Does Mutual Fund Performance Vary over the Business Cycle? *

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Comments welcome.

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Abstract

Conditional factor models allow both risk loadings and performance over a period to be a function of information available at the start of the period. Much of the literature to date has allowed risk loadings to be time-varying while imposing either the assumption that conditional performance is constant or the assumption that conditional betas are linear in the information. We develop a new methodology that allows conditional performance to be a function of information available at the start of the period but does not make assumptions about the behavior of the conditional betas. This methodology uses the Euler equation restriction that comes out of the factor model rather than the beta pricing formula itself. It assumes that the stochastic discount factor (SDF) parameters are linear in the information. The Euler equation restrictions that we develop can be estimated using GMM. We also use econometric techniques developed by Lynch and Wachter (2003) to take advantage of the longer data series available for the factor returns and the information variables. These techniques allow us to produce more precise parameter estimates than those obtained from the usual GMM estimation. We use our SDF-based method to assess the conditional performance of funds in the Elton, Gruber and Blake (1996) mutual fund data set. Using dividend yield and term spread to track the business cycle, we find that conditional mutual fund performance relative to conditional versions of the Fama-French and Carhart pricing models moves with the business cycle, and this business cycle variation in performance differs across large-NAV and small-NAV funds within at least one Weisenberger category. Moreover, the conditional performance of the large-NAV maximum capital gain portfolio is more procyclical than that of the small-NAV maximum capital gain portfolio. Maximum capital gain funds hold high growth stocks predominantly but we do not find any evidence of cyclical abnormal performance in the 5 lowest book-to-market portfolios of the 25 Fama-French portfolios.

1 Introduction

Mutual fund performance has long been of interest to financial economists, both because of its implications for market efficiency, and because of its implications for investors. A key question in evaluating performance is the choice of the benchmark model. Without a model for normal returns, it is impossible to define a mutual fund return as abnormal. Recently, the asset pricing literature has emphasized the distinction between unconditional and conditional asset pricing models.[1] The relative success of conditional models raises important questions for the mutual fund researcher. How does one evaluate performance when the underlying model is conditional? Might performance itself be conditional? In principle, a conditional model allows both risk loadings and performance over a period to be a function of information available at the start of the period. Several recent papers allow risk loadings to be time-varying but they either assume that conditional performance is a constant (Farnsworth, Ferson, Jackson, Todd, 2002, for mutual funds), conditional betas are linear in the information variables (Christopherson, Ferson and Glassman, 1998, for pension funds and Ferson and Harvey, 1999, for stocks) or both (Ferson and Schadt, 1996, for mutual funds,an important early contribution to the conditional performance literature).[2]

We develop a new methodology that allows conditional performance to be a function of information available at the start of the period, but without assumptions on the behavior of the conditional betas.[3] This methodology uses the Euler equation restriction that comes out of a factor model rather than the beta pricing formula itself. It only assumes that the stochastic discount factor (SDF) parameters are linear in the information. While the Euler equation does not provide direct information about the nature of time variation in the risk loadings, it can provide direct information about time variation in conditional performance. In contrast, the classic time-series regression methodology can only provide direct information about time-varying performance if strong assumptions are made about time-varying betas.

A set of factors constitute a conditional beta-pricing model if the conditional expected return on any asset is linear in the return's conditional betas with respect to the factors. It is well known (see Cochrane, 2001) that a set of factors constitutes a conditional beta-pricing model if and only if there exists a linear function of the factors (where the coefficients are in the conditional information set)

[1] See Jagannathan and Wang (1996) and Lettau and Ludvigson (2001b).

[2] Kosowski (2001) assesses time-variation in mutual fund performance using a regime-switching benchmark model. But his regimes are fund-specific, so it difficult to interpret his findings as evidence for business-cycle variation.

[3] Independently and concurrently, Ferson, Henry and Kisgen (2003) developed a similar methodology, but used it to evaluate the performance of bond funds rather than equity funds which is our focus.

that can be used as a stochastic discount factor in the conditional Euler equation. Our methodology determines the parameters of this stochastic discount factor by correctly pricing the factor returns. This estimated stochastic discount factor is then used to calculate the conditional performance of a fund by replacing the fund's return in the Euler equation with the fund return in excess of its conditional performance. We allow the parameters of the stochastic discount factor to be linear in the information variables, as in Lettau and Ludvigson (2001b), and we use the same linear specification for conditional fund performance. However, the methodology is sufficiently flexible to allow arbitrary functional forms for both.

We use our Euler equation restrictions to assess the conditional performance of funds in the Elton, Gruber and Blake (1996) mutual fund data set. Conditional performance is estimated for equal-weighted portfolios grouped by fund type. Three of the four fund types are the Weisenberger categories, maximum capital gain, growth, and growth and income, while the fourth group includes all other funds in our sample. We also consider the effect of total net assets under management on fund performance. For each year, we bifucate each of the three Wiesenberger categories, maximum capital gain, growth, and growth and income, based on total net assets under management at the start of the year, which we obtain, if reported, from the previous year's edition of Wiesenburger. We use two information variables. The first is the 12-month dividend yield on the value-weighted NYSE (DY) and the data used to construct this series come from CRSP. The second is the yield spread (TS) between 20-year and one-month Treasury securities, obtained from the Ibbotson data service. Both have been found to predict stock returns and move with the business cycle, with the term spread capturing higher frequency variation than the dividend yield (see Fama and French, 1989). Moreover, there are theoretical reasons why dividend yield is related to expected returns (see Campbell and Shiller, 1988), which makes data snooping much less of an issue for this variable as a predictor than for other variables in the literature. We have fund data from 12/93 back to 1/77 and factor return and instrument data back to 1/27.

We estimate the performance parameters using the Euler equation restrictions discussed above. One estimation technique that we employ is regular GMM estimated over the fund sample period. It is also possible to allow the factor returns and information variables to have longer data series than the mutual fund series as in Stambaugh (1997). A number of recent Bayesian mutual fund papers have taken advantage of the availability of longer data series for the factor returns than the mutual fund returns (see Pastor and Stambaugh, 2002a and 2002b). Lynch and Wachter (2007) have extended these methods to non-linear estimation in a frequentist setting. We use their methodology to estimate the Euler equation restrictions taking account of factor return and dividend yield data back to 1927.

We estimate two different factor models: the Fama and French (1993) model whose three factors are the market excess return, the return on a portfolio long high and short low book-to-market stocks, and the return on a portfolio long big stocks and short big stocks; and the four factor model of Carhart (1997) whose factors are the three Fama-French factors plus the return on a portfolio long stocks that performed well the previous year and short stocks that performed poorly. Three versions of each model are estimated. The first is the usual unconditional model. The second is the conditional model with performance not allowed to depend on the information variable, as in Ferson and Schadt (1996). The third is the conditional model with performance that is allowed to vary with the information variable. Implementing this last version for mutual funds is the innovation of the paper.

We find that conditional mutual fund performance does not move with either information variable when we group the funds by Wiesenburger category. However, once we bifucate each category based on assets under management (NAV), we find strong evidence of conditional performance that moves with dividend yield and with term spread. In particular, a Wald test for equality to zero for the six groups of the coefficients that determine how the performance moves with the information variable is always rejected, irrespective of the pricing model used as the benchmark or the information variable employed. Not surprisingly given the lack of variation in conditional performance for Wiesenburger category groups, the nature of the conditional abnormal performance for a category varies depending on whether NAV is above or below the median for that category. A Wald test of equality across NAV groups for each of the three Wiensenburger categories is always rejected, irrespective of the pricing model being used as the benchmark or the information variable employed. Moreover, we find that this rejection is driven by the small-NAV maximum capital gain funds having countercyclical performance that is significantly more countercyclical than the procyclical performance of the large-NAV maximum capital gain funds. Again, we obtain this result irrespective of the pricing model used or the information variable employed. The clear implication of our findings is that fund performance varies over the business cycle for some funds and the nature of that variation depends on NAV, at least for maximum capital gain funds.

While a natural explanation for our results is conditional abnormal fund performance, another explanation is that our pricing model is misspecified. What we see as conditional abnormal performance for maximum capital gain funds may in fact be cyclical mispricing of growth stocks by our benchmark pricing models. To rule out this alternative hypothesis, we repeat our testing using the 25 Fama-French portfolios sorted on size and book-to-market instead of our fund type portfolios. If pricing model misspecification is driving our fund performance results, we expect to find the coefficient that determines how performance moves with dividend yield or term spread to be non-zero for the low book-to-market portfolios. Instead, for the fund sample period, 1/77 to 12/93 and irrespective of information variable or pricing model, we are not able to reject the hypothesis that this coefficient is zero for the five lowest book-to-market portfolios using regular GMM or the Lynch-Wachter methodology. When we use the regression-based methodology of Ferson and Harvey that assumes conditional betas are linear in the information variables, we can only reject the hypothesis for the Fama-French model and the term spread as the information variable. These results strongly suggest that our conditional fund performance results are not being driven by mispricing of the underlying assets being held by the funds.

