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When Is Stock Picking Likely to Be Successful? Evidence from Mutual Funds

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Consistent with a costly arbitrage equilibrium in which arbitrage costs insulate mispricing, this study finds that mutual fund managers have stock-picking ability for stocks with high idiosyncratic volatility but not for stocks with low idiosyncratic volatility. These findings suggest that fund managers and other investors may want to pay special attention to high-idiosyncratic-volatility stocks because they provide fertile ground for stock picking. The study also finds that the stock-picking ability of the average mutual fund manager declined after the extreme growth in the number of both mutual funds and hedge funds in the late 1990s.

Can mutual fund managers pick stocks? If markets are efficient, the answer is no, because information is both fully and instantaneously reflected in prices. Alternatively, if costs prevent arbitrage from being fully effective, markets may be inefficient and profitable trading opportunities may arise. We used this logic to develop a new approach to detect fund manager skill. Our approach is built on the idea that if fund managers can pick stocks, their stock-picking ability should be most evident in stocks with high arbitrage costs, because these stocks can have persistent mispricing.

The arbitrage cost on which we focus is idiosyncratic volatility. The larger the weight that an arbitrageur places on a stock, the more the stock's idiosyncratic variance affects the portfolio's variance. Treynor and Black (1973) and Pontiff (2006) modeled this logic in a mean–variance framework and showed that arbitrageurs choose portfolio weights that are inversely related to each stock's idiosyncratic volatility. Extending Treynor and Black's logic, Pontiff (1996, 2006) and Shleifer and Vishny (1997) contended that in equilibrium, arbitrageurs will push alphas toward zero but will do so less for high-idiosyncratic-risk stocks because arbitrageurs are less willing to take large positions in those securities. Hence, the largest mispricing should be found in the highest-idiosyncratic-risk stocks because such stocks receive the least arbitrage resources. This line of reasoning suggests that high-idiosyncratic-volatility stocks should provide fertile ground for stock picking.

The evidence regarding the stock-picking ability of mutual fund managers is mixed. Using mutual fund holdings data, Wermers (2000) found evidence of stock-picking ability; using mutual fund return data, Carhart (1997) found no evidence of manager ability. Using the aggregate changes in quarterly holdings of U.S. equity mutual funds as a trade proxy, Chen, Jegadeesh, and Wermers (CJW 2000) found that stocks bought by funds outperform stocks sold by funds—a finding consistent with fund manager ability.

In this study, we followed CJW and used their trade proxy. Our use of trades was motivated by the findings in Kothari and Warner (2001), whose simulation evidence showed that trades are better than holdings at detecting manager ability. We found that CJW's results are mainly driven by stocks with high idiosyncratic volatility. Among stocks with high idiosyncratic volatility, those heavily bought by funds significantly outperform those heavily sold by funds. When idiosyncratic volatility is low, however, stocks heavily bought by funds have similar returns to stocks heavily sold by funds. These findings are consistent with a costly arbitrage equilibrium.

A complementary explanation of our findings is that stocks with high idiosyncratic volatility have had large streams of company-specific information, thereby providing opportunities for company-specific information production and stock picking. This line of reasoning is suggested in Morck, Yeung, and Yu (2000) and in Durnev, Morck, Yeung, and Zarowin (2003). Company-specific information can

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be costly to acquire. Investors who spend resources gathering company-specific information (e.g., mutual fund managers) should be able to use this information to make profitable trades. This line of reasoning is consistent with the arguments in Grossman and Stiglitz (1980).

Motivated by the CJW (2000) study of mutual fund trades from 1975 to 1994, we also studied how mutual fund managers' stock-picking abilities have changed over time. In the pre-1995 part of our sample, we found, like CJW, that mutual fund managers have stock-picking ability. In the post-1995 part of our sample, however, we found that CJW's aggregate trade measure does not predict returns; but even in that part of our sample, mutual fund managers do fare better when they trade in stocks with high idiosyncratic volatility. Barras, Scaillet, and Wermers (forthcoming) found that mutual fund managers' stock-picking ability has declined to almost zero since the mid-1990s. Barras et al. looked at performance at the fund level, whereas we examined stock-level performance. We provided the additional insight that manager ability is evident only in high-idiosyncratic-volatility stocks.

The decline in aggregate stock-picking ability of mutual funds could be the result of the extreme growth in both mutual funds and hedge funds. The number of unique U.S. equity mutual fund portfolios increased sevenfold over our sample period, from 305 in 1980 to 2,160 in 2003 (see Panel A of **Figure 1**). Moreover, between 1988 and 2003, the estimated number of hedge funds grew from about 1,000 to more than 8,000 (see Panel B of Figure 1).

This huge surge in the number of both mutual funds and hedge funds has plausibly had two effects. First, if more managers are chasing abnormal return opportunities, such opportunities should be less abundant. Second, the average quality of mutual fund managers may have decreased. In the last decade, the mutual fund industry has seen a substantial influx of new managers and analysts. Moreover, mutual funds must compete with hedge funds for good managers because managing a hedge fund is potentially more lucrative than managing a mutual fund. Thus, many of the mutual fund managers who generated the abnormal returns before 1995 are possibly working at hedge funds now. Our sample includes only the trades of mutual funds.

Data and Methodology

Our data on mutual fund holdings are from the CDA/Spectrum Mutual Fund Common Stock Holdings database. This database contains the quarterly holdings of virtually all U.S. mutual funds (for more details on the construction of the database, see Wermers 1999, Appendix A). During our sample period, U.S. SEC regulation N30-D required U.S. mutual funds to report their holdings twice a year.[1] Our CDA/Spectrum data begin in the first quarter of 1980 and end in the last quarter of 2003. We also used monthly stock-level data from the CRSP files.

