovery. In any event, the behavioral explanation suggests that now is an opportune time to invest in small-cap and value stocks. The behavioral explanation is mute on how long it will take for the recovery to occur, however, so it may be a while before investors who hold small-cap value stocks can enjoy the rewards for their patience.

To see which, if any, of the competing theories can explain the relative stock-price performance of the six equity classes, we looked at the evolution of their operating profitability in the past. Specifically, the rational-pricing and the new-paradigm hypotheses suggest that large-cap growth stocks should have experienced superior operating performance in the recent past. The rational-pricing hypothesis also suggests that small-cap value stocks should have gone through a period of depressed profitability in the past few years. A failure to find traces of such differences in operating performance among the equity classes would thus provide credibility for the behavioral explanation. Of course, even if differences in the profitability of the equity classes are not detectable in the recent record, they may ultimately show up in the future. We cannot dismiss the argument that the returns of the equity classes reflect differences in operating performance that have yet to be played out, but relying on unknown changes in future

earnings that are unconnected to changes in the recent past provides a shaky foundation, at best, to the rational-pricing or new-paradigm arguments.

## Methodology

Our objective was to measure the operating performance of the six equity classes, and we wanted to do so over a long sample period. These requirements meant that we could not rely on conventional indexes. For example, the Russell indexes for the full set of six equity classes began only in 1986, and data on the historical composition of the indexes were not generally available. Therefore, we followed the spirit of the approach used by Frank Russell Company and constructed portfolios corresponding to the indexes. At the end of June each year from 1968 through 1996, we classified all domestic common stocks on the NYSE, Amex, and Nasdaq into one of three groups on the basis of the company's equity market capitalization. The largest 200 companies were classified as "large," the next largest 800 companies were classified as "medium," and the remaining 2,000 companies were classified as "small."<sup>4</sup>

Within each size category, we separated companies into mutually exclusive value and growth groups. Here, our methodology differed from the approach of Frank Russell Company, in that a stock was classified solely on the basis of the ratio of its book value to market value of equity whereas Frank Russell Company also takes into account analyst forecasts of long-term growth.<sup>5</sup> Specifically, in each size category, we ranked stocks from lowest to highest by the ratio of book value to market value (BV/MV). We then went through this ranked list and assigned stocks to the growth group until we exhausted 50 percent of the total market capitalization of the ranked stocks. The remaining stocks (which represented the other half of the market capitalization of the size classification under consideration) we placed in the value group.<sup>6</sup> Note that because we used percentage of market capitalization, the number of stocks in the growth and value groups was not generally the same. This two-way classification yielded six portfolios corresponding to the equity classes.

Companies that have had disappointing profits and poor returns in the past tend to fall into the small-cap and value categories. Because these companies start from bases of low profitability, their operating performance can be expected to improve subsequently and they may be expected to experience a high growth rate in the future. Similarly, large companies tend to start from high levels of past profitability, so for these cases, one might

expect reversion in operating performance. To be conservative and to ensure that our results for operating performance were not artifacts of our classification procedure, we left a window of 18 months after the date of portfolio formation before we started measuring the returns and other characteristics of the portfolios.<sup>7</sup> The returns reported here are value weighted and measured on a buy-and-hold basis. We chose an annual holding period to correspond to a realistic investment horizon. Thus, the first annual return reported is for calendar 1970 and the last is for calendar 1998.

Measuring the operating performance was a more delicate task than simply measuring equity price performance, so we adopted two ways to measure operating performance. In the first method, when we calculated growth in earnings for a portfolio, for example, we compared the earnings of the companies in the portfolio in one year with these same companies' earnings in the prior year. Because we were comparing identical companies for adjacent years, we refer to the growth rate calculated in this manner as a "fixed-composition growth rate." The second procedure for calculating operating performance resembles the standard approach used for such popular benchmarks as the S&P 500, which is to compare operating performance of a total portfolio in one year with the total portfolio's performance in the adjacent year. Because the composition of a portfolio changed every year, however, we were not comparing like with like. For this reason, we refer to the growth rate calculated in this procedure as the "varying-composition growth rate." Each procedure produced a sequence of yearly growth rates beginning in 1970 and ending in 1998.<sup>8</sup>

## Results

The return that is anticipated on a stock depends, in general, not only on its operating performance but also on the price paid per dollar of performance. Hence, in the tables, we report the ratio of price to the operating variable (in the A panels) and changes in the operating variable measured as yearly fixed-composition growth rates (in the B panels) and varying-composition growth rates (in the C panels). Note that the price–operating performance ratio is measured at the beginning of each year. To obtain a robust picture of operating performance, we looked at four performance indicators—net sales revenue (annual data Item 12 in the Compustat Research and Active files), operating income before depreciation (Item 13), income (before extraordinary items) available for common equity (Item 237), and cash dividends to common stock (Item 21).