By enabling us to include factor return and dividend yield data back to 1/27, the unequal-samples methodology of Lynch and Wachter (2007) allows us to produce substantially more precise parameter estimates. The percentage reduction in standard error estimates is near 50% for the SDF parameters and is typically around 30% to 40% for the performance parameters. For some of the tests, this additional precision allows us to reject some hypotheses that we couldn't reject using just the 1977-1993 data. Our results suggest that the Lynch and Wachter (2007) methodology for dealing with unequal data lengths may allow, when some financial series are longer than others, much more precise parameter estimation than just using the shortest common series length in the estimation.

The paper is organized as follows. Section 2 discusses the theory behind our conditional performance measure. Section 3 discusses the data and Section 4 describes the empirical methodology. Section 5 presents the results and Section 6 concludes.

2 Theory

This section discusses the theory behind our conditional performance measure. Section 2.1 describes the benchmark models for asset returns. Performance is always measured relative to a given benchmark model. Section 2.2 defines our measure of conditional abnormal performance and discusses the estimation. Section 2.3 compares our measure to others in the literature.

2.1 Benchmark Models

Our paper examines fund performance relative to two benchmark pricing models and this subsection describes the two models. The first is the conditional factor model and the second is the unconditional factor model. Both can have multiple factors.

2.1.1 Conditional Factor Model

We start by assuming a conditional beta pricing model of the form

$$E_t[r_{t+1}] = E_t[\mathbf{r}_{\mathbf{p},t+1}]^\top \boldsymbol{\beta}_t, \tag{1}$$

where $\boldsymbol{\beta}_t$ is a column vector equal to

$$\boldsymbol{\beta}_t = \mathrm{Var}_t(\mathbf{r}_{\mathbf{p},t+1})^{-1}\mathrm{Cov}_t(\mathbf{r}_{\mathbf{p},t+1}, r_{t+1}),$$

and $\mathbf{r}_{\mathbf{p},t+1}$ is an Kx1 column vector of returns on zero-cost benchmark portfolios. In what follows, we will denote excess returns using lower-case r; gross returns will be denoted R. In the case where $\mathbf{r}_\mathbf{p}$ is the return on the market in excess of the riskfree rate, (1) is a conditional CAPM. When there are multiple returns, (1) can be interpreted as an ICAPM, or as a factor model where the factors are returns on portfolios.

As is well-known, (1) is equivalent to specifying a conditional stochastic discount factor model in which the stochastic discount factor is linear in $\mathbf{r}_\mathbf{p}$ with coefficients that are elements of the time-t information:

$$M_{t+1} = a_t + \mathbf{c}_t^\top \mathbf{r}_{\mathbf{p},t+1}. \tag{2}$$

With a stochastic discount factor model, any return R_{t+1} that is correctly priced by the stochastic discount factor,M_{t+1}, satisfies:

$$E_t[R_{t+1}M_{t+1}] = 1. \tag{3}$$

Following Cochrane (2001), we make the further assumption that the coefficients are linear functions of an information variable Z_t, which summarizes the information available to the investor at time t.[4] The linearity assumption has also been recently used in tests of the conditional CAPM (see Lettau and Ludvigson, 2001). With this assumption, the stochastic stochastic discount factor associated with the conditional factor model is given by:

$$M_{t+1} = a + bZ_t + (\mathbf{c} + \mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1}. \tag{4}$$

[4] The assumption of a single information variable is made for notational convenience. The model easily generalizes to multiple information variables, and even to the case where coefficients are nonlinear functions of Z_t.

We now show that (3) implies the conditional factor model given in (1). Let $R_{f,t+1}$ denote the riskfree rate of return. Because $R_{f,t+1}$ is known at time t:

$$E_t[M_{t+1}] = \frac{1}{R_{f,t+1}}.$$

Zero-cost portfolios and returns in excess of the riskfree rate satisfy:

$$E_t[r_{t+1}M_{t+1}] = 0. \tag{5}$$

Suppose that an asset with excess return r_{t+1} is priced correctly by M_{t+1}. Then (5) implies

$$\mathrm{Cov}_t\left(a + bZ_t + (\mathbf{c} + \mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1}, r_{t+1}\right) + E_t[M_{t+1}]E_t[r_{t+1}] = 0.$$

Because Z_t is known at time t,

$$E_t[r_{t+1}] = -\frac{(\mathbf{c} + \mathbf{d}Z_t)}{E_t[M_{t+1}]}^\top \mathrm{Cov}_t(\mathbf{r}_{\mathbf{p},t+1}, r_{t+1}). \tag{6}$$

Because M_{t+1} must price the reference assets correctly, (6) holds for the reference assets, and

$$\frac{(\mathbf{c} + \mathbf{d}Z_t)}{E_t[M_{t+1}]}^\top = -E_t[\mathbf{r}_{\mathbf{p},t+1}]^\top \mathrm{Var}_t(\mathbf{r}_{\mathbf{p},t+1})^{-1}. \tag{7}$$

Substituting (7) in to (6) produces (1). Thus specifying the stochastic discount factor as (4) implies a conditional beta pricing model.

2.1.2 Unconditional Factor Model

We also consider an unconditional factor model as the benchmark. An unconditional beta pricing model can be written

$$E[r_{t+1}] = E[\mathbf{r}_{\mathbf{p},t+1}]^\top \boldsymbol{\beta}, \tag{8}$$

where $\boldsymbol{\beta}$ is a column vector equal to

$$\boldsymbol{\beta} = \mathrm{Var}(\mathbf{r}_{\mathbf{p},t+1})^{-1}\mathrm{Cov}(\mathbf{r}_{\mathbf{p},t+1}, r_{t+1}).$$

It is easy to show that an unconditional beta pricing model with $\mathbf{r}_{\mathbf{p},t+1}$ as the factors is equivalent to specifying a stochastic discount factor model in which the stochastic discount factor is linear in $\mathbf{r}_{\mathbf{p}}$ with coefficients that are constants:

$$M_{t+1} = a + \mathbf{c}^\top \mathbf{r}_{\mathbf{p},t+1}. \tag{9}$$

With an unconditional stochastic discount factor model, any return R_{t+1} that is correctly priced by the stochastic discount factor,M_{t+1}, satisfies:

$$E[R_{t+1}M_{t+1}] = 1 \tag{10}$$

and any correctly priced, zero-cost return r_{t+1} satisfies

$$E[r_{t+1}M_{t+1}] = 0. \tag{11}$$

2.2 Performance Measures

We consider three performance measures. The first measures performance relative to the conditional model and allows it to be a function of the state of the economy at the start of the period. The last two assume that the abnormal performance is the same each period, with the two benchmarks being the conditional and unconditional factor models, respectively. To identify the stochastic discount factor coefficients associated with the benchmark model, we always assume that the stochastic discount factor correctly prices the factor returns and the riskless asset.

2.2.1 Performance Relative to the Conditional Factor Model

Consider the excess return on a fund $r_{i,t+1}$ and suppose that this excess return can be described by

$$E_t[r_{i,t+1}] = \alpha_{it} + E_t[\mathbf{r}_{\mathbf{p},t+1}]^\top \boldsymbol{\beta}_{i,t+1}, \tag{12}$$

where α_{it} represents abnormal performance relative to the conditional factor model described in (1), just as in the static case. This abnormal performance is in the time-t information. Recall that the stochastic discount factor, $M_{t+1} = a_t + \mathbf{c}_t^\top \mathbf{r}_{\mathbf{p},t+1}$, prices any asset return satisfying the conditional beta pricing model described in (1). It is easy to show that the following modification to the conditional stochastic discount factor model holds for $r_{i,t+1}$:

$$E_t\left[(a_t + c_t^\top \mathbf{r}_{\mathbf{p},t+1})(r_{i,t+1} - \alpha_{it})\right] = 0. \tag{13}$$

We consider two specifications for the abnormal performance. In the first, we let e_i and f_i be fund-specific constants such that

$$\alpha_{it} = e_i + f_i Z_t.$$

Under this specification, performance is allowed to be linear in the information variable Z_t. Consequently, we refer to this specification as conditional performance relative to the conditional factor model. This specification for the abnormal performance together with the linear specification for the stochastic discount factor in (4) implies that the following moment condition must hold:

$$E_t\left[(r_{i,t+1}-e_i-f_iZ_t)(a+bZ_t+(\mathbf{c}+\mathbf{d}Z_t)^\top\mathbf{r}_{\mathbf{p},t+1})\right]=0. \tag{14}$$