Following CJW (2000), we constructed an aggregate quarterly trading measure (*Trades*), as shown in the following equation:

$$Trades_{i,t} = \frac{SharesHeld_{i,t}}{TotalShares_{i,t}} - \frac{SharesHeld_{i,t-1}}{TotalShares_{i,t-1}}.$$

For each stock, we first measured its quarterly fractional holdings, which is the total number of shares of stock i held by all mutual funds in our sample at time t, divided by the total shares outstanding of stock i at time t. We subtracted the quarterly fractional holdings of stock i at time $t-1$ from the quarterly fractional holdings of stock i at time t; the difference is *Trades*, our aggregate quarterly trading measure. *Trades*, therefore, measures the aggregate change in quarterly holdings of stock i for the entire mutual fund industry. Our sample consists of 101,069 *Trades* observations.

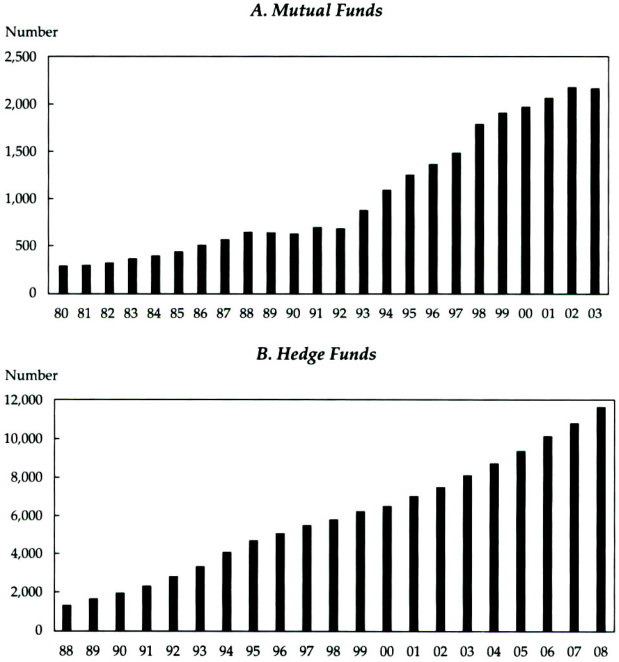
Results Based on *Trades*

Table 1 reports the gross returns of different *Trades* portfolios. To form the portfolios, we performed quarterly sorts of the stocks in our sample on the *Trades* measure. If a stock's *Trades* value was greater (less) than zero, it was a buy (sell) and was placed in the buy (sell) portfolio. We also placed each stock into a quintile on the basis of its *Trades* measure. Quintile 1 is for the highest values of *Trades*, and Quintile 5 is for the lowest values. We formed the quintiles quarterly.

Table 1 reports the results for the entire sample (1980–2003) and for two subsamples (1980–1994 and 1995–2003). The CJW (2000) sample spanned 1975 through 1994; thus, our second subsample (1995–2003) is completely outside their sample.[2] We examined 3-, 6-, and 12-month buy-and-hold subsequent returns. Following CJW, we value-weighted the portfolios' returns by the market value of each trade. We formed the portfolios quarterly; thus, the 6- and 12-month returns overlap, and we adjusted the standard errors according to the method of Newey and West (1987).

In Table 1, the results for both the entire sample and the 1980–94 subsample imply that, in aggregate, mutual fund managers have stock-picking ability. In the full sample, the buy portfolio has

Figure 1. Number of Mutual Funds and Hedge Funds



Notes: Panel A plots the annual number of U.S.-domiciled domestic equity mutual funds. Different share classes of the same fund are manually merged to avoid double counting and provide a count of unique mutual fund portfolios. Panel B plots the annual number of hedge funds (numbers for 2004–2008 are projections).

Sources: The data for Panel A were provided by Schwarz (2008). Panel B is based on data downloaded from www.hedgefund.com (Van Hedge Fund Advisors International, LLC).

larger returns than the sell portfolio for all three horizons, although the differences are not statistically significant. The differences in returns between Quintile 1 and Quintile 5 are positive for all three horizons and significantly so for the three- and six-month horizons. For example, the difference in returns for the three-month horizon is 1.44 percent (p-value = 0.033).

The results are much stronger for the 1980–94 subsample. The buys outperform the sells for all three return horizons, and the 3- and 12-month horizon differences are statistically significant. Quintile 1 also significantly outperforms Quintile 5 for each of the three return horizons. The differences in returns between Quintiles 1 and 5 are 1.89 percent (p-value = 0.004), 2.40 percent (p-value = 0.009), and 4.99 percent (p-value = 0.050) for the 3-, 6-, and 12-month horizons. These results are qualitatively similar to those in CJW (2000), who also reported strong manager stock-picking ability in their sample.

In the 1995–2003 subsample (subsequent to CJW's sample), fund managers do not appear to have stock-picking ability. In fact, the sells actually have higher returns than the buys at every horizon, but the difference is significant only for the 12-month horizon. Quintile 1 has higher returns than Quintile 5 at the three- and six-month horizons, but neither of these differences is statistically significant.