A net sales revenue variable is less plagued by such issues as negative values or extreme outliers than an earnings variable; thus, price to sales behaves more smoothly than price to earnings. Accordingly, this analysis begins with sales, reported in Table 2. Relative to the past, all the equity classes were priced at high multiples of sales at the beginning of 1999. The multiples for small-cap and mid-cap growth stocks in 1999 (1.57 and 1.77, respectively) were roughly twice their averages for the 1970–98 period. Value stocks in 1999 were also trading at multiples above their historical means. For example, the price-to-sales ratio (P/S) for large-cap value stocks in 1999 was 1.42 whereas the past average was 0.62.

What is especially striking in Panel A of Table 2 is the stellar P/S multiple for the large-cap growth portfolio. As recently as 1997, the P/S for this equity class was 2.13, but it had doubled by 1999 to a record-breaking 4.20. The historical 1970–98 average was only 1.38. The leap in the P/S for large-cap growth companies from 1997 on was not shared by the other equity classes. In the case of small-cap and mid-cap value stocks, for example, the P/S multiples in 1999 were close to their 1997 values. Table 2 may even be *understating* the multiple for large-cap growth stocks: Because the membership of each equity class was determined 18 months prior to measuring the performance, Table 2 reports the 1999 valuation of companies that were classified as large-cap growth stocks as of June 1996.<sup>9</sup>

Another way to appreciate how radically the current multiple for large-cap growth stocks deviates from the historical norm is as follows: Consider the 100 stocks with the highest market capitalizations based on the most current data (November 1999 as of this writing). As many as 25, or a quarter, of these are nonfinancial companies with P/S multiples above 7, and they constitute 35 percent of the total capitalization of the nonfinancial companies in this set. Although a stock priced at 7 times *earnings* would not raise eyebrows, valuations that are in excess of 7 times sales are remarkable. At no other time in our sample period were such high-flying valuations so pervasive. Table 2 suggests that the multiple of large-cap growth stocks began its ascent roughly in 1997. In each year from 1970 to 1996, on average, only 2 nonfinancial stocks a year out of the largest 100 had multiples above 7, representing, on average, only 1.6 percent of market capitalization of this subset.

Justifying these record multiples, therefore, requires an assumption that future economic conditions will depart considerably from past trends. In particular, the valuations suggest that many large-cap growth companies will be able to gener-

ate significant growth in profitability and sustain that growth over many years. This assumption does not fit well with a large body of research (dating back to Little 1962) documenting the lack of persistence in long-term growth rates. Even if the historical evidence is ignored, developments in global business markets suggest that maintaining high rates of growth in the future will be extremely difficult. The popular impression is that new products and technologies are arriving at a faster rate than in the past and that barriers to entry are falling, so markets are becoming even more competitive. If anything, new competitors can more easily start up businesses and enter markets now than in the past. For example, in the 25 large-cap stocks ranked highest by P/S in 1999, 11 companies did not even exist 10 years ago. These sobering considerations highlight how difficult it would be for companies to sustain the high growth rates required to justify the current rich multiples for large-cap growth stocks.

If a dramatic break from historical trends that would justify today's multiples is under way, the recent record should provide clear signs of it, but the behavior of sales growth rates does not offer that support. In particular, large growth companies have not recently enjoyed extraordinary improvements in operating performance, despite their astonishing stock returns. For example, Panel B of Table 2 shows that in the 1996–98 period, large-cap growth stocks' sales grew by an average of 6.0 percent a year and the growth rate of sales in 1998 was only 4.7 percent. These rates of growth were *lower* than the mean of 10.3 percent for the large-cap growth portfolio over the entire sample period. Panel B also indicates that, although small-cap and mid-cap value stocks earned disappointing returns, they did not suffer particularly weak sales growth in the recent past. Over the three-year period ending in 1998, sales grew by 12.7 percent and 9.7 percent a year for, respectively, the small-cap and mid-cap value portfolios. The corresponding mean sales growth figures for 1970–1998 were 8.1 and 7.5 percent. The small-cap value class did particularly well in terms of its most recent sales growth rate; sales in 1998 for this portfolio grew by 18.0 percent, well above its past average.

The varying-composition growth rates in Panel C tell a similar story.<sup>10</sup> Large-cap growth stocks did not experience superior performance with respect to sales growth from 1996 through 1998: Their average growth rate was close to zero. Compared with growth stocks over this three-year period, small-cap and mid-cap value stocks had relatively favorable growth rates in sales—an average of 15.2 percent a year for small-cap and 11.1 percent a year for mid-cap stocks. Keep in mind that the