In the second specification, we let e_i be a fund-specific constant such that

$$\alpha_{it}=e_i.$$

Since performance is a constant, we refer to this specification as unconditional performance relative to the conditional factor model. Using the linear specification for the stochastic discount factor in (4), we obtain the following moment condition:

$$E_t\left[(r_{i,t+1}-e_i)(a+bZ_t+(\mathbf{c}+\mathbf{d}Z_t)^\top\mathbf{r}_{\mathbf{p},t+1})\right]=0. \tag{15}$$

2.2.2 Performance Relative to the Unconditional Factor Model

Again consider the excess return on a fund $r_{i,t+1}$ but suppose that this excess return can be described by

$$E[r_{i,t+1}]=\alpha_i+E[\mathbf{r}_{\mathbf{p},t+1}]^\top\boldsymbol{\beta}_i, \tag{16}$$

where α_i represents abnormal performance relative to the unconditional factor model described in (8). It is easy to show that the following modification to the unconditional stochastic discount factor model holds for $r_{i,t+1}$:

$$E\left[(r_{i,t+1}-\alpha_i)(a+\mathbf{c}^\top\mathbf{r}_{\mathbf{p},t+1})\right]=0. \tag{17}$$

2.3 Comparison to other measures

An alternative to our method is the regression-based approach of Ferson and Harvey (1999) and Ferson and Schadt (1996). Both papers examine performance relative to the conditional pricing model (1). However, they differ from us in their specification of the conditional moments. Rather than assuming that the stochastic discount factor (4) is linear in the information variables, they assume that the conditional betas are linear.

Ferson and Schadt (1996) estimate a regression equation

$$r_{i,t+1}=\delta_{0,i}+\delta_{m,i}r_{m,t+1}+\delta_{Zm,i}Z_tr_{m,t+1}+\varepsilon_{i,t+1}, \tag{18}$$

where $r_{m,t+1}$ is the excess return on the market, using ordinary least squares.[5] If fund return satisfies (12) with $\alpha_{it} = e_i$, β_t linear in Z_t, and $r_{m,t+1}$ the only factor, Ferson and Schadt show that $\delta_{0,i}$ equals e_i. Thus, $\delta_{0,i}$ can be regarded as a measure of the fund's unconditional performance relative to the conditional factor model in (1).

Ferson and Harvey (1999) extend this approach to estimate conditional abnormal performance. Ferson and Harvey estimate the following unconditional regression:

$$r_{i,t+1} = \delta_{0,i} + \delta_{Z,i} Z_t + \delta_{m,i} r_m + \delta_{Zm,i} Z_t r_{m,t+1} + \varepsilon_{i,t+1}. \tag{19}$$

This specification can measure performance, α_{it}, of the form $e_i + f_i Z_t$. In particular, if the fund return satisfies (12) with $\alpha_{it} = e_i + f_i Z_t$, β_t linear in Z_t, and $r_{m,t+1}$ as the only factor, it is possible to show show that $\delta_{0,i}$ equals e_i and $\delta_{Z,i}$ equals f_i.

The disadvantage of this approach is that the interpretations of non-zero $\delta_{0,i}$ and $\delta_{Z,i}$ are sensitive to the assumed linearity of beta as a function of the information variable. For example, suppose that, with $\mathbf{r_p}_{,t+1}$ set equal to $r_{m,t+1}$, (4) represents a stochastic discount factor that prices $r_{i,t+1}$. As we have shown, (1) holds for $r_{i,t+1}$, but β_t need not be linear in Z_t. Taking unconditional expectations of (3) and using the reasoning above, it follows that

$$\begin{aligned} E[r_{i,t+1}] &= -\frac{1}{E[M_{t+1}]}\Big(b\mathrm{Cov}(r_{i,t+1}, Z_t) - \mathbf{c}^\top \mathrm{Cov}(r_{i,t+1}, r_{m,t+1}) - \mathbf{d}^\top \mathrm{Cov}(r_{i,t+1}, Z_t r_{m,t+1})\Big) \\ &= \begin{bmatrix} \beta_{i,Z}, & \beta_{i,r_m}, & \beta_{i,Zr_m} \end{bmatrix} \lambda \end{aligned} \tag{20}$$

where $\lambda^\top = \begin{bmatrix} \lambda_Z, & \lambda_{r_m}, & \lambda_{Zr_m} \end{bmatrix}$ is a vector of constants and $\begin{bmatrix} \beta_{i,Z}, & \beta_{i,r_m}, & \beta_{i,Zr_m} \end{bmatrix}$ is a vector of regression slope coefficients from a regression of $r_{i,t+1}$ on Z_t, $r_{m,t+1}$, $Z_t r_{m,t+1}$ and a constant. Because (20) must hold for the factor portfolio $r_{m,t+1}$, as well as for the scaled portfolio $Z_t r_{m,t+1}$, it follows that the last two elements of λ are the expected returns on these two portfolios; i.e., $\lambda_{r_m} = E[r_{m,t+1}]$ and $\lambda_{Zr_m} = E[Z_t r_{m,t+1}]$. Our model thus implies an unconditional model with 3 factors. Using the definition of regression, it follows that: $\delta_{m,i} = \beta_{i,r_m}$ and $\delta_{Zm,i} = \beta_{i,zr_m}$. When conditional betas are not linear, we can expect $\delta_{Z,i}$ to pick up unconditional residual correlation between $r_{i,t+1}$ and Z_t. It is therefore possible for $\delta_{Z,i}$ to be nonzero even if skill is not time-varying ($f_i = 0$).

Using the expressions for $\delta_{m,i}$ and $\delta_{Zm,i}$, it follows that $\delta_{0,i}$ and $\delta_{Z,i}$ are related in the following manner:

$$\delta_{0,i} = \delta_{Z,i}(\lambda_Z - E[Z_t]).$$

[5] Ferson and Schadt (1996) also consider multi-factor models, but use a single-factor model to illustrate their methodology.

Consequently, depending on the relative values of λ_Z and $E[Z_t]$, $\delta_{0,i}$ need not be zero either. If the betas are not linear, nonzero loadings on Z_t and a nonzero constant term do not necessary imply abnormal performance.

Our approach has several advantages over the regression-based approach. First, it makes clear assumptions about the stochastic discount factor associated with the factor model. Given that β is a characteristic of the asset rather than the economy, it may not be possible to write down the stochastic discount factor that would deliver the Ferson and Schadt (1996) specification. Our method is also very flexible. We could allow the coefficients of the stochastic discount factor to be nonlinear functions of Z_t without a significant change to the methodology. While the regression-based approach delivers an estimate of a tightly-parameterized time-varying beta of a mutual fund, our approach delivers an estimate of time-varying performance that is robust to the specification for beta.

We estimate performance using both the SDF and the regression-based approaches. We can therefore determine the extent to which the performance estimates from the regression-based approach arise from the assumption that beta is linear in the information variables.

3 Data

The riskfree and factor return data come from Ken French's website. Fama and French (1993) describe the construction of the riskfree rate series, the excess market return, the high minus low book-to-market portfolio return (HML) and the small minus big market capitalization portfolio return (SMB) are constructed. A description of the momentum portfolio return (UMD) can be found on the website. We use two information variable. The first is the 12-month dividend yield on the value-weighted NYSE (DY) and the data used to construct this series come from CRSP. The second is the yield spread (TS) between 20-year and one-month Treasury securities, obtained from the Ibbotson data service.

The mutual fund data is from Elton, Gruber and Blake (1996). Their sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $ 15 million or more and that are not restricted.[6] Their data runs from January 1977 through until December 1993. This is our sample period as well. Four fund type groups are constructed using the Wiesenberger style categories, with our classifications always consistent with those employed by Elton, Gruber and Blake and Ferson and Schadt (1996). Three of the four fund

[6]The types of restricted funds are described in detail in Elton, Gruber and Blake (1996).

types are the Wiesenberger categories, maximum capital gain, growth, and growth and income, while the fourth group includes all other funds in our sample. For disappearing funds, returns are included through until disappearance so the fund-type returns do not suffer from survivor conditioning.[7] Funds are reclassified at the start of each year based on their category at that time.

We also consider the effect of total net assets under management on fund performance. For each year, we bifucate each of the three Wiesenberger categories, maximum capital gain, growth, and growth and income, based on total net assets under management at the start of the year, which we obtain, if reported, from the previous year's edition of Wiesenburger. If total net assets under management is not reported in the previous year's edition, we use the most recent Wiesenburger edition before the previous year which does report total net assets under management. We only have Wiesenburger editions for 1976 through to 1990 so the total net assets under management used to bifucate the three types in the 1991 sample is also used to bifucate the three categories in the 1992 and 1993 samples. Thus, we are careful to form our small and large fund groups for each fund type each year based on information that is publicly available at the start of the year.