Table 1. Gross Returns of Stocks Traded by Mutual Funds (*p*-values in parentheses)

	Whole Sample (1980–2003) Number of Stock/Quarters: 101,069			Subsample 1 (1980–1994) Number of Stock/Quarters: 33,229			Subsample 2 (1995–2003) Number of Stock/Quarters: 67,840		
	3-Month	6-Month	12-Month	3-Month	6-Month	12-Month	3-Month	6-Month	12-Month
Buys (*Trades* > 0)	4.36%	8.43%	16.01%	4.61%	9.27%	18.29%	3.94%	6.96%	11.74%
Sells (*Trades* < 0)	4.12	8.14	15.96	3.84	8.45	15.82	4.58	7.59	16.23
Buys – Sells	0.25%	0.29%	0.05%	0.76%*	0.82%	2.47%**	–0.64%	–0.64%	–4.49%**
	(0.584)	(0.690)	(0.970)	(0.080)	(0.262)	(0.047)	(0.514)	(0.687)	(0.040)
Quintile 1 (top)	5.34%	10.03%	18.19%	5.66%	10.77%	20.66%	4.80%	8.72%	13.56%
Quintile 2	3.78	7.51	14.80	4.19	9.06	17.75	3.07	4.78	9.28
Quintile 3	3.80	7.31	14.70	4.23	8.23	16.76	3.07	5.69	10.83
Quintile 4	3.99	7.65	14.55	3.79	7.47	15.11	4.32	7.96	13.49
Quintile 5 (bottom)	3.90	8.01	15.68	3.77	8.37	15.67	4.12	7.39	15.68
Top – Bottom	1.44%**	2.02%*	2.52%	1.89%***	2.40%***	4.99%**	0.68%	1.33%	–2.12%
	(0.033)	(0.069)	(0.232)	(0.004)	(0.009)	(0.050)	(0.642)	(0.614)	(0.626)

Notes: This table reports buy-and-hold returns on various stock portfolios formed on the basis of mutual fund trades. At the end of each quarter, the fractional change of the market capitalization of each stock that is held by the universe of mutual funds (*Trades*) is computed using the CDA/Spectrum Mutual Fund Common Stock Holdings database. Next, at the end of each quarter, stocks are ranked on the basis of *Trades*, and the most bought 20 percent of stocks are assigned to Quintile 1, the next 20 percent, to Quintile 2, and so on. The 3-, 6-, and 12-month buy-and-hold gross returns are computed on the aggregate portfolio of all stocks bought by funds, Buys (*Trades* > 0), the aggregate portfolio of all stocks sold by funds, Sells (*Trades* < 0), and returns on quintile portfolios formed from the ranking on *Trades* measures. In all cases, buy-and-hold returns on holding portfolios are based on a strategy of purchasing the net change in shareholdings of each stock during the formation quarter. *p*-Values are adjusted for serial correlation by using Newey–West standard errors.

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

As discussed earlier, this decrease in stock-picking ability could be the result of the large increase in the number of both mutual funds and hedge funds during this period (see Figure 1). The increase in funds may have made markets more efficient, resulting in fewer stock-picking opportunities. Moreover, the average manager's ability may have declined because of both the influx of new managers and the loss of some good managers to hedge funds.

Alternatively, the decline in stock-picking ability may have been caused by an increase in fund manager herding. Brown, Wei, and Wermers (2008) showed that herding increased over our sample period and that return reversals in the subsequent year are prevalent in stocks that managers herd. Hence, both the weak results over the 12-month holding period and the weakening of manager ability in our second subsample (1995–2003) are consistent with the findings of Brown et al.

Table 2 reports benchmark-adjusted returns. We used benchmarks developed by Daniel, Grinblatt, Titman, and Wermers (DGTW 1997). The DGTW adjustment accounts for size, book-to-market, and momentum effects. To create the DGTW adjustment, DGTW sorted stocks first on market values, then on book-to-market values, and finally on past returns. The result was 125 different portfolios, for which monthly returns were calculated. We adjusted each stock's monthly return by subtracting the monthly return of the matching DGTW portfolio during the same period.[3]

The results in Table 2 are qualitatively similar to those in Table 1. In the full sample, managers appear to have stock-picking ability; Quintile 1 outperforms Quintile 5 by 1.21 percent (p-value = 0.023), 1.89 percent (p-value = 0.050), and 2.52 percent (p-value = 0.130), respectively, for the 3-, 6-, and 12-month horizons. These results, however, are driven mainly by the 1980–94 subsample. In that period, Quintile 1 outperforms Quintile 5 by 1.46 percent (p-value = 0.007), 1.96 percent (p-value = 0.007), and 3.59 percent (p-value = 0.010) for the 3-, 6-, and 12-month horizons. Moreover, the buys outperform the sells for all three horizons. These results are similar to those reported by CJW (2000).

Like our gross return results, the DGTW-adjusted return results for our 1995–2003 subsample suggest that fund manager stock-picking ability is

Table 2. DGTW-Adjusted Returns of Stocks Traded by Mutual Funds
(*p*-values in parentheses)

	Whole Sample (1980–2003)			Subsample 1 (1980–1994)			Subsample 2 (1995–2003)		
	Number of Stock/Quarters: 85,777			Number of Stock/Quarters: 30,145			Number of Stock/Quarters: 55,632		
	3-Month	6-Month	12-Month	3-Month	6-Month	12-Month	3-Month	6-Month	12-Month
Buys (*Trades* > 0)	0.56%	1.02%	1.61%	0.52%	0.98%	1.55%	0.62%	1.09%	1.73%
Sells (*Trades* < 0)	0.13	0.28	0.89	–0.24	0.02	–0.44	0.78	0.73	3.36
Buys – Sells	0.42%	0.74%	0.73%	0.76%*	0.96%*	1.99%**	–0.16%	0.36%	–1.64%
	(0.300)	(0.316)	(0.511)	(0.062)	(0.097)	(0.019)	(0.854)	(0.843)	(0.536)
Quintile 1 (top)	1.20%	2.15%	3.22%	1.17%	1.92%	2.99%	1.24%	2.56%	3.63%
Quintile 2	0.22	0.44	0.77	0.27	0.88	1.23	0.14	–0.35	–0.10
Quintile 3	0.05	0.06	0.42	0.23	0.16	0.42	–0.25	–0.10	0.42
Quintile 4	0.49	0.62	0.53	0.15	0.11	–0.13	1.08	1.51	1.75
Quintile 5 (bottom)	–0.02	0.26	0.70	–0.29	–0.03	–0.59	0.45	0.78	3.12
Top – Bottom	1.21%**	1.89%*	2.52%	1.46%***	1.96%***	3.59%**	0.79%	1.78%	0.51%
	(0.023)	(0.050)	(0.130)	(0.007)	(0.007)	(0.010)	(0.484)	(0.456)	(0.898)

