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The Persistence of Equity Fund Performance

1. Introduction

While the efficient markets hypothesis implies that past performance is no guide to future performance, financial press and firms that evaluate funds are based on the idea that funds that do well in the past will continue to do so in the future. If the hypothesis was literally true, not only would the average manager not be expected to outperform passive management, but also even managers with the best historical track records would not be expected to outperform in the future. In other words, the efficient market hypothesis implies that excess performance is the result of luck, not of skill.

For most clients, questions about the money managers' track records are among the first questions asked. But do managers' track records demonstrate skill that influences their future results? In order to investigate this question, we have to determine whether the best performing managers in the past are likely to be the best performing managers in the future. This is where the performance persistence studies come in.

Since the 1960s, there have been numerous academic studies devoted to measuring mutual fund performance, but very little research devoted to testing for persistence in fund performance. The findings reported by JENSEN (1968) suggest that, over the period 1945 through 1964, investors couldn't earn significant risk-adjusted returns by purchasing recently good performing funds, i.e., a lack of persistence in portfolio returns. Studies from the 1980s, however, have come to somewhat different conclusions. The results presented in GRINBLATT and TITMAN (1992) indicate that there is positive persistence in mutual fund performance. As they cannot explain this persistence by inefficiencies in the benchmark, the authors conclude that the past performance of a fund provides useful information for investors who are considering an investment in mutual funds. Some additional statistical evidence of persistence in mutual fund returns is reported in HENDRICKS, PATEL and ZECKHAUSER's study (1993). This persistence of relatively superior fund performance proves to be significant, although it is predominantly a short-run phenomenon, peaking at four quarters. They conclude that a strategy of selecting, every quarter, the top performers based on the last four quarters can significantly outperform the average mutual fund, though doing only marginally better than some benchmark market indices. More recently, BROWN and GOETZMANN (1995), also find evidence of the significant performance persistence. While repeat-winner phenomenon is more common, significant reversals also occur. This is important because it tells us

*We thank Mr. Nils Tuchschmid and the referee for comments that helped us to improve this paper. We are also grateful to Micropal for supplying data used in this study.
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that persistence is probably not due to individual managers selecting stocks that are overlooked or ignored by other managers. In other words, their findings show that, whatever the cause of winning or losing, it is a group phenomenon.

The practitioner literature expresses a consistent belief that active selection among professionally managed funds can be profitable. For example, BAUMAN and MILLER (1994) evaluate portfolio performance over a complete stock market cycle and, on this basis, test for the consistency of performance rankings over time. Their results show that correlation of portfolio performance rankings from one market cycle to the next are generally positive and meaningful. GOETZMANN and IBBOTSON (1994) investigate the question whether past fund performance relative to the mutual fund universe may be used to predict future fund relative performance. They show that the repeat-winner phenomenon is present not only in raw returns, but also in a common yardstick of risk-adjusted returns, the JENSEN measure (alpha). Thus, whether or not the security market line represents a legitimate and meaningful benchmark for manager performance, it appears that past alphas predict future alphas. Their findings imply either that managers exhibit superior relative performance, or at least that some managers are superior at controlling this common performance measure.

The objective of our study is to examine whether we can detect such a performance persistence phenomenon of equity funds in some European countries. Our sample includes all French, German, UK and Swiss equity funds that exist since 1985. When we test for the persistence phenomenon in raw returns, we find no evidence, except for the UK, that funds with above-median raw returns over the preceding year repeat their superior performance. When these persistence tests are performed by looking at the risk level of funds, we detect strong positive relationship in risk adjusted returns.

The rest of this article is organized as follows. In Section 2, we present different performance measures. The data used in this study is described in Section 3. Section 4 tests for persistence with raw returns, while persistence with risk-adjusted returns is analyzed in Section 5. Finally, the last section contains some concluding comments.

2. Performance Measures: Preliminaries

The most widely used performance measure in the mutual fund industry is reward to variability ratio, proposed by SHARPE (1966). This measure is defined as a ratio between the risk premium, expressed as the return over the risk-free rate, and the total risk, measured by the standard deviation of the portfolio. Hence, this ratio, built on Markowitz's mean-variance paradigm, which assumes that the mean and standard deviation of one-period return are sufficient statistics for evaluating the prospects of an investment portfolio, is defined as follows:

$$S_P = (R_P - RF)/\sigma_P \qquad (1)$$

where

S_P is the portfolio P ex-post SHARPE ratio,
R_P is the portfolio return over the considered period,
RF is the risk-free rate over the same period, and
σ_P is the standard deviation of the portfolio.