**Table 2. Price Multiple and Growth of Sales, 1970–98**

Year	Growth			Value		
	Small	Medium	Large	Small	Medium	Large
<i>A. Price-to-sales ratio</i>						
1990	0.79	0.88	1.24	0.39	0.55	0.63
1991	0.63	0.72	1.19	0.25	0.42	0.51
1992	1.08	1.10	1.54	0.34	0.54	0.66
1993	1.15	1.07	1.62	0.42	0.69	0.69
1994	1.21	1.26	1.36	0.58	0.71	0.84
1995	1.15	1.12	1.29	0.49	0.62	0.77
1996	1.33	1.24	1.65	0.58	0.75	0.95
1997	1.44	1.49	2.13	0.62	0.83	1.00
1998	1.61	1.61	2.88	0.76	0.96	1.20
1999	1.57	1.77	4.20	0.60	0.89	1.42
1970–98	0.80	0.90	1.38	0.35	0.49	0.62
1970–79	0.54	0.84	1.64	0.25	0.41	0.63
1980–89	0.75	0.72	0.89	0.31	0.42	0.43
1990–98	1.15	1.17	1.66	0.49	0.67	0.81
1994–98	1.35	1.34	1.86	0.61	0.77	0.95
1996–98	1.46	1.45	2.22	0.65	0.85	1.05
<i>B. Fixed-composition growth rate of portfolio sales</i>						
1990	0.127	0.125	0.102	0.060	0.020	0.072
1991	0.077	0.065	0.058	0.021	-0.011	-0.027
1992	0.077	0.070	0.064	-0.059	-0.010	0.018
1993	0.221	0.080	0.063	-0.006	0.043	0.001
1994	0.172	0.120	0.102	0.112	0.082	0.048
1995	0.198	0.151	0.110	0.121	0.130	0.087
1996	0.187	0.120	0.046	0.105	0.096	0.097
1997	0.239	0.155	0.088	0.097	0.128	0.095
1998	0.203	0.148	0.047	0.180	0.070	0.049
1970–98	0.147	0.127	0.103	0.081	0.075	0.080
1970–79	0.152	0.148	0.143	0.109	0.116	0.134
1980–89	0.125	0.118	0.089	0.066	0.049	0.058
1990–98	0.165	0.114	0.075	0.068	0.060	0.048
1994–98	0.200	0.139	0.078	0.123	0.101	0.075
1996–98	0.209	0.141	0.060	0.127	0.097	0.080
<i>C. Varying-composition growth rate of portfolio sales</i>						
1990	0.075	0.047	0.112	0.124	0.150	0.139
1991	-0.010	0.105	0.058	0.234	0.081	0.028
1992	-0.091	-0.058	0.072	-0.010	0.079	-0.045
1993	0.103	0.121	0.009	0.070	0.004	0.018
1994	0.036	-0.019	0.189	0.010	0.196	0.026
1995	0.037	0.117	0.100	0.225	0.180	0.151
1996	0.134	0.148	0.030	0.084	0.095	0.138
1997	0.078	0.007	-0.014	0.138	0.112	0.209
1998	-0.035	0.108	-0.010	0.238	0.125	0.040
1970–98	0.090	0.111	0.091	0.167	0.130	0.130
1970–79	0.141	0.142	0.133	0.238	0.166	0.189
1980–89	0.092	0.126	0.081	0.142	0.111	0.122
1990–98	0.034	0.062	0.059	0.120	0.112	0.075
1994–98	0.049	0.070	0.057	0.136	0.141	0.111
1996–98	0.057	0.086	0.002	0.152	0.111	0.127

varying-composition growth rates were influenced by the returns on the portfolios and that over the years in question, these two equity classes did not earn as high returns as growth stocks, so their higher measured growth rates cannot be explained by the inclusion of returns.

Moving from growth in revenues to take profit margins into account, **Table 3** reports operating income before depreciation. This indicator includes the effects of most expenses but is less erratic than net income (which we examine subsequently). The results shown in **Table 3** echo those in **Table 2**. As **Panel A** shows, at the beginning of 1999, the valuation of large-cap growth stocks was at a record level of 17.6 times operating income before depreciation, compared with this category's overall historical average of 7.42. Nonetheless, growth in operating income before depreciation for this equity class exhibited much less eye-catching deviation when compared with the past—and when compared with the other equity classes. For instance, focusing on the fixed-composition growth rates shown in **Panel B** for the three-year period ending in 1998 reveals that operating income grew by 9.6 percent a year for the large-cap growth stocks whereas the overall historical average was 10.6 percent. In comparison, small-cap value stocks had higher income growth (16.6 percent) over the 1996–98 period; the growth rate for mid-cap value stocks (7.6 percent) was not very different from the rate for the large-cap growth portfolio.

In short, although large-cap growth stocks earned a return over 1996–1998 wildly in excess of their historical average, they did not enjoy a parallel surge in operating performance. Rather, large-cap growth stocks were very richly priced relative to sales and operating income, reflecting investors' rosy expectations of the companies' future growth and ability to sustain that growth. These expectations appear to be at odds with the increasing competitiveness of world markets, however, and the extreme difficulty of maintaining a company's market position in a rapidly changing environment. Conversely, small-cap and mid-cap value stocks have fallen out of favor with investors, even though their recent operating performance has not been poor.