Notes: See notes to Table 1. This table reports buy-and-hold adjusted returns on various stock portfolios formed on the basis of mutual fund trades. Each buy-and-hold stock return is adjusted by subtracting the buy-and-hold return on the matching DGTW portfolio during that holding period. The matching DGTW portfolio was developed by Daniel, Grinblatt, Titman, and Wermers (1997). The 3-, 6-, and 12-month buy-and-hold DGTW-adjusted returns are computed on the aggregate portfolio of all stocks bought by funds, Buys (*Trades* > 0), the aggregate portfolio of all stocks sold by funds, Sells (*Trades* < 0), and returns on quintile portfolios formed from the ranking on *Trades* measures.

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

not present in that period. The returns of Quintile 1 are higher than those of Quintile 5 for every horizon, but none of the differences is statistically significant.

Results Based on *Trades* and Idiosyncratic Volatility

We cross-sorted our *Trades* portfolios into idiosyncratic volatility portfolios. We constructed two measures of idiosyncratic volatility: (1) the standard deviation of monthly returns that are orthogonal to the market (with the value-weighted CRSP index as a proxy for the market) and (2) the standard deviation of monthly returns that are orthogonal to the Fama–French–Carhart four-factor model (Fama and French 1996; Carhart 1997). The Fama–French–Carhart four-factor model augments the market model by accounting for the effects of size, book to market, and momentum on individual stock returns:[4]

$$r_i = r_f + \beta_1(r_m - r_f) + \beta_2 SMB + \beta_3 HML + \beta_4 UMD + e_i.$$

We estimated idiosyncratic volatility by regressing the previous 60 monthly returns of each stock on the monthly factor realizations of each model. The standard deviations of the residuals (e_i) from these regressions are our idiosyncratic volatility measures. To be included in the sample, each stock had to have at least 12 months of past-return data. We studied the two idiosyncratic volatility measures in separate tables. In each table, we placed each stock into one of five idiosyncratic volatility portfolios. Portfolio 1 is for low-volatility stocks, and Portfolio 5 is for high-volatility stocks. All the returns in this part of our analysis are DGTW adjusted.

Market Model Idiosyncratic Volatility Results. Table 3 reports the results for the cross-sorted portfolios in the 1980–94 subsample. Panels A, B, and C report the 3-, 6-, and 12-month returns. In Panel A, the only significant differences between the buys and sells occur in idiosyncratic volatility Portfolios 4 and 5 (the high-idiosyncratic-volatility portfolios); the differences are, respectively, 2.21 percent (*p*-value = 0.037) and 2.35 percent (*p*-value = 0.062). In Panel A, we also see that Quintile 1 outperforms Quintile 5 only in high-idiosyncratic-volatility stocks. The differences between Quintile 1 and Quintile 5 are 2.26 percent (*p*-value = 0.051) and 2.90 percent (*p*-value = 0.026) for idiosyncratic volatility Portfolios 4 and 5, whereas the differences in the other three portfolios are not significant.

Table 3. Mutual Fund Trading Performance and Idiosyncratic Volatility from the Market Model: Subsample 1, 1980–1994
(*p*-values in parentheses)

	1 (low var)	2	3	4	5 (high var)	High – Low Var	
A. 3-month DGTW-adjusted returns							
Buys (*Trades* > 0)	0.33%	0.09%	0.43%	0.68%	2.10%	1.77%*	(0.056)
Sells (*Trades* < 0)	0.25	0.39	–0.61	–1.53	–0.25	–0.50	(0.726)
Buys – Sells	0.08%	–0.30%	1.04%	2.21%**	2.35%*		
	(0.889)	(0.716)	(0.222)	(0.037)	(0.062)		
Quintile 1 (top)	0.17%	0.04%	0.78%	0.80%	2.71%	2.36%*	(0.053)
Quintile 2	0.57	0.07	0.31	0.71	–0.17	–0.74	(0.513)
Quintile 3	0.13	0.36	0.30	1.00	0.29	0.16	(0.885)
Quintile 4	0.40	0.21	–0.53	–0.92	–0.79	–1.17	(0.454)
Quintile 5 (bottom)	0.03	0.26	–0.69	–1.46	–0.19	–0.22	(0.872)
Top – Bottom	0.21%	–0.22%	1.47%	2.26%*	2.90%**		
	(0.810)	(0.822)	(0.114)	(0.051)	(0.026)		
B. 6-month DGTW-adjusted returns							
Buys (*Trades* > 0)	0.53%	0.43%	0.36%	1.37%	3.89%	3.36%**	(0.028)
Sells (*Trades* < 0)	0.56	1.13	–0.24	–2.04	–0.29	–0.85	(0.712)
Buys – Sells	–0.03%	–0.70%	0.60%	3.40%**	4.17%*		
	(0.972)	(0.422)	(0.504)	(0.014)	(0.075)		
Quintile 1 (top)	0.50%	0.15%	1.00%	1.71%	4.72%	4.13%**	(0.036)
Quintile 2	1.28	0.85	–0.33	0.74	2.51	1.23	(0.521)
Quintile 3	–0.08	0.81	0.00	0.81	–1.43	–1.35	(0.490)
Quintile 4	0.59	–0.07	–1.25	–0.97	–1.90	–2.47	(0.263)
Quintile 5 (bottom)	0.56	1.11	–0.44	–1.89	–0.21	–0.76	(0.726)
Top – Bottom	0.23%	–0.96%	1.44%	3.60%**	4.93%**		
	(0.856)	(0.425)	(0.278)	(0.022)	(0.044)		
C. 12-month DGTW-adjusted returns							
Buys (*Trades* > 0)	1.30%	0.95%	0.41%	3.22%	4.41%	3.11%	(0.335)
Sells (*Trades* < 0)	–0.97	1.17	0.52	–3.17	1.73	2.70	(0.577)
Buys – Sells	2.28%*	–0.22%	–0.12%	6.39%***	2.69%		
	(0.073)	(0.906)	(0.938)	(0.005)	(0.579)		
Quintile 1 (top)	2.56%	2.79%	1.69%	3.58%	5.25%	2.61%	(0.520)
Quintile 2	1.77	1.26	–1.49	1.89	2.83	1.06	(0.771)
Quintile 3	0.71	–0.09	–0.42	1.85	–0.64	–1.35	(0.739)
Quintile 4	1.02	–0.61	–3.24	–2.39	–1.19	–2.06	(0.493)
Quintile 5 (bottom)	–0.09	0.79	–0.06	–3.03	1.30	1.39	(0.767)
Top – Bottom	2.99%	2.00%	1.74%	6.62%**	3.94%		
	(0.108)	(0.475)	(0.366)	(0.015)	(0.451)		