4 Empirical Methodology

An advantage of our measure of performance is the ease with which it can be estimated. The first subsection describes the moments used in the estimation. These come from the pricing restrictions involving the SDF that were derived in the previous section. The second subsection describes how the usual GMM methodology is used to estimate the parameters and also how the new methodology of Lynch and Wachter (2007) for unequal data lengths is applied to take advantage of the longer data series for factor returns than for fund returns.

4.1 Moment restrictions used in the SDF-based estimation

The moment restrictions that we use depend on whether we are using the conditional or unconditional factor model as the benchmark model.

4.1.1 Conditional factor model as the benchmark

With a conditional K factor model, the associated SDF in (4) has $2(K+1)$ parameters to be estimated. The coefficients a, b, $\mathbf{c}$, and $\mathbf{d}$ can be estimated using the following $2(K+1)$ moment conditions:

[7] See Brown, Goetzmann, Ibbotson and Ross (1992) and Carpenter and Lynch (1999) for discussions of the effects of survivor conditioning on performance measurement.

$$E[\Big((a+bZ_t)+(\mathbf{c}+\mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1}\Big)\left[\begin{array}{c} R_{f,t+1} \\ \mathbf{r}_{\mathbf{p},t+1}\end{array}\right]\otimes\left[\begin{array}{c} 1 \\ Z_t\end{array}\right] \quad - \quad \left[\begin{array}{c} 1 \\ \mathbf{0}\end{array}\right]\otimes\left[\begin{array}{c} 1 \\ Z_t\end{array}\right]] = \mathbf{0} \qquad (21)$$

These must hold if the stochastic discount factor in (4) correctly prices the riskfree return, $R_{f,t+1}$, using (3) and the zero-cost factor portfolio returns, $\mathbf{r}_{\mathbf{p},t+1}$ using (5). Since (4) and (5) are conditional moment restrictions, it is possible to multiply both sides of each by 1 and Z_t and then use the law of iterated expectations to arrive at the unconditional moment restrictions in (21). Since there are $2(K+1)$ moments and parameters, these moments are able to just-identify the SDF parameters.[8]

The moments used to identify the fund-specific performance parameters depend on the abnormal performance specification. However, the basic approach is to take the modified SDF model that prices fund excess returns, (13), and again multiply by variables in the time-t information set before conditioning down. When fund performance is allowed to be linear in Z_t such that $\alpha_{it} = e_i + f_i Z_t$, the following 2 moments conditions can be obtained for excess return r_i by multiplying by 1 and Z_t:

$$E[\Big((r_{i,t+1}-e_i-f_iZ_t)\Big((a+bZ_t)+(\mathbf{c}+\mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1}\Big)\Big)\otimes\left[\begin{array}{c} 1 \\ Z_t\end{array}\right]] \quad = \quad \left[\begin{array}{c} 0 \\ 0\end{array}\right]. \qquad (22)$$

Since there are 2 moments and parameters, these moments are able to just-identify the fund-specific performance parameters.

When fund performance is restricted to be a constant such that $\alpha_{it} = e_i$, the following moment condition can be obtained for excess return r_i by multiplying by 1 and conditioning down:

$$E[(r_{i,t+1}-e_i)\Big((a+bZ_t)+(\mathbf{c}+\mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1}\Big)] \quad = \quad 0. \qquad (23)$$

Since there is 1 moment and parameter, the fund-specific performance parameter is again just-identified. We could have multiplied by Z_t as for the previous specification, but then the parameter would be over-identified. The SDF parameters are estimated using the moment conditions (21) as before.

4.1.2 Unconditional factor model as the benchmark

With an unconditional K factor model, the associated SDF in (9) has $(K+1)$ parameters to be estimated. There is one performance parameter per fund. The $(K+1)$ moments used to identify

[8]The conditional moment restrictions in (4) and (5) can also be multiplied by nonlinear functions of Z_t before conditioning down, which would allow the parameters to be over-identified by the moments.

the $(K+1)$ SDF parameters, follow immediately from the following moment conditions:

$$E[\Big(a + \mathbf{c}^\top \mathbf{r}_{\mathbf{p},t+1}\Big) \begin{bmatrix} R_{f,t+1} \\ \mathbf{r}_{\mathbf{p},t+1} \end{bmatrix} - \begin{bmatrix} 1 \\ \mathbf{0} \end{bmatrix}] = \mathbf{0} \tag{24}$$

These must hold if the stochastic discount factor in (9) correctly prices the riskfree return, $R_{f,t+1}$, using (10) and the zero-cost factor portfolio returns, $\mathbf{r}_{\mathbf{p},t+1}$ using (11). The fund-specific performance parameter, $e_i = \alpha_i$ is identified directly by the moment restriction (17). Notice that again the number of moments just equals the number of parameters so that the parameters are just identified.

4.2 GMM estimation with equal and unequal length data

We have fund data back to 1/77 and factor return and instrument data back to 1/27, which means we have factor return data that goes back much further than fund return data. Moments that identify the SDF parameters do not use fund return data and so we have data on these moments back to 1/27. Let the short sample period refer to the sample period over which there is fund return, factor return and instrument data. Here, the short sample period is 1/77 to 12/93. Let the short-complement sample period refer to the sample period over which there is only factor return and instrument data. Here, the short-complement sample period is 1/27 to 12/76. Lastly, let the long sample period be the union of the short and short-complement sample periods.

The usual GMM estimation strategy takes the sample period to be that for which data is available for all moments. Here, estimating GMM in the usual way uses only the short sample period data. The problem with this approach is that the information contained in the factor return and instrument data from 1/27 to 12/76 is completely ignored. Lynch and Wachter (2007) have developed asymptotic theory for a variety of GMM estimators that use this additional information. They present two GMM estimators and show that they both have the same asymptotic variance and that this variance is always weakly smaller than that for the usual short sample estimator. The asymptotic theory assumes that data is added to the short-complement and short samples in the same ratio as in the available sample. We utilize one of these GMM estimators as a way to use the in formation contained in the short complement data.

We describe the various estimation methods employed to assess conditional performance relative to the conditional model and then briefly describe how these methods apply to the other two performance measures. Let $t = 1$ be date 1/27, $t = T$ be date 12/93, and $t = (1-\lambda)T + 1$ be date 1/77. With this notation, λ represents the fraction of the long sample period covered by the short sample period. Suppose we are interested in the performance of N funds whose returns over period $t+1$ are given by $\mathbf{r_{N,t+1}} = [r_{1,t+1} \ ... \ r_{N,t+1}]'$. To make notation more compact, we define

$$\mathbf{f}_1(\mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, Z_t, \theta_1) = \left[\begin{array}{c} R_{f,t+1} \\ \mathbf{r}_{\mathbf{p},t+1} \end{array} \right] \left((a + bZ_t) + (\mathbf{c} + \mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1} \right) \otimes \left[\begin{array}{c} 1 \\ Z_t \end{array} \right] - \left[\begin{array}{c} 1 \\ \mathbf{0} \end{array} \right] \otimes \left[\begin{array}{c} 1 \\ Z_t \end{array} \right] \quad (25)$$

and

$$\mathbf{f}_2(\mathbf{r}_{\mathbf{N},t+1}, \mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, Z_t, \theta_1, \theta_2) = (\mathbf{r}_{\mathbf{N},t+1} - \mathbf{e} - \mathbf{f}Z_t) \otimes \left((a + bZ_t) + (\mathbf{c} + \mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1} \right) \otimes \left[\begin{array}{c} 1 \\ Z_t \end{array} \right], \quad (26)$$

where $\mathbf{e} = [e_1 \ ... \ e_N]'$, $\mathbf{f} = [f_1 \ ... \ f_N]$, $\theta_1 = [a \ b \ \mathbf{c}' \ \mathbf{d}']'$ and $\theta_2 = [\mathbf{e}' \ \mathbf{f}']'$. Note that the f_1 moments identify the SDF parameters while the f_2 moments identify the fund parameters. Define

$$\mathbf{g}_{1,T}(\theta) = \frac{1}{T} \sum_{t=1}^{T} \mathbf{f}_1(\mathbf{r}_{\mathbf{p},t}, R_{f,t}, Z_{t-1}, \theta_1) \quad (27)$$

$$\mathbf{g}_{1,\lambda T}(\theta) = \frac{1}{\lambda T} \sum_{t=(1-\lambda)T+1}^{T} \mathbf{f}_1(\mathbf{r}_{\mathbf{p},t}, R_{f,t}, Z_{t-1}, \theta_1) \quad (28)$$

$$\mathbf{g}_{1,(1-\lambda)T}(\theta) = \frac{1}{(1-\lambda)T} \sum_{t=1}^{(1-\lambda)T} \mathbf{f}_1(\mathbf{r}_{\mathbf{p},t}, R_{f,t}, Z_{t-1}, \theta_1) \quad (29)$$

$$\mathbf{g}_{2,\lambda T}(\theta) = \frac{1}{\lambda T} \sum_{t=(1-\lambda)T+1}^{T} \mathbf{f}_2(\mathbf{r}_{\mathbf{N},t}, \mathbf{r}_{\mathbf{p},t}, R_{f,t}, Z_{t-1}, \theta_1, \theta_2), \quad (30)$$

where $\theta = [\theta_1 \ \theta_2]$.