At the equilibrium, all portfolios should have the same ratio. But, in the reality, we observe some differences among ratios. Intuitively, higher ratio means more risk premium per unit of total risk, or, in other words, better performance.

Despite of its simplicity and wide use, this reward to variability ratio is subject to a number of critiques. The SHARPE ratio highly depends on the risk-free rate. The risk-free rate, theoretically unique, is approximated in practice by a default-free government bonds with the same maturity as the investment horizon. Such a bond may not be available, so different investors may consider dif-

ferent risk-free rate approximations, which could lead to different portfolio rankings.

As emphasized before, a portfolio, let say *P*, with higher SHARPE ratio than other portfolios, provides more extra return per unit of total risk, and, hence, is preferred by risk-averse investors. But what would result if the total risk is that high so the portfolio *P* is simply judged too risky? In fact, the SHARPE ratio simply says that, by combining positions in the portfolio *P* and in the risk-free asset, it is possible to achieve a higher return for the same level of risk than by any other combination of the risk-free asset and a lower SHARPE ratio portfolio.

Another problem arises with active strategies which appear riskier then they really are. An active manager can beat a buy and hold strategy in every subperiod and, however, have inferior SHARPE ratio over the whole period. In fact, shifts in the mean portfolio returns between subperiods are not recognized as shifts in the strategy, but regarded as higher return volatility, which biases the SHARPE measure downward.

Finally, one could criticize the fact that the SHARPE ratio ignores the possibility of reducing the total risk by diversification.

In efficient markets, only the systematic risk should be remunerated, since specific risk can be eliminated through an appropriate diversification. Hence, TREYNOR's (1965) measure of portfolio performance is based on portfolio systematic risk component (beta) rather than on the total risk, and is defined as follows:

$$T_P = (R_P - RF)/\beta_P \qquad (2)$$

where

T_P is the portfolio *P* ex-post TREYNOR ratio,and

β_P is the measure of the portfolio systematic risk.

In other words, the TREYNOR ratio gives us a coefficient of portfolio excess return per unit of systematic risk. Hence, the larger the ratio value, the more preferable the portfolio is for investors. Since the TREYNOR ratio could be viewed as a linear transformation of the SHARPE ratio, most of the critiques addressed to SHARPE ratios are still valid. Moreover, as the TREYNOR measure considers only the systematic risk of securities, its application should be restricted to well diversified portfolios.

Both the SHARPE and TREYNOR ratios provide a raw performance measure. In fact, these ratios do not distinguish between the market risk premium and the excess return which is due to the manager's security selection ability and market timing skill. Security selection involves the identification of individual securities which are undervaluated relative to the market in general. The manager would then invest in those securities which offer an abnormally high risk premium. Market timing refers to forecasts of returns on the market portfolio. If the manager believes he can forecast the market return, he will adjust his portfolio risk level accordingly. Thus, it is important to evaluate the portfolio managers on both security selection ability and market timing skill.

JENSEN (1968) formulated a model to measure the manager's security selection ability as:

$$R_P - RF = \alpha_P + \beta_P(R_M - RF) + \varepsilon_P \qquad (3)$$

where

α_P is a measure of security selection ability,

R_M is the return on the market portfolio, and

ε_P is a random error term with expected value of zero.

Positive alphas mean positive manager's security selection ability, while negative alphas imply negative selection ability. This specification assumes that the risk level of the portfolio under consideration is stationary through time and ignores the market timing skill of the managers.

Indeed, portfolio managers may shift the overall risk composition of their portfolio in anticipation of broad market price movements. TREYNOR and MAZUY (1966) addressed this issue and suggested a model of the portfolio return as a nonlinear function of the market return. They argued that if a manager can forecast market re-

turns, he will hold a greater proportion of the market portfolio when the return on the market is high and a smaller proportion when the return on the market is low.
Thus, in order to test for market timing skill, they performed the following equation:

$$R_P - RF = \alpha_P + \beta_P(R_M - RF) + \gamma_P(R_M - RF)^2 + \varepsilon_P \quad (4)$$

where
γ_P is a measure of market timing skill.

A positive value of γ_P would imply positive market timing skill of the portfolio manager.
There are other models in the literature that permit identification of selectivity and timing skills of portfolio managers, such as the models developed by HENRIKSSON AND MERTON (1981) and GRINBLATT and TITMAN (1989b).
The HENRIKSSON and MERTON model tests whether the manager has special information and uses it correctly. They assume that managers receive signals that predict whether or not the market return would exceed the risk free rate. In addition, they assume that an informed manager will increase his part invested in the market portfolio when the bullish market is forecasted, and decrease this part when information received predicts the bearish market. In other words, the value of the portfolio's betas depend on the predicted magnitude of the market move. According to this, a good market skill implies a larger portfolio's beta when the market is bullish than the one for the bearish market.
In order to test for this market timing skill, HENRIKSSON and MERTON developed the following model:

$$R_P - RF = \alpha_P + \beta_{HP}\,Max[0, R_M - RF] + \beta_{LP}\,Min[0, R_M - RF] + \varepsilon_P \quad (5)$$

where
β_{HP} is the bullish market portfolio's beta, and
β_{LP} is the bearish market portfolio's beta.