Notes: See notes to Tables 1 and 2. This table reports buy-and-hold adjusted returns on various stock portfolios formed on the basis of mutual fund trades and stocks' idiosyncratic volatility. Each buy-and-hold stock return is adjusted by subtracting the buy-and-hold return on the matching DGTW portfolio during that holding period. The number of stock/quarter observations in this subsample is 30,145. At the end of each quarter, in addition to the fractional change of the market capitalization of each stock, the idiosyncratic volatility of each stock held by mutual funds is computed. The idiosyncratic volatility is measured by the standard deviation of the residuals from the market model, with the value-weighted CRSP index as a market proxy. In addition to being ranked on the basis of *Trades*, stocks are ranked on the basis of idiosyncratic volatility, and the lowest 20 percent of stocks are assigned to group 1, the next 20 percent, to group 2, and so on. In each idiosyncratic volatility group, the 3-, 6-, and 12-month buy-and-hold DGTW-adjusted returns are computed on the aggregate portfolio of all stocks bought by funds, Buys (*Trades* > 0), the aggregate portfolio of all stocks sold by funds, Sells (*Trades* < 0), and returns on quintile portfolios formed from the ranking on *Trades* measures.

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

The patterns in Panel B, which measures six-month returns, are very similar to those observed in Panel A. The buys outperform the sells when the trades take place in the high-idiosyncratic-volatility Portfolios 4 and 5; the differences are 3.40 percent (p-value = 0.014) and 4.17 percent (p-value = 0.075). Again, Quintile 1 is statistically different from Quintile 5 only in idiosyncratic volatility Portfolios 4 and 5. The differences between Quintile 1 and Quintile 5 are 3.60 percent (p-value = 0.022) and 4.93 percent (p-value = 0.044).

The patterns in Panel C, which measures 12-month returns, are similar to those observed in Panels A and B but are not as strong. The biggest differences between the buy and sell portfolios occur in idiosyncratic volatility Portfolios 4 and 5: 6.39 percent (p-value = 0.005) and 2.69 percent (p-value = 0.579). The biggest differences between Quintiles 1 and 5 are also in idiosyncratic volatility Portfolios 4 and 5.

Taken in its entirety, Table 3 shows that, in aggregate, mutual fund managers make profitable trades only in stocks that have high idiosyncratic volatility. These findings are consistent with a costly arbitrage equilibrium in which idiosyncratic risk prevents arbitrageurs from taking large positions in mispriced securities, and thus mispricing persists. These findings may help explain why mutual funds exhibit a preference for high-idiosyncratic-risk stocks, as documented by Falkenstein (1996). The results are stronger for the 3- and 6-month horizons as compared with the 12-month horizon. This finding suggests that the information that managers trade on is medium term.

Table 4 reports the results for the 1995–2003 portion of our sample. The results in Table 4 are similar to those in Table 3 in that the most profitable trades tend to occur in high-idiosyncratic-volatility portfolios and the information (if any) that managers trade on seems to be reflected in prices within 12 months. Overall, however, we found little evidence of manager ability during this period. In Panel A, the largest difference between the buy and sell portfolios occurs in the highest-idiosyncratic-volatility portfolio, although the difference is not statistically significant. The largest difference between Quintiles 1 and 5 also occurs in idiosyncratic volatility Portfolio 5, but again, the difference is not significant. Panel B shows the same pattern: The best trades occur in the high-idiosyncratic-volatility portfolios, but the results are not statistically significant. In Panel C, which measures the 12-month returns, the managers do poorly in high-idiosyncratic-volatility stocks.

As mentioned earlier, the huge increase in the number of mutual funds reported in Figure 1 may have decreased the number of profitable trading opportunities. Moreover, the growth in hedge funds reported in Figure 1 may also have contributed to a decrease in profitable trading opportunities, and hedge funds may have recruited many of the good mutual fund managers who generated the abnormal returns in the earlier part of our sample.