The canonical GMM estimator takes the following form:

$$\hat{\theta}_T = \text{argmin}_\theta \ \mathbf{h}_T^\top \mathbf{W}_T \mathbf{h}_T. \quad (31)$$

The usual GMM estimator for the short sample is referred to as the Short estimator and sets

$$\mathbf{h}_T(\theta) = \left[\mathbf{g}_{1,\lambda T}(\theta)^\top \ \mathbf{g}_{2,\lambda T}(\theta)^\top \right]^\top. \quad (32)$$

These sample moments correspond to the population moments on the left hand sides of (21) and (22) which explains why asymptotically they are equal to zero under the null, as required by the GMM methodology.

Before we define the estimator that uses the short-complement sample data, we first define the asymptotic covariance matrix:

$$\mathbf{S}_{ij} = \sum_{k=-\infty}^{\infty} E\left[\mathbf{f}_i(\mathbf{r}_0, \theta) \mathbf{f}_j(\mathbf{r}_{-k}, \theta)^\top \right], \quad (33)$$

where

$$\mathbf{f}_1(\mathbf{r}_{t+1},\theta) = \mathbf{f}_1(\mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, Z_t, \theta_1)$$
$$\mathbf{f}_2(\mathbf{r}_{t+1},\theta) = \mathbf{f}_2(\mathbf{r}_{\mathbf{N},t+1}, \mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, Z_t, \theta_1, \theta_2).$$

We let $\hat{\mathbf{S}}_{ij,\lambda T}(\tilde{\theta})$ be the Newey-West estimator of $\mathbf{S}_{ij}$ that uses the short sample, 6 lags and parameter estimate $\tilde{\theta}$.

The estimator that uses the short-complement sample is labelled the Adjusted Moment estimator by Lynch and Wachter [2007] and sets

$$\mathbf{h}_T(\theta) = \left[\mathbf{g}_{1,T}(\theta)^\top \ \tilde{\mathbf{g}}_{2,T}(\theta)^\top\right]^\top, \tag{34}$$

where

$$\begin{aligned}\tilde{\mathbf{g}}_{2,T}(\theta) &= g_{2,\lambda T}(\theta) + \hat{\mathbf{B}}_{21,\lambda T}(1-\lambda)(g_{1,(1-\lambda)T}(\theta) - g_{1,\lambda T}(\theta)) \\ &= g_{2,\lambda T}(\theta) + \hat{\mathbf{B}}_{21,\lambda T}(g_{1,T}(\theta) - g_{1,\lambda T}(\theta)),\end{aligned} \tag{35}$$

and

$$\hat{\mathbf{B}}_{21,\lambda T}(\tilde{\theta}) = \hat{\mathbf{S}}_{21,\lambda T}(\tilde{\theta})\left(\hat{\mathbf{S}}_{11,\lambda T}(\tilde{\theta})\right)^{-1} \tag{36}$$

for some prespecified $\tilde{\theta}$ that is a consistent estimate of θ_0, the true parameter vector. Notice that there are two differences between this estimator and the usual short sample GMM estimator. First, the sample moments that estimate the stochastic discount factor parameters use the long sample which includes the short-complement as well as the short sample. Second, the sample moments used to estimate the fund performance parameters take the analogous short sample moments and modify them to incorporate information from the short-complement sample SDF moments.

With appropriate regularity conditions, Lynch and Wachter (2007) show that this estimator is consistent. Hansen [1982] shows that the asymptotically efficient GMM estimator for a given set of moment conditions is obtained by using a weighting matrix that converges to the inverse of covariance matrix for the sample moments. With the imposition of appropriate regularity conditions, Lynch and Wachter (2007) show that

$$\sqrt{T}\begin{bmatrix}\sqrt{(1-\lambda)}\mathbf{g}_{(1,1-\lambda)T}(\theta_0) \\ \sqrt{\lambda}\mathbf{g}_{(1,\lambda)T}(\theta_0) \\ \sqrt{\lambda}\mathbf{g}_{2,\lambda T}(\theta_0)\end{bmatrix} \to_{\mathrm{d}} N\left(\mathbf{0}, \begin{bmatrix}\mathbf{S}_{11} & \mathbf{0} & \mathbf{0} \\ \mathbf{0} & \mathbf{S}_{11} & \mathbf{S}_{12} \\ \mathbf{0} & \mathbf{S}_{12} & \mathbf{S}_{22}\end{bmatrix}\right). \tag{37}$$

By exploiting this result together with the fact that the Newey-West estimator $\hat{\mathbf{S}}_{ij,\lambda T}(\tilde{\theta})$ converges to $\mathbf{S}_{ij}$ if $\tilde{\theta}$ converges to the true parameter vector θ_0, it is possible to use Newey-West covariance estimators to construct consistent estimators of the covariance matrices for the sample moments for both GMM estimations. These can be used to construct consistent estimates of the standard errors of the estimates for both. It is important that $\tilde{\theta}$ be a consistent estimator of θ_0.

When calculating standard errors for the Adjusted Moment estimation, Newey-West evaluated at the parameter estimates for that iteration is used. For the Short estimation, standard errors are calculated using Newey-West evaluated at the parameter estimates reported for the Adjusted Moment estimation. Doing so allows the efficiency gains from using the Adjusted Moment estimators instead of the Short estimator to be quantified more easily. Finally, Newey-West is used to calculate $\hat{\mathbf{B}}_{21,\lambda T}$ in the Adjusted Moment estimation and is evaluated at the Short parameter estimates for the first iteration and at the first iteration estimates for the second. Second iteration Adjusted Moment estimates are reported.

The Adjusted Moment method achieves asymptotic efficiency gains relative to the usual Short method. The maximum possible gain is 1 less the square root of the ratio of the length of the short sample to the length of the long; this equals 49.6% given our sample lengths. This maximum efficiency gain is achieved for the SDF parameters since the SDF moments are able to identify these parameters and there is data for these moments back to 1927. For the fund specific performance parameters, which only appear in the fund-specific moments, the magnitude of the gain increases as the correlation between the SDF and the fund-specific moments increases. When there exists linear combinations of the SDF moments that are perfectly correlated with all of a fund's performance moments, the maximum possible gain of 49.6% is achieved for that fund's performance parameters. However, when the fund-specific moments are uncorrelated with the SDF moments, there is still a non-zero efficiency gain, because the fund-specific moments depend on the SDF parameters. Using the Adjusted Moment method, the short-complement SDF-moment data allow more precise estimates of the SDF parameters to be obtained, which in turn allow the fund-specific moments to more precisely estimate the fund-specific performance parameters.

The above discussion focuses on how to implement the two estimation methods when estimating conditional performance relative to a conditional model. It is straight forward to adapt these implementations to estimate unconditional performance relative to an conditional model and unconditional performance relative to an unconditional model. To estimate the former, the definition for $\mathbf{f}_1$ remains the same but the definition for $\mathbf{f}_2$ becomes:

$$\mathbf{f}_2(\mathbf{r}_{\mathbf{N},t+1}, \mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, Z_t, \theta_1, \theta_2) = (\mathbf{r}_{\mathbf{N},t+1} - \mathbf{e}) \otimes \Big((a + bZ_t) + (\mathbf{c} + \mathbf{d}Z_t)^\top \mathbf{r}_{\mathbf{p},t+1}\Big) . \quad (38)$$

With this definition of $\mathbf{f}_2$, the associated sample moments $\mathbf{g}_{2,\lambda T}$ in the Short estimation correspond to the population moments on the left hand side of (23). Notice that the Short and Adjusted Moment estimations remain just-identified. To estimate unconditional performance relative to the unconditional model, the definitions for $\mathbf{f}_1$ and $\mathbf{f}_2$ become

$$\mathbf{f}_1(\mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, \theta_1) = \begin{bmatrix} R_{f,t+1} \\ \mathbf{r}_{\mathbf{p},t+1} \end{bmatrix} \left(a + \mathbf{c}^\top \mathbf{r}_{\mathbf{p},t+1}\right) - \begin{bmatrix} 1 \\ \mathbf{0} \end{bmatrix} \tag{39}$$

and

$$\mathbf{f}_2(\mathbf{r}_{\mathbf{N},t+1}, \mathbf{r}_{\mathbf{p},t+1}, R_{f,t+1}, \theta_1, \theta_2) = (\mathbf{r}_{\mathbf{N},t+1} - \mathbf{e} - \mathbf{f} Z_t) \otimes \left(a + \mathbf{c}^\top \mathbf{r}_{\mathbf{p},t+1}\right). \tag{40}$$

With these definitions, the associated sample moments $\mathbf{g}_{1,\lambda T}$ and $\mathbf{g}_{2,\lambda T}$ in the Short estimation correspond respectively to the population moments on left hand sides of (24) and (17) with $e_i = \alpha_i$. Again, the Short and Adjusted Moment estimations remain just-identified.