Popular attention has been most heavily focused on the behavior of net income in the different asset classes, but of the variables we considered, income before extraordinary items available to common equity was perhaps the most erratic. Even though we were examining performance from the standpoint of whole equity classes, we found portfolio net income to be highly volatile and, in some cases, even negative. For example, **Panels B and C**

of **Table 4** show that between 1991 and 1992, income for the small-cap value portfolio moved from a negative to positive number, so calculating a growth rate for 1992 was not meaningful.

The noisiness of the income variable in **Table 4** suggests that care should be exercised before drawing inferences from these data.<sup>11</sup> Nonetheless, **Table 4** generally confirms the conclusions from **Tables 2 and 3**: **Table 4** provides no evidence that large-cap growth companies had impressively high growth (compared with the past) in income in the 1996–98 period. The fixed-composition growth rates in **Panel B** indicate that average growth over this period was 11.0 percent, which is quite close to the historical mean of 9.6 percent a year. At the same time, income growth for small-cap value stocks for the same period was not calamitous compared with this group's past track record.

Finally, **Table 5** reports our findings on the price-to-dividends ratio and the growth of dividends for the different equity classes. The climb in stock prices in recent years has tended to diminish the contribution of dividend yields to returns. In addition, the use of stock buy-backs as a means of distributing cash to shareholders has grown. As a result, the price-to-dividends ratios for the equity asset classes at the beginning of 1999 were all considerably higher than their historical averages. They may even remind some readers of yields in the Japanese market. For example, the 1999 price-to-dividends ratio for the larger companies (which are more likely to pay dividends) was 109.38 (for the large-cap growth stocks) and 59.08 (for the large-cap value stocks), which represented dividend yields of, respectively, 0.9 percent and 1.7 percent. For the whole sample period, large-cap growth stocks averaged a 43.83 ratio and large-cap value stocks averaged a 22.23 ratio (corresponding to yields of 2.3 percent and 4.5 percent, respectively). For each of the equity asset classes, recent growth in dividends has generally been similar to the historical average. From this evidence, as well as that in the previous tables, the recent operating performance of large-cap growth stocks does not justify their sky-high multiples.

## Conclusion

All six of the equity asset classes based on size and value versus growth commanded high multiples at the beginning of 1999. The high multiples indicate that, by historical standards, the stock market stood at a record level. In particular, the recent valuation of large-cap growth companies relative to a variety of operating performance measures is far in excess of these companies' past experience. For example,

**Table 3. Operating Income before Depreciation, 1970–98**

Year	Growth			Value		
	Small	Medium	Large	Small	Medium	Large
<i>A. Price-to-income ratio</i>						
1990	7.67	6.22	6.83	3.85	3.56	3.58
1991	5.97	5.11	6.03	2.69	2.90	3.34
1992	11.17	8.46	8.17	3.85	3.70	4.55
1993	10.69	8.32	8.37	4.62	4.38	4.40
1994	10.70	8.62	6.98	5.67	4.57	4.84
1995	9.79	7.36	6.37	4.76	3.98	4.03
1996	11.00	8.11	8.42	5.04	4.34	4.57
1997	11.91	9.39	10.60	5.51	4.93	4.89
1998	13.48	10.21	12.67	5.83	5.51	6.06
1999	12.50	11.58	17.60	5.22	5.14	7.27
1970–98	7.10	6.33	7.42	3.58	3.45	3.51
1970–79	4.65	5.79	8.82	2.75	3.16	3.31
1980–89	6.70	5.39	5.26	3.43	3.06	2.83
1990–98	10.26	7.98	8.27	4.65	4.21	4.47
1994–98	11.38	8.74	9.01	5.36	4.67	4.88
1996–98	12.13	9.24	10.56	5.46	4.93	5.17
<i>B. Fixed-composition portfolio income growth rate</i>						
1990	0.101	0.081	0.094	0.055	-0.066	0.005
1991	0.076	0.009	0.038	-0.045	0.044	-0.145
1992	0.099	0.091	0.076	0.101	0.095	0.033
1993	0.268	0.123	0.050	0.142	0.165	0.086
1994	0.207	0.135	0.152	0.183	0.134	0.120
1995	0.227	0.185	0.141	0.172	0.176	0.138
1996	0.159	0.102	0.055	0.114	0.057	0.111
1997	0.222	0.161	0.139	0.209	0.135	0.142
1998	0.187	0.142	0.097	0.176	0.037	0.039
1970–98	0.138	0.115	0.106	0.125	0.095	0.071
1970–79	0.136	0.134	0.140	0.143	0.116	0.105
1980–89	0.111	0.099	0.084	0.112	0.084	0.051
1990–98	0.170	0.113	0.093	0.120	0.084	0.055
1994–98	0.200	0.145	0.116	0.170	0.107	0.109
1996–98	0.189	0.135	0.096	0.166	0.076	0.096
<i>C. Varying-composition portfolio income growth rate</i>						
1990	0.010	-0.041	0.132	0.083	0.056	0.063
1991	0.038	0.076	0.136	0.077	0.152	-0.155
1992	-0.149	-0.059	0.054	0.159	0.163	0.044
1993	0.253	0.131	0.012	0.100	0.079	0.171
1994	0.078	0.082	0.269	0.046	0.108	0.117
1995	0.068	0.187	0.122	0.202	0.175	0.235
1996	0.112	0.098	-0.024	0.168	0.125	0.206
1997	0.089	0.070	0.053	0.225	0.131	0.217
1998	-0.041	0.092	0.120	0.295	0.122	-0.043
1970–98	0.092	0.112	0.100	0.173	0.139	0.127
1970–79	0.154	0.137	0.119	0.220	0.155	0.158
1980–89	0.074	0.128	0.086	0.149	0.137	0.132
1990–98	0.046	0.068	0.094	0.148	0.123	0.088
1994–98	0.060	0.105	0.104	0.184	0.132	0.141
1996–98	0.051	0.087	0.048	0.228	0.126	0.120