Fama–French–Carhart Four-Factor Model Idiosyncratic Volatility Results. **Table 5** reports the results for the 1980–94 subsample, for which we used the idiosyncratic volatility measure from the Fama–French–Carhart four-factor model instead of the market model. The results in Table 5 are very similar to those in Table 3, which also reports the results for the 1980–94 subsample. In Panel A, we see that stock-picking ability increases monotonically with idiosyncratic volatility and that the buys outperform the sells only in the two highest-volatility portfolios. The differences between the buys and the sells are 2.38 percent (p-value = 0.031) and 2.50 percent (p-value = 0.048) in Portfolios 4 and 5. Panel A also reveals that the return differentials between Quintiles 1 and 5 increase monotonically with idiosyncratic volatility and that Quintile 1 beats Quintile 5 only when trades occur in the top two idiosyncratic volatility portfolios. The differences between Quintiles 1 and 5 are 2.28 percent (p-value = 0.063) and 3.11 percent (p-value = 0.016) in Portfolios 4 and 5.

The results reported in Panel B, which are based on six-month returns, are similar to those in Panel A. In Panel B, the buys outperform the sells only in the two highest-volatility portfolios. The differences between the buys and the sells are 3.41 percent (p-value = 0.015) and 4.53 percent (p-value = 0.040) in Portfolios 4 and 5. Both the differences in returns and the statistical significance of those differences increase with idiosyncratic volatility. Panel B also reveals that Quintile 1 beats Quintile 5 only when the trades occur in the top two idiosyncratic volatility portfolios. The differences between Quintiles 1 and 5, which increase monotonically with idiosyncratic volatility, are 3.59 percent (p-value = 0.035) and 5.48 percent (p-value = 0.019) in Portfolios 4 and 5.

Unlike Panels A and B, Panel C, which reports findings from 12-month returns, reveals no distinct pattern among the portfolios. These findings again suggest that the information on which managers trade is reflected in prices within 12 months of the trade.

Table 6 reports the results for the 1995–2003 subsample. As in Tables 2 and 4, we see little evidence of manager stock-picking ability in Table 6. Almost none of the differences are statistically significant in Table 6. In Panels A and B, however, we

Table 4. Mutual Fund Trading Performance and Idiosyncratic Volatility from the Market Model: Subsample 2, 1995–2003
(p-values in parentheses)

	1 (low var)	2	3	4	5 (high var)	High – Low Var	
A. 3-month DGTW-adjusted returns							
Buys (*Trades* > 0)	–0.20%	–0.04%	0.58%	1.85%	3.33%	3.54%	(0.240)
Sells (*Trades* < 0)	–0.35	0.65	0.52	1.77	2.80	3.14	(0.206)
Buys – Sells	0.14%	–0.69%	0.07%	0.08%	0.54%		
	(0.818)	(0.460)	(0.965)	(0.951)	(0.864)		
Quintile 1 (top)	0.39%	–0.44%	–0.20%	2.44%	4.16%	3.77%	(0.293)
Quintile 2	–0.28	0.33	0.89	0.77	1.72	2.00	(0.411)
Quintile 3	–0.52	–0.08	1.13	0.66	–1.21	–0.68	(0.752)
Quintile 4	0.79	0.90	4.16	3.00	–1.26	–2.05	(0.277)
Quintile 5 (bottom)	–0.50	0.36	–0.15	1.72	3.12	3.62	(0.127)
Top – Bottom	0.89%	–0.80%	–0.04%	0.72%	1.04%		
	(0.254)	(0.457)	(0.977)	(0.568)	(0.761)		
B. 6-month DGTW-adjusted returns							
Buys (*Trades* > 0)	–0.52%	–0.20%	0.94%	3.29%	7.95%	8.47%	(0.215)
Sells (*Trades* < 0)	–0.58	–0.08	–1.12	5.85	6.77	7.35	(0.107)
Buys – Sells	0.06%	–0.12%	2.06%	–2.56%	1.18%		
	(0.948)	(0.936)	(0.450)	(0.356)	(0.872)		
Quintile 1 (top)	–0.01%	–0.95%	–0.13%	4.06%	10.59%	10.60%	(0.204)
Quintile 2	–0.87	0.30	1.65	0.96	–0.23	0.64	(0.858)
Quintile 3	–0.34	–0.27	2.49	4.26	–0.18	0.16	(0.953)
Quintile 4	0.07	2.34	6.13	0.05	–0.95	–1.02	(0.747)
Quintile 5 (bottom)	–0.28	0.43	–2.09	6.19	6.72	7.00	(0.116)
Top – Bottom	0.27%	–1.38%	1.96%	–2.13%	3.87%		
	(0.819)	(0.432)	(0.480)	(0.417)	(0.644)		
C. 12-month DGTW-adjusted returns							
Buys (*Trades* > 0)	–1.03%	–0.57%	3.81%	7.64%	10.97%	12.00%	(0.316)
Sells (*Trades* < 0)	–2.86	0.92	0.55	8.05	23.55	26.41**	(0.041)
Buys – Sells	1.83%	–1.49%	3.25%	–0.42%	–12.58%		
	(0.270)	(0.559)	(0.598)	(0.933)	(0.199)		
Quintile 1 (top)	–0.86%	–1.60%	2.11%	8.27%	13.84%	14.69%	(0.306)
Quintile 2	–1.22	–0.49	4.07	1.87	5.34	6.57	(0.536)
Quintile 3	–0.60	–0.25	6.02	12.72	0.94	1.54	(0.838)
Quintile 4	–0.75	4.18	8.51	5.10	1.52	2.27	(0.735)
Quintile 5 (bottom)	–2.60	1.77	0.34	8.77	23.24	25.83**	(0.033)
Top – Bottom	1.74%	–3.37%	1.77%	–0.50%	–9.40%		
	(0.326)	(0.213)	(0.750)	(0.926)	(0.394)		

Notes: See notes to Tables 1, 2, and 3. The number of stock/quarter observations in this subsample is 55,632.