4.3 Regression-based estimation

The regression-based (Reg-based) estimation approach of Ferson and Harvey (1999), Ferson and Schadt (1996) and Fama and French (1993) is also used to estimate performance parameter estimates. The regressions are run using the short sample data and standard errors are again calculated using Newey-West with 6 lags. All three performance measures are estimated using the regression-based methodology: conditional performance relative to the conditional model; unconditional performance relative to the conditional model; and unconditional performance relative to the unconditional model.

5 Results

We use our Euler equation restrictions to assess the conditional performance of funds in the Elton, Gruber and Blake (1996) mutual fund data set. Conditional performance is estimated for equal-weighted portfolios grouped by fund type. Three of the four fund types are the Weisenberger categories, maximum capital gain, growth, and growth and income, while the fourth group includes all other funds in our sample. We also consider the effect of total net assets under management on fund performance. For each year, we bifucate each of the three Wiesenberger categories, maximum capital gain, growth, and growth and income, based on total net assets under management at the start of the year, which we obtain, if reported, from the previous year's edition of Weisenberger. We use two information variables. The first is the 12-month dividend yield on the value-weighted NYSE (DY) and the second is the yield spread (TS) between 20-year and one-month Treasury securities. Both have been found to predict stock returns and move with the business cycle, with the term spread capturing higher frequency variation than the dividend yield (see Fama and French, 1989). Moreover, there are theoretical reasons why dividend yield is related to expected returns (see Campbell and Shiller, 1988), which makes data snooping much less of an issue for this variable as a predictor than for other variables in the literature. We have fund data from 12/93 back to 1/77 and factor return and instrument data back to 1/27.

We estimate the performance parameters using the Euler equation restrictions discussed above. One estimation technique that we employ is regular GMM estimated over the fund sample period. It is also possible to allow the factor returns and information variables to have longer data series than the mutual fund series as in Stambaugh (1997). A number of recent Bayesian mutual fund papers have taken advantage of the availability of longer data series for the factor returns than the mutual fund returns (see Pastor and Stambaugh, 2002a and 2002b). Lynch and Wachter (2007) have extended these methods to non-linear estimation in a frequentist setting. We use their methodology to estimate the Euler equation restrictions taking account of factor return and dividend yield data back to 1927.

We estimate two different factor models: the Fama and French (1993) model whose three factors are the market excess return, the return on a portfolio long high and short low book-to-market stocks, and the return on a portfolio long big stocks and short big stocks; and the four factor model of Carhart (1997) whose factors are the three Fama-French factors plus the return on a portfolio long stocks that performed well the previous year and short stocks that performed poorly. Three versions of each model are estimated. The first is the usual unconditional model. The second is the conditional model with performance not allowed to depend on the information variable, as in Ferson and Schadt (1996). The third is the conditional model with performance that is allowed to vary with the information variable. Implementing this last version for mutual funds is the innovation of the paper.

This section reports performance results when funds are grouped on the basis of Weisenberger category and when each fund category is bifucated on the basis of net asset value. Performance is assessed relative to the Fama-French three-factor model, and the Carhart four-factor model. This section also examines whether mispricing of the underlying stocks held by the funds can explain the conditional performance that we document for the funds.

Throughout, unless stated otherwise, we normalize Z_t to be mean zero and unit standard deviation based on the short sample. Doing so makes e_i and f_i easier to interpret. In particular, an e value of zero implies that the unconditional mean abnormal performance is zero. Further, f measures the shift in conditional abnormal performance that results from a one standard error shift in the dividend yield value.

5.1 Conditional performance by fund category

Tables 1 through 4 report results for the estimations of conditional performance for fund groups formed on the Weisenberger categories. The first two tables use dividend yield as the information variable and the second two use the term spread. Tables 1 and 3 report conditional performance relative to the conditional Fama-French 3-factor model, while Tables 2 and 4 report conditional performance relative to the conditional Carhart 4-factor model. Each table reports results for three estimation techniques: the usual GMM estimation using the short sample (Short); the Lynch-Wachter estimation that uses the short-complement sample data(Full); and, the associated Ferson-Harvey regression-based estimation (Reg-based). In both panels, each column reports results for one technique. There is also a column that reports the percentage reduction in a parameter estimate's standard error from using the Full method rather than the Short method. So that differences in parameter estimates don't drive the magnitude of the reduction, the Full standard error is compared to the Short standard error obtained by calculating Newey-West covariances using the Full parameter estimates. In each table, Panel A reports performance parameters and standard errors, while Panel B reports the results of joint tests for the performance parameters.

Panel A in Table 1 shows that almost all of the e estimates for the Fama-French pricing model with dividend yield as the instrument are insignificantly different from zero (at the 5% level two-sided) using either SDF method or the Reg-based method. However, Panel B reports that a hypothesis test of all e equal to zero can be easily rejected, irrespective of the estimation method. Even so, none of the estimation methods are able to reject the null hypothesis of an average e equal to zero. We also test equality of the e coefficients across the four fund-category groups and are able to easily reject this hypothesis for all three methods. When conditional performance is measured relative to the Carhart pricing model with dividend yield as the instrument, the results for e in Table 2 are virtually unchanged from those reported in Table 1 for the Fama-French model.

Turning to the results for the f parameter, which measures the extent to which conditional performance moves with the dividend yield, Panel A in Table 1 shows that almost all the estimates for the Fama-French model are insignificantly different from zero using a 5% two-sided cutoff. We are interested in whether conditional performance moves with dividend yield since an answer in the affirmative means that conditional performance really is different from unconditional performance. Joint tests of all four f coefficients equal to each other or zero cannot be rejected, irrespective of whether an SDF- or Reg-based method is used. Table 2 shows that this result is robust to choice of benchmark model.

Tables 3 and 4 reports similar results for e when term spread is used as the information variable rather than dividend yield. While the point estimates for e in Panel A of each table are all insignificantly different from zero (at the 5% level two-sided), Wald tests of all e coefficients equal to zero in Panel B easily reject the hypothesis at the 5% level for both the Fama-French and Carhart models with two exceptions. The Short SDF methodology borderline rejects for Carhart and doesn't reject for Fama-French. The hypothesis of all e the same can also be rejected at 5% except when only the short sample data is used to implement the SDF method for the Fama-French model. Turning to the estimation of f, there is very weak evidence of abnormal performance moving with term spread at least when measured relative to the Fama-French pricing model. Again Panel A of each table reports point estimates for f that are almost never significantly different from zero (at the 5% level two-sided) irrespective of Weisenberger category or estimation method. However, Panel B of Table 3 shows that the hypotheses of all f equal to zero and each other both can be rejected using the Full method for the Fama-French model. This result is not robust to estimation method or pricing model, which is why the we regard the evidence that abnormal performance moves with term spread as weak.

The conclusion we draw is that mutual fund performance relative to conditional models does not appear to move with either the dividend yield or the term spread in a fashion that is consistent irrespective of pricing model or choice of the SDF- or regression-based methodology. This results prompts us to examine conditional performance as a function of NAV within each Weisenberger category.

5.2 Conditional performance bifucating fund categories on the basis of net asset value

Tables 5 through 8 report results for the estimations of conditional performance for fund groups formed by bifucating on the basis of net asset value within each Weisenberger category at the start of each year. The first two tables use dividend yield as the information variable and the next two use the term spread while Tables 5 and 7 report conditional performance relative to the conditional Fama-French 3-factor model and Tables 6 and 8 report conditional performance relative to the conditional Carhart 4-factor model.

Panel A in each of Tables 5 and 6 shows that when dividend yield is the information variable, almost all of the e estimates are insignificantly different from zero (at the 5% level two-sided) using either the SDF methods or the Reg-based method for both the Fama-French and Carhart pricing models. However, Panel B reports that hypotheses tests of all e equal to zero or all e equal to each other can always be easily rejected, again irrespective of the estimation method for both pricing models. Even so, none of the estimation methods are able to reject the null hypothesis of an average e equal to zero for either pricing model. When conditional performance is measured relative to a conditional model with term spread rather than dividend yield as the information variable, the results for e in Tables 7 and 8 are virtually unchanged from those reported in Tables 5 and 6.