As the „true" market portfolio is not observable, these different performance measures have to use a proxy of the market portfolio (such as a stock index). As a result, abnormal returns might only be a measurement error due to the inefficiency of the market proxy. This is commonly known as ROLL's critique (1978). Some recent studies avoid this critique by developing new models without using market proxies.
For instance, the GRINBLATT and TITMAN model requires the historical sequence of portfolio weights (i.e., the amount invested in each stock) for the manager. This measure, developed initially by CORNELL (1979), calculates the difference between the returns of assets when they are in the portfolio with their returns at later dates. The basic idea is that the assets held by informed portfolio managers will have higher returns when they are included in the portfolio than when they are not included. The reason that later rather than earlier period returns are used for the comparison is that some portfolio managers pick their assets in part based on past returns, so that inference based on earlier returns is likely to be systematically biased. Unfortunately, these data on portfolio weights are not often publicly available.

3. Data

Our data base consists of all French, German, UK and Swiss publicly offered equity mutual funds that exist since 1985, as well as a subsample of all Swiss equity funds that exist since 1992. The data for this study were made available by *Micropal*. For each fund, we record the name, the monthly return and the asset value. Returns include dividends and are before expenses and management fees. In total, there are 227 equity funds that exist over the whole ten-year period of study. However, as in the Swiss market there are only six funds that have existed over the entire period, we also performed the same persistence tests on nineteen equity funds that exist since 1992.

Our study uses equity market indices as market proxies. The determination of a good market proxy involves the consideration of all available assets, and may considerably influence the empirical results. ELTON, GRUBER, DAS and HLAVKA (1993) investigated the impact of non-S&P stock on mutual fund returns when S&P is used as a benchmark portfolio. They found that returns on non-S&P assets are significant factors in performance assessment. In order to avoid this problem, the benchmark portfolio should contain all mutual funds assets. Thus, we should select the market index that includes all listed stocks, is value weighted and considers dividends as reinvested (performance index). Unfortunately, such a market index does not exist for all countries, so we had to make a trade-off between these different criteria.

Among various indices available in France, Germany, UK and Switzerland, we selected the SBF 250 (CAC Général), DAX, FT All-Share and Swiss Performance Index as the market portfolio proxies. While neither CAC 40 nor SBF 250 do consider dividends as reinvested, SBF 250 is the largest available French index, calculated on the basis of 250 listed stocks. Moreover, as these two indices are highly correlated, the choice of index has a little impact on our results. Deutscher Aktienindex (DAX) is value weighted and composed of the 30 largest German stocks. Contrary to Frankfurter Allgemeine Zeitung index (FAZ), DAX is a performance index. Since in the UK there is no index that considers dividends as reinvested, we selected the Financial Time All-Share Index, which is the largest one with its 823 stocks. In Switzerland, the performance index is computed on the basis of 376 stocks which represents 97 percent of total Swiss market capitalization.

Another problem arises with the choice of the appropriate risk-free rate. The risk-free rate is important because it appears in the CAPM framework as the minimum required rate of return as well as a part of the risk premium. By definition, the risk-free asset should pay a fixed interest, should not have any default risk nor be sensitive to the market risk. In the United States, the T-bill rate is very well accepted by both academicians and practitioners. In most European countries, the government one-month bills are not perfectly liquid. We have then decided to use the *Eurocurrency one-month rate* as the risk-free rate, despite the fact that it includes a default risk premium.

Because of need of liquidity, equity mutual funds are not only invested in equities. In fact, a part of equity fund assets is invested in money market. Thus, in order to assess the influence of these money market assets on the equity fund returns behavior, Table 2 compares the mean fund returns to the returns to market indices. The mean is calculated on the monthly basis over the twelve-month periods and is equally weighted. Note that the average returns for mutual funds do not differ significantly from the benchmarks. As fund mean returns are highly correlated with benchmark equity indices, we can conclude that, on average, the money market part of equity funds has a little impact.