**Table 4. Operating Income before Extraordinary Items Available for Common Equity, 1970–98**

Year	Growth			Value		
	Small	Medium	Large	Small	Medium	Large
<i>A. Price-to-income ratio</i>						
1990	29.63	17.38	17.07	47.64	14.74	13.68
1991	30.83	16.34	16.96	35.83	16.28	13.47
1992	79.63	26.69	23.82	-58.91	26.05	27.01
1993	57.00	23.95	21.17	66.51	21.11	27.39
1994	46.95	26.04	20.50	37.86	18.86	20.36
1995	37.94	21.39	17.04	28.73	13.63	12.65
1996	41.92	22.82	22.58	22.64	16.22	14.96
1997	53.17	25.34	23.53	23.16	17.85	15.20
1998	88.14	33.07	29.55	23.24	20.48	19.92
1999	274.80	37.52	39.84	26.32	21.05	23.95
1970–98	28.77	17.63	18.64	29.06	13.46	12.23
1970–79	13.22	14.76	21.94	9.98	9.69	9.77
1980–89	23.69	15.06	12.91	51.62	12.82	9.24
1990–98	51.69	23.67	21.36	25.19	18.36	18.29
1994–98	53.62	25.73	22.64	27.13	17.41	16.62
1996–98	61.08	27.08	25.22	23.01	18.18	16.69
<i>B. Fixed-composition portfolio income growth rate</i>						
1990	-0.098	-0.034	0.053	-0.032	-0.233	-0.141
1991	-0.599	-0.057	-0.089	-1.081	-0.094	-0.418
1992	0.411	0.169	0.172	NM	0.623	-0.039
1993	0.480	0.096	-0.068	1.658	0.427	0.510
1994	0.135	0.212	0.254	0.603	0.420	0.465
1995	0.151	0.148	0.058	0.585	0.224	0.114
1996	-0.064	0.077	0.170	0.169	0.086	0.249
1997	-0.103	-0.052	0.076	0.543	0.120	0.049
1998	-0.520	0.083	0.086	0.006	-0.033	0.045
1970–98	0.025	0.078	0.096	NM	0.120	0.050
1970–79	0.118	0.126	0.152	0.220	0.135	0.096
1980–89	0.054	0.041	0.061	0.606	0.088	0.002
1990–98	-0.097	0.067	0.074	NM	0.141	0.055
1994–98	-0.120	0.090	0.126	0.358	0.154	0.174
1996–98	-0.261	0.034	0.110	0.220	0.056	0.110
<i>C. Varying-composition portfolio income growth rate</i>						
1990	-0.126	-0.036	0.061	-0.367	-0.185	-0.077
1991	-0.646	-0.017	-0.079	-1.093	-0.101	-0.363
1992	1.120	0.094	0.263	NM	0.583	-0.029
1993	0.523	0.128	-0.048	0.313	0.305	0.668
1994	0.056	0.128	0.339	0.314	0.320	0.555
1995	0.204	0.118	0.048	0.327	0.178	0.240
1996	-0.025	0.144	0.166	0.217	0.017	0.326
1997	-0.156	-0.068	0.083	0.592	0.122	0.049
1998	-0.639	0.057	0.118	-0.086	0.033	-0.009
1970–98	0.028	0.101	0.105	0.156	0.129	0.120
1970–79	0.160	0.146	0.135	0.226	0.176	0.151
1980–89	0.030	0.097	0.082	0.041	0.093	0.099
1990–98	-0.103	0.058	0.098	0.217	0.120	0.109
1994–98	-0.177	0.073	0.147	0.253	0.129	0.216
1996–98	-0.333	0.040	0.122	0.210	0.056	0.113

NM = not meaningful.