Turning to the results for the f parameter in Tables 5 and 6, which measures the extent to which conditional performance moves with the dividend yield, Panel A shows that all the estimates are insignificantly different from zero using a 5% two-sided cutoff for both pricing models irrespective of estimation method. Again, we are interested in whether conditional performance moves with dividend yield since an answer in the affirmative means that conditional performance really is different from unconditional performance. Joint tests of all six f coefficients equal to zero and of all six f coefficients equal to each other are both easily rejected for both pricing models (see Panel B of Tables 5 and 6), irrespective of whether an SDF- or the Reg-based method is employed. The conclusion we draw is that mutual fund performance relative to conditional models moves with the dividend yield. Moreover, this movement is not the same for all 6 fund portfolios.

The next issue to examine is how this movement in performance varies depending on portfolio. Since some of the f coefficients differ from zero only after the categories are bifucated on the basis of NAV, it seems likely that the f coefficients differ across large and small funds within a category for at least one category. To assess this, we perform a joint test for the 3 categories of a zero difference between the f coefficients for the large and small fund portfolios within each category. Panel B in Table 5 shows that this hypothesis can be rejected for the Fama-French model irrespective of estimation method employed. And Panel B of Table 6 shows this rejection also occurs for the Carhart model, again irrespective of estimation method employed. When we look to see which category's f difference across the large and small funds is driving this rejection, we find that the only category whose difference is significantly different from zero (at the 5% level two-tailed) is maximum capital gain. And Panel B in each of Tables 5 and 6 show that this result holds irrespective of estimation method and for both pricing models. The difference for both models is negative which indicates that the conditional performance of the large-NAV maximum capital gain portfolio is more procyclical than that of the small-NAV maximum capital gain portfolio because dividend yield is a countercyclical variable (Fama and French, 1989).

We now discuss the results reported in Tables 7 and 8 for the f coefficient of the conditional models that use term spread as the information variable. The results for both pricing models largely mirror those for the f coefficients of the conditional models that use dividend yield as the information variable. Again Panel A in each table shows that all the estimates are insignificantly different from zero using a 5% two-sided cutoff for both pricing models irrespective of estimation method. However, joint tests of all f coefficients being equal to zero and to each other and of all 3 f differences between the large- and small-NAV portfolios within each Weisenberger category being equal to zero can be rejected at the 5% level for the Full and Reg-based methods but not the Short method for the Fama-French model. Panel B of Table 8 shows that for the Carhart model all 3 hypotheses are still rejected by the Full method while now none are rejected by the Reg-based or Short methods. The ability to reject these hypotheses using the Full but not the Short method is an example of how the Lynch-Wachter methodology for dealing with unequal data periods can produce more precise parameter estimates that just using the intersection of the data periods in a GMM estimation. When we look to see which category's f difference across the large and small funds is driving these rejections, we again find that the only category whose difference is significantly different from zero (at the 5% level two-tailed) is maximum capital gain. While the dividend yield and the term spread variables are both counter-cyclical, their correlation is by no means 1. Instead, Fama and French (1989) document how the former captures a lower frequency cyclical pattern than the latter. Even so the f difference between the large- and small-NAV maximum capital gain portfolio is significantly negative using either as the information variable for both the Fama-French and Carhart pricing models. Thus, the conditional performance of the large-NAV maximum capital gain portfolio is more procyclical than that of the small-NAV maximum capital gain portfolio using dividend yield or term spread to track the business cycle.

5.3 Unconditional and average conditional performance by fund category

It is interesting to compare the unconditional performance of the fund category portfolios relative to conditional models with their unconditional performance relative to unconditional models. Such a comparison is similar to the comparison performed in Ferson and Schadt (1996) using the regression-based methodology. They found that unconditional performance for mutual funds is typically higher when measured relative to the conditional rather than the unconditional version of a particular factor model. Their explanation for this finding relied on the negative covariance between conditional fund betas and conditional risk premia that they found in their sample. The intuition is that for a given mean conditional beta, this negative correlation causes the product of conditional beta and the risk premia to be lower on average, which, for given performance relative to the conditional factor model, makes unconditional expected fund return lower. Since a fund's mean conditional beta is likely close to its unconditional beta, zero correlation translates into near-identical performance for the conditional and unconditional versions of the model. Given performance relative to the conditional factor model, performance relative to the unconditional factor model becomes lower as the correlation becomes more negative.

Tables 9 and 10 report unconditional performance results for the 4 Weisengerger category portfolios relative to the conditional Fama-French and Carhart models with dividend yield as the information variable, while Tables 11 and 12 report unconditional performance results for these same 4 portfolios relative to the conditional Fama-French and Carhart models with term spread as the information variable. Tables 15 and 16 report results for unconditional performance of these 4 portfolios relative to unconditional versions of the same two pricing models, Fama-French and Carhart. Comparing Tables 9 and 10 with Tables 15 and 16, we find a similar result to Ferson and Schadt when dividend yield is the information variable, based on the point estimates, even when using SDF-based methods. In particular, for a given estimation method and benchmark model, average performance is almost always higher relative to the conditional model than to the unconditional model for all but the maximal capital gain portfolio irrespective of the pricing model and the miscellaneous group using the Carhart model. For example, consider the difference between unconditional performance relative to the unconditional model and unconditional performance relative to the conditional model, averaged across the three estimation methods employed. When Fama-French is used as the benchmark, this average difference is 0.001% for the maximal capital gain portfolio but negative for the rest, ranging from -0.016% to -0.061%. A similar pattern emerges using the Carhart model as benchmarks except that the average difference for the miscellaneous group as well as maximum capital gain is positive. Comparing Tables 11 and 12 with Tables 15 and 16, we find that average performance is more often lower relative to the conditional model than the unconditional model when term spread rather than dividend yield is the information variable in the conditional model. In particular, for a given estimation method and benchmark model, average performance is lower relative to the conditional model than to the unconditional model using at least 2 of the 3 estimation methods for all but the maximal capital gain portfolio irrespective of the pricing model and the miscellaneous group using the Carhart model. More of the differences between unconditional performance relative to the unconditional model and conditional performance relative to the conditional model are negative for both pricing models when the Full method is used. For the Reg-based method, only the maximum capital gain category's difference is negative for the Fama-French model, while only the miscellaneous category's difference is negative for the Carhart model. The Short method gives similar average performance differences to those obtained with the Reg-based method, except the difference for the growth and income category is a small negative number (-0.001%) rather than a small positive number (0.001%) when Fama-French is the pricing model.

The question arises as to why the differential has a different sign for the maximal capital gain portfolio than for the other three when dividend yield is the information variable for the conditional model. And why do more categories have positive differences when term spread rather than dividend yield is the information variable for the conditional model? The answer can be found by examining the beta-related coefficients for the regression-based method. The coefficients on the terms that interact the dividend yield or term spread with the factors indicate how the conditional betas vary with dividend yield. For either model pricing model, an expression for the difference can be developed by assuming that both conditional betas and risk premia are linear in dividend yield and that mean conditional betas are close to their unconditional counterparts.

For the Fama-French model, the assumption of linear conditional betas implies that, for the regression

$$\begin{aligned} r_{i,t+1} = \delta_{0,i} + \delta_{Z,i} Z_t + \delta_{m,i} r_{m,t+1} + \delta_{Zm,i} Z_t r_{m,t+1} + \delta_{HML,i} r_{HML,t+1} + \delta_{ZHML,i} Z_t r_{HML,t+1} \\ + \delta_{SMB,i} r_{SMB,t+1} + \delta_{ZSMB,i} Z_t r_{SMB,t+1} + \varepsilon_{i,t+1}, \end{aligned}$$

the coefficients satisfy

$$\beta_{m,i,t} = \delta_{m,i} + \delta_{Zm,i} Z_t \quad (41)$$

$$\beta_{HML,i,t} = \delta_{HML,i} + \delta_{ZHML,i} Z_t \quad (42)$$

$$\beta_{SMB,i,t} = \delta_{SMB,i} + \delta_{ZSMB,i} Z_t, \quad (43)$$

where $\beta_{j,i,t}$ is the conditional beta of portfolio i with respect to factor j. The assumption of linear conditional risk premia means

$$E_t[r_{m,t+1}] = \gamma_{m,i} + \gamma_{Zm,i} \quad (44)$$

$$E_t[r_{HML,t+1}] = \gamma_{HML,i} + \gamma_{ZHML,i} Z_t \quad (45)$$

$$E_t[r_{SMB,t+1}] = \gamma_{SML,i} + \gamma_{ZSML,i} Z_t. \quad (46)$$

With the further assumption that mean conditional betas equal their unconditional counterparts, it can be shown that the difference between unconditional (relative to the unconditional model) and expected conditional performance equals:

$$\alpha_i - E[\alpha_{i,t}] = e_{uu,i} - e_{cc,i} = (\delta_{Zm,i}\gamma_{Zm,i} + \delta_{ZHML,i}\gamma_{ZHML,i} + \delta_{ZSMB,i}\gamma_{ZSMB,i})\sigma_Z^2. \quad (47)$$

where $e_{uu,i}$ is the e parameter for fund i's unconditional performance relative to the unconditional model, and $e_{cc,i}$ is the e parameter for fund i's conditional performance relative to the conditional model.