Table 1: Number and Capitalization of Equity Mutual Funds by Country: Ten-Year Sample

France		Germany		UK		Switzerland	
nbr of funds	assets value (Mio FF)	nbr of funds	assets value (Mio DM)	nbr of funds	assets value (Mio £)	nbr of funds	assets value (Mio SF)
27	87520.0	18	16647.7	176	31017.1	6	2142.6

Table 2: Equity Funds and Benchmark Equity Indices mean returns

period	France mean return		Germany mean return		UK mean return		Switzerland mean return	
	funds	SBF 250	funds	DAX	funds	FT All-Share	funds	SPI
08/85 to 07/86	0.0027	0.0034	0.0020	0.0021	0.0027	0.0025	0.0022	0.0022
08/86 to 07/87	0.0011	0.0010	0.0002	–0.0001	0.0029	0.0027	0.0004	0.0003
08/87 to 07/88	–0.0002	–0.0004	–0.0007	–0.0015	–0.0004	–0.0007	–0.0008	–0.0009
08/88 to 07/89	0.0016	0.0021	0.0019	0.0018	0.0011	0.0013	0.0015	0.0016
08/89 to 07/90	0.0009	0.0010	0.0017	0.0019	0.0003	0.0008	0.0007	0.0007
08/90 to 07/91	–0.0007	–0.0010	–0.0005	–0.0008	0.0000	0.0003	–0.0004	–0.0005
08/91 to 07/92	0.0006	0.0005	0.0001	0.0001	0.0005	0.0007	0.0006	0.0005
08/92 to 07/93	0.0004	0.0005	–0.0001	–0.0003	0.0015	0.0014	0.0016	0.0017
08/93 to 07/94	0.0006	0.0001	0.0013	0.0012	0.0004	0.0004	0.0010	0.0011
08/94 to 07/95	–0.0001	–0.0001	0.0001	0.0000	0.0007	0.0010	0.0005	0.0006
Correlation coefficient	0.985		0.983		0.980		0.989	

4. Persistence with Raw Returns

Several recent studies, such as GRINBLATT and TITMAN (1992), HENDRICKS, PATEL and ZECKHAUSER (1993), GOETZMANN and IBBOTSON (1994), and BROWN and GOETZMANN (1995) argue in favor of a hot hand phenomenon, that is, mutual funds that achieved above average returns continue to enjoy superior performance. Following GOETZMANN and IBBOTSON (1994), we analyze the predictability of performance by constructing two-way tables showing successive performance over successive periods. In the tables that follow, we defined a fund as a winner (loser) in the current twelve-month period[1] if it has achieved the raw rate of return that exceeds or equals[2] (is lower than) the median raw return of all funds over the same period. The same criterion is used to identify it as a winner or loser for the following period. Finally, we computed the combined results as a sum of individual-year results.

In order to test for the statistical significance of a persistence phenomenon, the following tables provide z-test statistic for repeat winners and repeat losers. The z-test for repeat winners was calculated as follows. Let p be the probability that a winning fund continues to be a winning fund in the next period, and assume independence across funds. If there is no persistence, we would expect p equal to one half. Therefore, evidence against persistence in winning would be provided by failing to reject the hypothesis that $p = 1/2$.

Since the random variable $\tilde{X}$ of the number of persistently winning funds will have a binomial distribution b(n, p) where n is the total number of winners in the initial period, we can construct a binomial test to see if the probability p of consistent winning is greater than one half. When the number of funds is reasonably large $(n \geq 20)$, the random variable $z = \left(\tilde{X} - np\right) \Big/ \sqrt{np(1-p)}$ will be approximately distributed as normal with mean zero and standard deviation one. In a similar manner, we performed the same test for repeat losers.

In other words, the test for repeat winners (losers) is performed as follows:

$$z = \left(\tilde{X} - np\right) \Big/ \sqrt{np(1-p)} \qquad (6)$$

where

$\tilde{X}$ is the number of repeat winners (losers) over two successive periods,

n is the total number of winners (losers) in the initial period, and

p is the probability of consistent winning (losing), supposed equal to 0.5.

If we take a look at the combined results reported in Table 3, we can see that, on average, the ratio associated with picking a winner (W) is about 55 percent, which means 5 percent more repeaters than would be expected by chance. Moreover, this positive persistence phenomenon appears to be significant at the 5 percent level. For the individual years, four years out of nine indicate statistically significant winning persistence, while remaining periods do not exhibit any significant relationship. In order to investigate the question whether picking a loser (L) would lead to a superior performance in the following period, one should refer to results for repeat losers.

Our findings show that, on average, only 45 percent of loser funds in the initial period become winners the next year. In other words, losers tend to remain losers. This cold hand phenomenon is significant at the 5 percent level in two individual years, as well as for combined results.