**Table 5. Cash Dividends to Common Equity, 1970–98**

Year	Growth			Value		
	Small	Medium	Large	Small	Medium	Large
<i>A. Price-to-dividends ratio</i>						
1990	112.71	51.37	42.91	37.65	22.43	23.06
1991	95.04	42.05	38.84	23.38	20.47	19.98
1992	156.26	60.86	51.15	37.97	29.83	24.47
1993	167.56	65.53	48.88	53.74	33.84	26.32
1994	146.42	79.38	43.37	68.94	31.83	30.98
1995	149.41	72.97	42.95	58.29	31.26	27.93
1996	206.58	87.63	53.06	57.01	38.74	31.62
1997	216.95	100.58	62.69	65.54	41.33	40.85
1998	308.09	128.55	73.52	77.20	54.24	54.57
1999	271.69	131.32	109.38	62.73	48.51	59.08
1970–98	100.60	52.13	43.83	35.96	24.29	22.23
1970–79	46.48	39.41	49.51	25.96	20.36	19.55
1980–89	89.37	42.88	31.87	30.35	19.70	16.94
1990–98	173.22	76.55	50.82	53.30	33.77	31.09
1994–98	205.49	93.82	55.12	65.40	39.48	37.19
1996–98	243.87	105.59	63.09	66.58	44.77	42.35
<i>B. Fixed-composition portfolio dividend growth rate</i>						
1990	0.030	0.065	0.118	0.139	-0.092	0.009
1991	0.183	0.022	0.122	-0.118	-0.027	-0.030
1992	-0.051	0.040	0.109	-0.064	0.069	0.018
1993	0.224	0.068	0.084	0.102	0.189	-0.023
1994	0.057	0.096	0.099	0.147	-0.014	0.040
1995	0.078	0.110	0.087	0.205	0.093	0.265
1996	0.238	0.119	0.118	0.044	0.129	-0.069
1997	-0.082	0.097	0.117	0.138	0.045	0.078
1998	0.204	0.076	0.091	0.193	0.158	0.126
1970–98	0.123	0.093	0.109	0.112	0.082	0.060
1970–79	0.145	0.122	0.124	0.107	0.087	0.068
1980–89	0.130	0.080	0.097	0.144	0.101	0.070
1990–98	0.092	0.077	0.105	0.082	0.057	0.042
1994–98	0.093	0.100	0.102	0.144	0.080	0.083
1996–98	0.110	0.097	0.109	0.123	0.110	0.042
<i>C. Varying-composition portfolio dividend growth rate</i>						
1990	0.054	0.139	0.130	-0.071	-0.048	0.071
1991	0.127	0.111	0.173	0.036	-0.013	0.026
1992	-0.241	0.014	0.034	-0.060	0.067	0.011
1993	0.251	0.030	0.088	0.059	0.179	-0.041
1994	0.121	-0.060	0.103	0.006	0.044	0.078
1995	-0.041	0.070	0.031	0.266	0.115	0.366
1996	0.100	0.091	0.163	0.151	0.136	-0.090
1997	-0.211	0.004	0.038	0.171	0.039	0.137
1998	0.033	-0.074	0.158	0.252	0.159	0.019
1970–98	0.059	0.081	0.099	0.144	0.120	0.105
1970–79	0.132	0.110	0.103	0.142	0.116	0.114
1980–89	0.034	0.095	0.093	0.202	0.169	0.139
1990–98	0.009	0.034	0.101	0.084	0.073	0.058
1994–98	-0.007	0.004	0.097	0.165	0.098	0.092
1996–98	-0.036	0.005	0.118	0.191	0.110	0.018

in the 29 years beginning in 1970 covered in our sample, the three highest returns on the large-cap growth portfolio occurred within the last four years. The relative valuation had become even more extreme by late 1999. This strong recent price performance of large-cap growth stocks defies what has been the previous pattern of stock returns, which generally favored small-cap and value stocks.

Clearly, the recent history of returns and relative valuations suggests that a major disruption has occurred. Possibly, a new economic paradigm is emerging that is making and will continue to make large-cap growth stocks shine. The rational-asset-pricing hypothesis suggests that the cause of the change is recent large shocks to the operating performance (or investors' expectations about future operating performance) of the equity asset classes. The behavioral hypothesis suggests that once the leap in prices of certain sectors had sparked investor enthusiasm, returns were further boosted as investors chased performance.

We tried to sort out these hypotheses by examining the evolution of the equity asset classes' operating performance over the recent past. We conclude that the operating performance of large-cap growth stocks in recent years cannot have been the trigger for their huge stock returns. Over the 1996–98 period, large-cap growth stocks earned a return of 34 percent a year, but their operating performance for this period was not outstanding when compared with the past. In terms of sales, for instance, the growth rate for the three years was 6 percent a year but the average for these companies was 10.3 percent for the entire sample period. The results are similar for operating income before depreciation; this measure grew by 9.6 percent a year for these companies from 1996 through 1998, which is not very different from their overall past mean of 10.6 percent. Moreover, the operating performance of small-cap and mid-cap value stocks was by no means disappointing.