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

Table 5. Mutual Fund Trading Performance and Idiosyncratic Volatility from the Fama–French–Carhart Four-Factor Model: Subsample 1, 1980–1994
(p-values in parentheses)

	1 (low var)	2	3	4	5 (high var)	High – Low Var	
A. 3-month DGTW-adjusted returns							
Buys (*Trades* > 0)	0.22%	0.15%	0.44%	0.70%	2.07%	1.85%**	(0.041)
Sells (*Trades* < 0)	0.42	–0.03	–0.23	–1.69	–0.43	–0.86	(0.573)
Buys – Sells	–0.21%	0.18%	0.66%	2.38%**	2.50%**		
	(0.720)	(0.806)	(0.422)	(0.031)	(0.048)		
Quintile 1 (top)	–0.35%	0.16%	0.68%	0.70%	2.67%	3.03%**	(0.013)
Quintile 2	0.33	0.10	0.31	0.84	–0.02	–0.35	(0.765)
Quintile 3	0.13	0.24	0.64	0.84	0.71	0.58	(0.636)
Quintile 4	0.31	–0.17	–0.54	0.16	–1.43	–1.74	(0.240)
Quintile 5 (bottom)	0.21	–0.16	–0.41	–1.59	–0.43	–0.64	(0.662)
Top – Bottom	–0.56%	0.32%	1.09%	2.28%*	3.11%**		
	(0.685)	(0.709)	(0.253)	(0.063)	(0.016)		
B. 6-month DGTW-adjusted returns							
Buys (*Trades* > 0)	0.44%	0.40%	0.58%	1.37%	3.84%	3.40%**	(0.029)
Sells (*Trades* < 0)	0.71	0.29	–0.28	–2.04	–0.69	–1.40	(0.524)
Buys – Sells	–0.28%	0.11%	0.85%	3.41%**	4.53%**		
	(0.726)	(0.899)	(0.388)	(0.015)	(0.040)		
Quintile 1 (top)	–0.39%	–0.12%	1.19%	1.70%	4.75%	5.14%**	(0.010)
Quintile 2	1.02	1.00	0.29	0.64	2.17	1.15	(0.562)
Quintile 3	0.19	0.07	0.66	0.61	–0.87	–1.06	(0.634)
Quintile 4	0.52	–0.71	–1.11	0.70	–2.56	–3.08*	(0.096)
Quintile 5 (bottom)	0.65	0.29	–0.42	–1.89	–0.74	–1.38	(0.513)
Top – Bottom	–1.04%	–0.41%	1.61%	3.59%**	5.48%**		
	(0.581)	(0.706)	(0.129)	(0.035)	(0.019)		
C. 12-month DGTW-adjusted returns							
Buys (*Trades* > 0)	1.62%	0.17%	0.68%	3.13%	4.14%	2.52%	(0.445)
Sells (*Trades* < 0)	–0.95	–1.10	0.98	–1.80	0.14	1.08	(0.814)
Buys – Sells	2.57%**	1.27%	–0.30%	4.93%**	4.00%		
	(0.046)	(0.433)	(0.847)	(0.023)	(0.400)		
Quintile 1 (top)	3.48%	2.13%	2.40%	3.30%	4.97%	1.49%	(0.710)
Quintile 2	2.01	0.84	–0.70	1.95	3.08	1.07	(0.777)
Quintile 3	1.33	–0.77	0.08	2.07	0.24	–1.09	(0.785)
Quintile 4	1.04	–1.98	–2.23	–0.88	–2.99	–4.03	(0.168)
Quintile 5 (bottom)	–0.22	–1.38	0.51	–1.79	–0.33	–0.12	(0.980)
Top – Bottom	3.70%**	3.51%	1.90%	5.09%**	5.30%		
	(0.030)	(0.138)	(0.242)	(0.047)	(0.302)		

Notes: See notes to Tables 1, 2, and 3. The number of stock/quarter observations in this subsample is 30,145. Idiosyncratic volatility is measured by the standard deviation of the residuals from the Fama–French–Carhart four-factor model.

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

Table 6. Mutual Fund Trading Performance and Idiosyncratic Volatility from the Fama–French–Carhart Four-Factor Model: Subsample 2, 1995–2003
(*p*-values in parentheses)