This can be compared to the results of GOETZMANN and IBBOTSON (1994): the ratio associated with picking a winner, based up on a past winning performance, was about 60/40.

Table 3: Frequency of Repeat Performers: Entire Sample[3]
Number of Funds: 227

Initial Period		**Next Period** W	L	Percentage Repeat Winners	*z*-Test Repeat Winners	Percentage Repeat Losers	*z*-Test Repeat Losers	Persistence
08/85 to 07/86	W	72	43	62.61	*2.70***			yes
	L	43	69			61.61	*2.46***	yes
08/86 to 07/87	W	67	48	58.26	*–1.77**			yes
	L	48	64			57.14	1.51	no
08/87 to 07/88	W	52	63	45.22	–1.03			no
	L	62	50			44.64	–1.13	no
08/88 to 07/89	W	66	48	57.89	*1.69**			yes
	L	49	64			56.64	1.41	no
08/89 to 07/90	W	76	39	66.09	*3.45***			yes
	L	39	73			65.18	*3.21***	yes
08/90 to 07/91	W	65	50	56.52	1.40			no
	L	50	62			55.36	1.13	no
08/91 to 07/92	W	57	58	49.57	–0.09			no
	L	58	54			48.21	–0.38	no
08/92 to 07/93	W	63	52	54.78	1.03			no
	L	52	60			53.57	0.76	no
08/93 to 07/94	W	54	61	46.96	–0.65			no
	L	61	51			45.54	–0.94	no
Combined	W	572	462	55.32	*3.42***			yes
Results	L	462	547			54.21	*2.68***	yes

* significant at 10 percent level
** significant at 5 percent level

Table 4: Frequency of Repeat Performers: Country-by-Country
Period of Study: 1985–1994

Country	Combined Results	W	L	Percentage Repeat Winners	z-Test Repeat Winners	Percentage Repeat Losers	z-Test Repeat Losers	Persistence
France	W	72	54	57.1	1.60			no
(27 funds)	L	54	63			53.8	0.83	no
Germany	W	42	39	51.9	0.33			no
(18 funds)	L	39	42			51.9	0.33	no
UK[4]	W	443	357	55.4	*3.04***			yes
(176 funds)	L	357	427			54.5	*2.50***	yes
UK General	W	142	118	54.6	1.49			no
(57 funds)	L	118	135			53.4	1.07	no
UK Income	W	139	122	53.3	1.05			no
(58 funds)	L	122	139			53.3	1.05	no
UK Growth	W	162	117	58.1	*2.69***			yes
(61 funds)	L	117	153			56.7	*2.19***	yes
Switzerland	W	15	12	55.6	n/a			n/a
(6 funds)	L	12	15			55.6	n/a	n/a
Switzerland[5]	W	8	12	40.0	–0.89			no
(19 funds)	L	12	6			33.3	–1.41	no

* significant at 10 percent level
** significant at 5 percent level

The country-by-country analysis, reported in Table 4, reveals some interesting features of the persistence phenomenon.

Combined results for French equity funds show that both winner and loser initial period funds have the same probability to continue or to reverse the pattern during the following period. The desaggregation of German sample by individual years (not reported here) indicates two cases of positive performance persistence as well as two reversal patterns, significant at 10 percent level. However, the combined results show that, for both winners and losers, there is no significant persistence phenomenon over the entire sample period.

The combined results for UK sample repeat winners show that the winner-followed-by-winner phenomenon is significant at 5 percent level over the whole period of study. The data for repeat losers show a weak positive persistence of loser fund performance, significant at 5 percent level of confidence, despite several negative relationships in individual years.

As results reported in this section depend only on funds raw returns we might expect, as mentioned by GOETZMANN and IBBOTSON (1993), to find winners repeating among funds over the course of several years, if only because investors demand higher returns from riskier funds. Therefore one may argue that tests using returns uncorrected for risk document merely the differential expected returns between high-risk versus low-risk funds. For this reason, it is of interest to group funds according to their risk level, and test for performance persistence within these different categories. Under the assumption that investment objectives are linked to risk level, by splitting the total UK sample into General, Income and

Growth funds, we should obtain subsamples of homogenous risk. If significant performance persistence for the total UK sample is due to one category which systematically outperforms the others, no performance persistence should be detected in subsamples taken individually.

The combined results for UK General[6] funds indicate that neither winners nor losers exhibit any significant performance persistence. The reported results for UK Income winners show that, on average, the initial period winners have the same probability to remain winners or to become losers in the next period. The similar findings are obtained for loser funds. Contrary to General and Income subsamples, Growth funds exhibit significant positive performance persistence over the entire period. In fact, while the results for individual years reveal some significant relationship depending on periods considered, winners and losers have, on average, respectively 58 and 57 percent of chance to repeat their relative performance in the following period. Finally, results for these three UK subsamples do not allow us to conclude that the persistence phenomenon, identified in the total UK sample, is due to one category outperforming systematically the others.