Of course, the future growth in profits of large-cap growth stocks may be radically different from the long-term past. But when the historical record is considered, the assumptions that would justify the sky-high relative valuations of large-cap growth stocks are very bold. Consider this simple illustration: One can easily find today a stock trading at 60 times earnings or even higher. Suppose the P/E multiple reverts to a more representative value of 20. To be very generous, assume further that the adjustment will take place over 10 years, during which time investors are content to accept a zero rate of return on the stock. The result of these assumptions is that earnings for this company must triple over 10

years. To hit such a bogey is not easy. Growth at this rate would rival the historical performance of the most successful companies of the past—large pharmaceutical companies, for example.

Now consider a case that is closer to reality. Assume that investors require a rate of return of 10 percent a year on a stock. In this case, earnings would have to rise sevenfold in 10 years—an accomplishment in the league of what Intel pulled off in the past. Operating performance would have to be even more stellar if the long-term multiple is less than 20 (Siegel 1999 recently suggested that a typical P/E of 14 is not unreasonable). Moreover, the investors that are flocking to the market today would probably not be satisfied with a return of 10 percent.

In short, many stocks currently selling at rich P/E multiples have a good chance of disappointing investors in the future. Yet, investors today commonly bid enthusiastically for a stock at a price 60 or more times earnings and lavish valuations in the tens of billions of dollars on companies that have yet to show a positive profit.

Asness, Friedman, Krail, and Liew (2000) provided additional evidence on whether the current differences in the relative valuations of the equity classes are the result of differences in expected growth in future earnings. Based on consensus forecasts of future 12-month earnings from the I/B/E/S database, they found that the spread in expected earnings growth cannot explain the current spread in valuation multiples.

One lesson from history is that it is very difficult for a company to maintain a dominant competitive edge for long periods. Given the fast pace of technological innovation and heightened competition of today, we conclude that it is unlikely to get any easier for a company to stay ahead of its rivals. As a result, it stretches plausibility to expect that many companies in the future will enjoy prolonged periods of high growth that will justify their high current multiples. Technological advances in certain industries have generated enormous benefits for end-users and consumers, but whether shareholders in these industries' companies stand to reap similarly large gains is an entirely different matter.

In short, we found that the recent relative stock price performance of the equity asset classes cannot be explained by differences in their operating performance. In this respect, the evidence does not support the rational-asset-pricing hypothesis or the new-paradigm thesis. Although future growth in profitability may differ radically from the past, the most likely explanation for the recent behavior of U.S. equity prices is a behavioral or institutional one.

## **Appendix A. Calculation of Stock Returns and Operating Performance**

This appendix provides details about the procedures we used for calculating returns and operating performance for the six portfolios based on combinations of size and value style versus growth style.

### **Return to Size/Style**

We measured returns to the equity classes as though each portfolio was governed by a buy-and-hold investment strategy. At the end of the December that fell 18 months after the stocks in each class were identified, we invested in a value-weighted portfolio of the companies available in each class (based on December market values) and held it for the following year. If a company was delisted during the year, we took the value held in that stock and reinvested it in the remaining issues. At the end of the next December, we took the ending value of the portfolio (including dividends) and used it to buy a new value-weighted portfolio. The refreshed portfolio was made up of companies belonging to the same equity asset class, as identified by the classification 18 months earlier. In this way, for each of the six equity asset classes, we built up a time series of annual value-weighted returns starting in calendar year 1970 and ending in calendar year 1998.

### **Operating Performance**

To take a specific example, suppose the objective is to assess growth in operating performance as measured by earnings. The standard approach for an index, such as the S&P 500, is to cumulate the earnings of all companies in the index each year and then find the percentage change in total earnings. The problem is that the composition of the index changes from one year to the next, so the growth in earnings of the index is based on a comparison of different sets of companies.

Another approach is to take the average (either a simple average or a value-weighted average) of the earnings growth rate of all the companies in an index or portfolio. The average growth rate calculated in this way implicitly gives more influence, however, to companies with high P/Es. For instance, consider two companies with identical earnings of \$1 in a given year. In the next year, one company's earnings grow to \$1.10 while the other's earnings grow to \$1.50. The simple mean growth rate is 30 percent. This corresponds to the earnings growth rate experienced by an investor who purchased one share of each stock, which means the investor had to have made a larger investment in the stock with the higher price and higher P/E.<sup>12</sup>

The upshot is that standard measures of growth in profitability are flawed in one way or another. We adopted a new approach that is similar to the buy-and-hold strategy underlying the measurement of returns.

**Fixed-Composition Growth Rate.** When we calculated the growth in earnings for one of our asset classes, the procedure was as follows.<sup>13</sup> Recall that our return calculations reflected an initial investment at the end of each December in a value-weighted portfolio of all the stocks belonging to that equity asset class. Suppose we started with \$100, which allowed us to buy some percentage of the portfolio. We could calculate the total earnings generated by this portfolio as of the investment date and calculate our stake in these earnings as determined by our percentage ownership of the portfolio. The amount of these earnings was considered the "base earnings number." Similarly, we could see how much the portfolio's earnings and our fractional share were at the end of the subsequent year.<sup>14</sup> We called this figure the "final earnings number." The growth in the portfolio's earnings was the percentage difference between the final and base earnings numbers. Note that the calculation compared identical companies over adjacent years.