	1 (low var)	2	3	4	5 (high var)	High – Low Var	
A. 3-month DGTW-adjusted returns							
Buys (*Trades* > 0)	–0.11%	–0.01%	0.12%	2.38%	3.10%	3.21%	(0.284)
Sells (*Trades* < 0)	–0.29	0.53	1.42	–0.17	2.97	3.26	(0.172)
Buys – Sells	0.18%	–0.54%	–1.30%	2.54%	0.12%		
	(0.785)	(0.569)	(0.267)	(0.144)	(0.967)		
Quintile 1 (top)	0.28%	–0.20%	–0.68%	3.01%	3.89%	3.61%	(0.308)
Quintile 2	–0.36	0.34	0.35	1.67	1.17	1.53	(0.532)
Quintile 3	–0.41	–0.19	1.06	0.74	–0.57	–0.16	(0.940)
Quintile 4	0.88	0.84	3.56	2.45	–0.05	–0.94	(0.623)
Quintile 5 (bottom)	–0.29	0.04	0.77	–0.48	3.08	3.36	(0.135)
Top – Bottom	0.57%	–0.24%	–1.45%	3.49%**	0.81%		
	(0.459)	(0.822)	(0.285)	(0.034)	(0.803)		
B. 6-month DGTW-adjusted returns							
Buys (*Trades* > 0)	–0.35%	–0.25%	0.81%	3.36%	7.70%	8.06%	(0.235)
Sells (*Trades* < 0)	0.06	–1.15	0.53	4.04	6.00	5.95	(0.189)
Buys – Sells	–0.41%	0.90%	0.28%	–0.68%	1.70%		
	(0.676)	(0.481)	(0.870)	(0.857)	(0.804)		
Quintile 1 (top)	–0.57%	–0.30%	0.04%	4.19%	10.28%	10.85%	(0.193)
Quintile 2	–0.73	–0.19	1.25	1.29	–0.14	0.59	(0.868)
Quintile 3	–0.07	–0.44	1.62	4.87	–0.10	–0.02	(0.994)
Quintile 4	0.42	2.38	5.44	–0.94	0.89	0.47	(0.882)
Quintile 5 (bottom)	0.51	–0.84	–0.38	3.81	5.98	5.47	(0.208)
Top – Bottom	–1.08%	0.54%	0.43%	0.38%	4.31%		
	(0.423)	(0.723)	(0.776)	(0.918)	(0.592)		
C. 12-month DGTW-adjusted returns							
Buys (*Trades* > 0)	–0.52%	–0.53%	4.11%	5.95%	11.38%	11.90%	(0.324)
Sells (*Trades* < 0)	–1.23	–0.93	1.84	5.11	24.49	25.72*	(0.055)
Buys – Sells	0.70%	0.41%	2.27%	0.84%	–13.11%		
	(0.607)	(0.844)	(0.663)	(0.889)	(0.144)		
Quintile 1 (top)	–0.78%	0.06%	3.00%	6.40%	14.25%	15.04%	(0.298)
Quintile 2	–0.50	–1.87	4.68	1.50	6.21	6.70	(0.539)
Quintile 3	–0.11	0.47	4.40	11.85	2.97	3.09	(0.711)
Quintile 4	–0.25	4.32	8.64	5.58	1.59	1.84	(0.771)
Quintile 5 (bottom)	–0.82	–0.04	1.11	5.25	24.51	25.33**	(0.041)
Top – Bottom	0.04%	0.10%	1.88%	1.16%	–10.26%		
	(0.984)	(0.968)	(0.682)	(0.834)	(0.312)		

Notes: See notes to Tables 1, 2, 3, and 5. The number of stock/quarter observations in this subsample is 55,632.

*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

do see that the managers perform slightly better in the high-idiosyncratic-volatility portfolios than they do in the low-idiosyncratic-volatility portfolios.

Conclusion

This study provides two main findings. First, we found that mutual fund managers exhibit stock-picking ability only in stocks with high idiosyncratic volatility. This finding is consistent with a costly arbitrage equilibrium in which unhedgeable volatility prevents risk-averse arbitrageurs from taking large positions in mispriced securities, and thus, mispricing persists. An alternative explanation for this finding is that high-idiosyncratic-volatility stocks have large streams of company-specific information, thereby providing opportunities for company-specific information production and stock picking. One practical implication of this finding is that fund managers and other investors may want to pay special attention to high-idiosyncratic-volatility stocks because they provide fertile ground for stock picking.

We also found little evidence of stock-picking ability among mutual fund managers in the later part of our sample (after the mid-1990s), although fund managers do seem to make better trades in high-idiosyncratic-volatility stocks. This finding could be the result of the large increase in the number of both mutual funds and hedge funds that occurred in the late 1990s. Increased competition among managers may have caused a decrease in the number of profitable trading opportunities, and the large increase in the number of managers may have caused the quality of the average mutual fund manager to decline. But our results are based on aggregate measures and thus concern the mutual fund industry as a whole (or the average mutual fund); therefore, our findings do not rule out the existence of some mutual fund managers with superior stock-picking ability, even in the later part of our sample.

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This article qualifies for 1 CE credit.

Notes

1. CDA/Spectrum collects data from these filings, as well as from voluntary quarterly reports that funds send to their shareholders. Effective 11 February 2004, the SEC required mutual funds to report their holdings on a quarterly basis.
2. To check for robustness, we divided our sample into two equal subsamples (1980–1991 and 1992–2003), and all results were similar.
3. The DGTW benchmark data are available at Russ Wermers' website (www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm). For more details on the construction of DGTW portfolios, see DGTW (1997) or CJW (2000), who also used the DGTW adjustment.
4. SMB is the monthly return of a portfolio that is long small stocks and short large stocks; HML is the monthly return of a portfolio that is long value stocks and short growth stocks; UMD is the monthly return of a portfolio that is long stocks with high past returns and short stocks with low past returns. For more information on these factors or to download the data, see Kenneth French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

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costs of executing the transactions. Over the years, the U.S. SEC's inconsistent interpretations of pertinent sections of the Securities Exchange Act of 1934 have generally allowed the continued use of soft dollars for the payment of not only brokerage commissions but also research products and services. This article discusses the history of the practice and suggests two approaches that may hasten the end of the era of soft dollars: client commission-sharing arrangements and paying for research directly in cash.

Equity Investments

Consistent with a costly arbitrage equilibrium in which arbitrage costs insulate mispricing, this study finds that mutual fund managers have stock-picking ability for stocks with high idiosyncratic volatility but not for stocks with low idiosyncratic volatility. These findings suggest that fund managers and other investors may want to pay special attention to high-idiosyncratic-volatility stocks because they provide fertile ground for stock picking. The study also finds that the stock-picking ability of the average mutual fund manager declined after the extreme growth in the number of both mutual funds and hedge funds in the late 1990s.

Previous studies suggest that trading-volume measures may proxy for a number of factors, including liquidity, momentum, and information. For relatively illiquid (typically smaller) stocks, investors may demand a liquidity premium, which can result in a negative relationship between trading volume (as a proxy for liquidity) and stock returns. For relatively liquid (typically larger) stocks—the focus of this article—momentum and information effects may dominate and result in a positive relationship between trading volume and stock returns. Portfolios of S&P 500 Index and large-capitalization stocks sorted on higher trading volume and turnover tend to have higher subsequent returns (holding periods of 1–12 months) than those with lower trading volume.

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