In order to test for a performance persistence among Swiss equity funds, we considered first the whole ten-year period despite the fact that there were only six funds available. In order to keep the sufficient number of funds, we then considered nineteen funds available over the last three-year period. Our findings confirm those reported for France and Germany, that is no significant pattern of performance persistence.

The results obtained in this section allow some concluding remarks. Over the whole ten-year period from August 1985 through July 1995, it is hard to conclude that there is much predictability in French equity fund returns. In fact, in the case of French funds, winners and losers tended to repeat on average just half of the time. The similar findings are obtained for German and Swiss funds. In the UK, the ratio associated with picking a winner, based upon past winning performance is about 55 percent. This result suggests a weak, but significant, positive persistence relationship in winner fund returns, i.e., winning following winning pattern. The similar result is observed for loser funds, with a loser-followed-by-loser ratio of 55 percent, significant at 5 percent level of confidence.

These empirical findings are, except for the UK, contrary to those in GOETZMANN and IBBOTSON (1994), BROWN and GOETZMANN (1995) and MALKIEL (1995), in support of positive persistence phenomenon in raw returns.

Until now, the fund classification is done without assessing the risk taken by different funds. In the next section, we examine whether there exists a relationship in risk adjusted fund returns.

5. Persistence with Risk-Adjusted Returns

In order to test the persistence in risk-adjusted returns as in various American studies, we decided to use the JENSEN measure. Thus, we can compare our results for European countries with those in GRINBLATT and TITMAN (1992), GOETZMANN and IBBOTSON (1994), MALKIEL (1995) and BROWN and GOETZMANN (1995). According to JENSEN, it is possible to examine whether, ex-post, the portfolio manager has made better results in performance than what we could expect by looking at the risk level of its portfolio. In the case of the manager ability to consistently select underevaluated securities, we should observe constantly positive alphas. Positive alphas imply the manager superior ability in stock selection. The JENSEN measure of performance is valid only if the manager has no market timing skill. COGGIN, FABOZZI and RAHMAN (1993) investigated empirically the importance of timing. At the purely statistical level, one can assess the significance of the timing values by looking at the t-values. However, in the TREYNOR and MAZUY model, the impact of timing on portfolio return is, in effect, measured by multiplying a rather small decimal fraction, γ, by a squared decimal

fraction, $(R_M - RF)^2$. Thus, results reported by COGGIN, FABOZZI and RAHMAN show that there is a very little impact of market timing on portfolio returns.

We further examine this persistence phenomenon in risk adjusted returns by regressing alphas of the considered period on the preceding period alphas. Therefore, we first estimated time-series alphas for each fund and for each twelve-month period as follows:

$$\alpha_F^k = \left(R_{Ft}^k - RF_t^k\right) - \beta_F^k\left(R_{Mt}^k - RF_t^k\right) + \varepsilon_{Ft}^k \qquad (7)$$

where

α_F^k is the fund F risk adjusted return over the twelve-month period k, and
the subscript t denotes the month in the period k.

We then regressed next twelve-month cross-sectional alphas on last cross-sectional alphas:

$$\alpha_F^k = \theta_0 + \theta_1 \alpha_F^{k-1} + \varepsilon_{Fk} \qquad (8)$$

where

θ_1, the slope of the regression, measures the magnitude of the twelve-month alphas on the subsequent twelve-month alphas.

Positive value of the coefficient θ_1 implies the positive performance persistence phenomenon of risk adjusted returns.

In Table 5, we present the empirical results for each country, obtained by running the above regression. To the extent that the alpha is indeed a risk adjusted standard of relative fund performance, we would expect any persistence in relative alphas to be due to relative level of management skills.

T-stat values for French funds indicate that the relation between two successive period alphas is significant at 5 percent level of confidence in even seven years. As the slope coefficient is positive, this implies the positive persistence in risk adjusted returns over seven periods. Moreover, the average explanatory power of the regression over these seven years is 40 percent. However, the slope coefficients being inferior to unity in seven out of nine cases, means repeating performance pattern with performance in the subsequent years closer to zero than in the initial years. In other words, positive alphas are followed by positive but smaller alphas, and negative alphas are followed by less negative alphas.

Empirical findings for German funds show a similar pattern of positive persistence in risk adjusted returns. In fact, in seven of nine periods, fund performance is significantly related to past performance. Here again, we observe only one case of slope coefficient superior to unity. On average, R-squared of the regression is equal to 0.41, which means that 41 percent of variation of alphas are explained by past alphas.