We then moved ahead one year, refreshed the membership of each equity class portfolio, and repeated the calculations. The result was a sequence of fixed-composition annual growth rates in operating variables beginning in 1970 and ending in 1998.

**Varying-Composition Growth Rate.** To facilitate comparisons with the standard approach used for popular market indexes, we also used another procedure for calculating growth rates. As in the first method, we started with \$100 invested at the beginning of 1970 in an equity class portfolio. At the end of the year, we calculated the earnings that our investment in the portfolio generated. Then, we liquidated our investment and reinvested the amount (together with all dividends) in the reconstituted equity class portfolio. We repeated these steps at each subsequent year-end.

The growth of earnings calculated in this manner depends not only on the operating profitability of the stocks in the portfolio but also on the returns earned on the stocks. Hence, if a portfolio's past returns were high, the portfolio's earnings could grow simply because we had more funds to invest.<sup>15</sup> As a result, under this procedure, the growth over time in the earnings for an equity class portfolio partly reflected its past returns as well as its operating performance.

## Notes

- Whether investment strategies based on the patterns in historical returns are profitable involves additional considerations, such as the degree of turnover and trading costs necessitated by the strategy (as pointed out by Fouse in 1989, for example). Because our main focus is not on assessing the profitability of specific investment strategies, these considerations are beyond the scope of this article.
- Shleifer (1999) provides further discussion of how investor sentiment and overreaction can lead to departures from market efficiency.
- One example of such popularizations is the highly influential and informative book by Siegel (1994).
- In the earlier years of our sample period, fewer than 3,000 stocks were available for classification. So, we used the corresponding percentage of available companies as large, medium, or small. Specifically, we considered 200/3,000 (or roughly 7 percent of the available stocks) to be large, 800/3,000 (27 percent) to be medium, and so on. The total number of available companies in our sample rose above 3,000 in 1975.
- Our approach to value-versus-growth classification resembles that of Standard & Poor's and BARRA.
- Although cases of a stock having a negative book value did not occur frequently, we classified those stocks as value.
- We also used a shorter window, but the results were generally similar.
- The varying-composition method assumed reinvestment of all capital gains and dividends in the portfolio at the end of each year. Thus, performance improvement computed in this manner depended not only on the operating performance of the companies in the portfolio but also on the returns earned on the companies' stocks. The fixed-composition growth rates were not affected by the portfolio's past return. Further details about the procedures used for calculating returns and earnings growth are in Appendix A.
- The reported behavior of the large-cap value portfolio toward the end of the sample period may also have been influenced by our classification procedure. Given the high returns that large-cap growth stocks have earned in the past few years, the largest 200 stocks in recent years are more likely to have been drawn from this subset. As a result, what we deemed to be value stocks out of the top 200 companies may currently be more growth-oriented than was the case in the past. For example, over the total 1970–98 sample period, the large-cap value portfolio had a value-weighted average decile ranking on BV/MV of 6.2 (where 1 is low and 10 is high). In 1998, the portfolio's average BV/MV rank was 4.7.
- The make-up of the different equity classes was quite stable. Of the companies classified as small-cap value in a given year, for example, on average, about 73 percent (as a percentage of the portfolio's market capitalization) remained in the portfolio in the next year. For the mid-cap and large-cap value portfolios, the averages were 79 percent and 88 percent, respectively. The corresponding statistics for the small-cap, mid-cap, and large-cap growth portfolios were roughly comparable.
- Another reason for caution concerns the accounting conventions for measuring net income. Some have argued that to the extent that the value of stock options granted to employees is not counted as compensation expenses, measured earnings may be overstated. This problem may be more severe for companies in the "new economy" technology sector, where employee stock options are used more widely than in "old economy" companies. Another cause for caution is that the high returns earned on stock market investments in recent years have helped companies with defined-benefit pension plans lower the cost of funding their pension liabilities. In the event that returns in the future fall, such funding costs may rise.
- See the discussion in Ikenberry and Lakonishok (1993).
- For additional details on this methodology, see Givoly and Lakonishok (1993), Ikenberry and Lakonishok, and Chan, Lakonishok, and Sougiannis (1999).
- Not all companies survived for a full year after the initial investment date. We assumed that each of the nonsurviving companies earned the average earnings of the surviving companies.
- This issue arises whenever the composition of a portfolio changes over time. If the same stocks remain in the portfolio, the fact that they have higher (or lower) past returns than other stocks does not distort the calculation of the portfolio's earnings. The fractional ownership of the portfolio stays the same, so any growth reflects the growth in earnings. If new stocks that do not have similarly high past returns are introduced into the portfolio, then the available funds allow the purchase of more of those stocks; so, everything else being the same, the portfolio's earnings will rise.

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