If we take a look at the results for the entire UK sample, we can observe a significant relationship in cross-sectional alphas over eight years. In two out of the eight years, this relationship is negative, implying reversals in equity funds performance. During six other years, we observe a positive relationship. Despite these significant results, past alphas explain only a marginal proportion of following period alphas. In order to test whether this persistence phenomenon might be related more to style than skills, we performed the same tests on relatively homogeneous subsets of data. The results for General, Income and Growth funds match those obtained using the entire UK sample, and demonstrate that the performance persistence phenomenon is not likely to be due to varying objectives or styles of fund portfolios. For General and Income funds, we observe a significant performance persistence phenomenon over five and six years, respectively. Slope coefficients are still inferior to one, and, for General funds, negative and statistically significant at 10 percent level in only one year. The results of the cross-sectional regressions for Growth funds subsample report four negative slope coefficients, i.e., four periods of reversal persistence in funds risk adjusted re turns. But only two of these coefficients are sig-

Table 5: Regression of next twelve-month cross-sectional Alphas on last twelve-month cross-sectional Alphas

Dependent Variable	Independent Variable	**France** (27 funds) θ_1 (t-stat)	R^2	**Germany** (18 funds) θ_1 (t-stat)	R^2	**UK** (176 funds) θ_1 (t-stat)	R^2	**UK General** (57 funds) θ_1 (t-stat)	R^2	**UK Income** (58 funds) θ_1 (t-stat)	R^2	**UK Growth** (61 funds) θ_1 (t-stat)	R^2	**Switzerland** (11 funds) θ_1 (t-stat)	R^2
08/86 to 07/87	08/85 to 07/86	0.21 (1.49)	0.08	0.65 (3.20**)	0.39	0.35 (6.33**)	0.19	0.32 (2.77**)	0.12	0.38 (3.64**)	0.19	0.27 (3.32**)	0.16		
08/87 to 07/88	08/86 to 07/87	0.40 (1.69)	0.10	0.13 (0.95)	0.05	0.25 (3.83**)	0.08	0.26 (1.98*)	0.07	0.03 (0.28)	0.00	0.23 (1.98**)	0.06		
08/88 to 07/89	08/87 to 07/88	0.68 (4.28**)	0.42	1.00 (1.39)	0.11	0.15 (1.34)	0.01	0.24 (1.00)	0.02	0.42 (1.99**)	0.07	–0.08 (–0.44)	0.00		
08/89 to 07/90	08/88 to 07/89	0.39 (2.37**)	0.18	1.07 (4.45**)	0.55	0.53 (6.91**)	0.22	0.53 (4.89**)	0.30	0.60 (4.17**)	0.24	0.46 (3.18**)	0.15		
08/90 to 07/91	08/89 to 07/90	0.80 (4.96**)	0.50	0.56 (3.42**)	0.42	–0.10 (–1.91*)	0.02	–0.15 (–1.77*)	0.05	0.07 (0.76)	0.01	–0.16 (–1.75*)	0.05	0.58 (2.45**)	0.40
08/91 to 07/92	08/90 to 07/91	1.19 (5.74**)	0.57	0.45 (2.05*)	0.21	0.14 (2.24*)	0.03	0.19 (1.47)	0.04	0.22 (1.81*)	0.06	0.07 (0.85)	0.01	0.72 (3.44**)	0.57
08/92 to 07/93	08/91 to 07/92	0.54 (7.76**)	0.71	0.49 (2.54**)	0.29	0.14 (2.22*)	0.03	0.16 (1.70*)	0.05	0.24 (3.58**)	0.19	–0.01 (–0.04)	0.00	0.05 (0.38)	0.02
08/93 to 07/94	08/92 to 07/93	0.22 (2.30**)	0.17	0.39 (2.40**)	0.26	0.23 (5.13**)	0.13	0.03 (0.40)	0.00	0.16 (1.86*)	0.06	0.32 (4.03**)	0.22	0.26 (0.86)	0.08
08/94 to 07/95	08/93 to 07/94	0.86 (2.71**)	0.23	0.78 (7.41**)	0.77	–0.48 (–4.53**)	0.11	0.00 (–0.01)	0.00	–0.23 (–1.13)	0.02	–0.60 (–3.83**)	0.20	0.64 (4.04**)	0.64

* significant at 10 percent level
** significant at 5 percent level

nificantly different from zero. The regression results imply that there is, over the total period of nine years, a positive persistence in relative fund performance in four periods, and a negative persistence in two periods.

We now run regressions on the Swiss fund sample. In order to keep a sufficient number of funds, we considered the last 5 and 3-year periods. The results for the 5-year subsample show three cases of significant relationship between successive periods alphas, which implies the performance persistence phenomenon in these three years. When we regress the eighteen-month alpha (Jan 94–Jun 95) of each of the Swiss funds on its previous eighteen-month alpha (Jul 92–Dec 93), our results[7] reveal a slope coefficient θ_1 of 1.08 and a *t*-statistic of 3.19. These empirical findings imply that there is a persistence in relative fund performance from the first eighteen-month period to the second eighteen-month period. According to these results, we expect not only to repeat the same relative performance, but to have this performance multiplied by 1.08. Moreover, this model seems to have a good explanatory power of 37 percent.

6. Conclusions

Past manager performance has long been used to evaluate future performance. Early studies of mutual fund behavior have suggested that there is little information in the performance track record. Recent empirical literature has emphasized predictable patterns in the time series of mutual fund returns. Moreover, these studies have also documented considerable persistency in fund returns: good performing funds tend to continue to perform well, at least over the near term.

This paper uses a similar methodology as in numerous American performance persistence studies, but applied to French, German, Swiss and UK equity funds. Our findings show a positive persistence phenomenon in winner funds raw returns for the UK only. In addition, the predictability of the risk adjusted fund returns was analyzed by regressing following period alphas on basic period alphas. The results indicate a positive persistence of relative fund performance. These findings are consistent with those reported in GRINBLATT and TITMAN (1992), GOETZMANN and IBBOTSON (1994), MALKIEL (1995) and BROWN and GOETZMANN (1995).

How can it be so easy to use simple historical information to identify a winning asset in an efficient financial market? One could imagine to implement an active strategy consisting in buying winners and short selling losers on a yearly basis. The answer seems to be the inability of investors to short most losing funds, and consequently, earn arbitrage profits generated from these predictable patterns in fund returns. Therefore, we might simply buy winners.

Our results for risk adjusted returns, reported in Table 6, show that alphas are close to zero or

Table 6: Statistics for Risk-Adjusted Returns (Alphas)

Country	Mean	Min	Max	Standard Deviation
France	–0.002	–0.004	0.001	0.00098
Germany	–0.001	–0.004	0.001	0.00100
UK General	0.000	–0.007	0.004	0.00099
UK Income	–0.001	–0.008	0.003	0.00120
UK Growth	0.000	–0.008	0.005	0.00143
Switzerland (3 years)	0.000	–0.003	0.001	0.00080
Switzerland (5 years)	–0.001	–0.003	0.000	0.00111

even negative. This means that the performance persistence documented here does not imply that active management would be able to outperform a passive investment strategy, and that individual investors can achieve abnormal returns by investing in winning funds.

The results reported here might be influenced by the survivorship bias. This bias is induced by the fact that the sample does not include the funds that disappeared over the time.

Mutual funds typically disappear as a result of being terminated or merged into other funds. In their earlier study, GRINBLATT and TITMAN (1989a) estimated empirically this fund disappearance problem. Their results indicate that the positive bias in performance estimates for samples that exclude nonsurviving funds is fairly small, on average between 0.1 and 0.4 percent per year, depending on the benchmark. BROWN, GOETZMANN, IBBOTSON and ROSS (1992) presented some numerical examples to show that the survivorship bias effect can be strong enough to account for the strength of the evidence favoring return predictability. MALKIEL (1995) estimates that analyses that systematically exclude nonsurviving funds will significantly overstate the returns received by mutual fund investors. This finding suggests that previous researchers, such as GRINBLATT and TITMAN, have underestimated the magnitude of surviving bias by claiming that the bias is relatively small.

Up to now, there is no consensus about this issue. On one hand, survivorship bias seems to overstate the persistence phenomenon by excluding bad funds that disappear during the period of study. On the other hand, persistence phenomenon due to those same funds (which perform systematically poorly prior to disappear) is not taken into account. As a result, one could argue that these two effects offset each other, and that the impact of the survivorship bias on the return predictability is fairly small.

Footnotes

[1] According to HENDRICKS, PATEL and ZECKHAUSER (1993), the one year evaluation horizon gives the most significant results in term of performance persistence.

[2] Results for winner funds defined as achieving a rate of return above the median are similar.

[3] Entire sample includes funds from France, Germany, UK and Switzerland.

[4] Entire UK sample including General, Income and Growth funds.

[5] Sub sample including nineteen funds available over the 1992–1994 period.

[6] Funds that can not be characterized as Income or Growth funds.

[7] Not reported in Table 5.

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