We regress the factors on dividend yield for the 1977 to 1993 period to obtain γ estimates and we use them together with the δ estimates from the Reg-based method to obtain estimates of the difference. With dividend yield as the information variable in the conditional model, only the maximal capital gain portfolio has a positive difference estimated using (47) for both the Fama-French and Carhart models. This pattern of differences is largely the same as those obtained from the e estimations, suggesting that the Ferson and Harvey's intuition of negative correlation between risk premia and conditional risk loadings driving the lower unconditional performance relative to the unconditional model than the conditional model applies here when the information variable is dividend yield. When the term spread is the information variable in the conditional model,(47) delivers positive estimates of the difference for almost all the fund categories irrespective of pricing model, with the only exception being the estimated difference for the maximum capital gain category using the Fama-French model. Hence the greater preponderance of positive differences with term spread rather than dividend yield as the information variable is due at least in part to more positive and less negative correlations between risk premia and conditional risk loadings.[9]

Another comparison of interest is the value of the e parameter for conditional versus unconditional performance, when both are measured relative to the conditional model. Since the dividend yield is demeaned, a difference can only occur asymptotically because the assumption of constant abnormal performance is affecting the calculated conditional beta. Moreover, the demeaning is

[9] A derivation of the expression for the performance difference in (47) together with the delta estimates and the results for the return predictability regressions are available from the authors upon request.

performed with respect to the short sample. So when using the Reg-based or Short estimation methods, an in-sample difference can only occur if the sample estimate of Beta is affected by the assumption of constant performance. However, this is likely a second order effect and our results are consistent with this assessment. Using the Reg-based and especially the Short estimation methods, the e estimates are virtually identical, irrespective of the benchmark model. However, when using the unequal sample length methods, in-sample differences can occur for other reasons, since the method adds a second, typically non-zero mean term to each of the fund-specific moments. So it is not surprising that the e differences are typically larger when using the Full method rather than either of the short sample methods. It is instructive to compare the e estimates in tables 1 through 4 which report conditional performance results for the 4 Weisenberger category portfolios with those in tables 9 through 12 which report conditional performance results. While the largest absolute e difference is 0.001% using Short and 0.025% using Reg-based, the largest absolute difference is 0.040% using Full.

In general, the results for the Reg-based method are qualitatively similar to those for the SDF-based methods, both for performance measured relative to the unconditional and conditional versions of the three pricing models. When measuring performance relative to an unconditional model, the point estimates for the Short method are identical to those for the Reg-based method.[10] However, this is not true when comparing the Short method estimates to the Full estimates, since Full uses information in the short-complement sample factor return data to help with the estimation, while the Reg-based method only uses short sample data. When a conditional model is used as the benchmark, we no longer expect the point estimates from the SDF-based methods to be the same or even similar to those for the Reg-based method, since different assumptions are imposed by the two methods on the parameters of the conditional model. Hence, our finding of qualitatively similar results even when using conditional model benchmarks is an intriguing one. One implication is that the Ferson-Schadt (1996) results, which are based on only the regression-based approach, appear robust to relaxing that approach's assumption of conditional betas linear in the information variables.

Finally, the tables demonstrate clearly that using short-complement sample data for factor returns and the dividend yield can result in much more precise parameter estimates, for the SDF parameters and also for the performance parameters, at least based on the asymptotic distributions

[10] The standard errors differ in the tables because the Short method standard errors employ Newey-West covariances calculated using the Full parameter estimates, while the Reg-based method standard errors employ Newey-West covariances calculated using the Reg-based parameter estimates. If the same parameter estimates were used to calculate Newey-West covariances with both methods, then the standard errors would be the same too.

for these parameters. For the SDF parameters, the asymptotic precision improvement is a function of the relative sizes of the long and short samples. The percentage reduction for the SDF parameters is 49.6%, but this also represents an upper bound on the possible precision improvement for the performance parameters. The percent reduction is typically around 30% or 40% for the performance parameters, though sometimes it drops into the teens. It is often low for the e coefficient of the miscellaneous fund portfolio. To sum up, the results show how the Lynch and Wachter methodology for dealing with unequal length data can produce substantial improvements in estimation precision.

5.4 An alternative to abnormal performance: ruling out pricing model misspecification

Our f coefficient results clearly show different time-varying abnormal performance for large versus small NAV funds within at least one Weisenberger category relative to the two conditional pricing models we use as benchmarks. Moreover, the conditional performance of the large-NAV maximum capital gain portfolio is more procyclical than that of the small-NAV maximum capital gain portfolio. We would like to attribute this abnormal performance to fund manager skill, but an alternate explanation is pricing model misspecification. In particular, it may be the case that the f coefficients for stocks held by maximum capital gain funds are non-zero and generally more negative for stocks held by large NAV funds than for stocks held by small-NAV funds. If we find this to be true, then we must acknowledge that the time-varying conditional abnormal performance we document may be due to time-varying conditional abnormal returns generated by the stocks in the funds and not by the skill of the fund managers.

To evaluate this alternative explanation for our results, we repeat our analysis, estimating conditional performance for the 25 Fama-French portfolios that are sorted on size and book-to-market, instead of the fund portfolios. Details of the construction of these portfolios can be found in Fama and French (1993). The results are reported in Tables 15 and 16 for dividend yield as the information variable and in Tables 17 and 18 for term spread as the information variable. The first table of each pair reports results using Fama-French as the benchmark pricing model while the second reports results using the Carhart model. In each table, Panels A and B report point estimates and standard errors for, respectively, the e and f coefficients, using each of the three methods. Panel C reports joint hypothesis test results for the f coefficients. Since maximum capital gain funds hold predominantly high growth stocks in high growth industries like technology, we focus our attention on the 5 lowest book-to-market portfolios. Specifically, we test the joint hypothesis that all five f coefficients are equal to zero.

Looking at the f estimates across estimation methods and pricing models in Panel B of the tables, only one of the f coefficients for the 5 lowest book-to-market portfolios is significantly different from zero at the 5% level two-tailed out of 60 such coefficients. However, Panel C of the tables shows that it is almost always impossible to reject the hypotheses of all 5 f coefficients for the lowest book-to-market portfolios equal to zero at the 5% level, with the Reg-based method for the Fama-French model and term spread the only exception. These results suggest that the time-varying abnormal performance we find for the fund portfolios cannot be attributed to time-varying abnormal returns on the stocks being held by the funds. In particular, the difference in time-varying abnormal performance across large- and small-NAV maximum capital gain funds does not appear to be driven by model mispricing of stocks. Indeed, we find only one instance of significant cyclical abnormal performance by any of the 5 lowest book-to-market portfolios, across the 3 estimation methods, the 2 information variables and the 2 pricing models. And a joint test of all 5 of these portfolios having abnormal cyclical performance equal to zero can only be rejected one time out of twelve, across estimation methods, information variables and pricing models.

6 Conclusions

We develop a new methodology that allows conditional performance to be a function of information available at the start of the period but does not make any assumptions about the behavior of the conditional betas. This methodology uses the Euler equation restriction that comes out of the factor model rather than the beta pricing formula itself. It assumes that the stochastic discount factor (SDF) parameters are linear in the information. The Euler equation restrictions that we develop can be estimated using GMM. We also use econometric techniques developed by Lynch and Wachter (2007) to take advantage of the longer data series available for the factor returns and the information variables. These techniques allow us to produce much more precise parameter estimates than those obtained from the usual GMM estimation. We use our SDF-based method to assess the conditional performance of funds in the Elton, Gruber and Blake (1996) mutual fund data set. Using dividend yield and term spread to track the business cycle, we find that conditional mutual fund performance relative to conditional versions of the Fama-French and Carhart pricing models moves with the business cycle, and this business cycle variation in performance differs across large-NAV and small-NAV funds within at least one Weisenberger category. In particular, the conditional performance of the large-NAV maximum capital gain portfolio is more procyclical than that of the small-NAV maximum capital gain portfolio. Maximum capital gain funds hold high growth stocks predominantly but we do not find any evidence of cyclical abnormal performance in the 5 lowest book-to-market portfolios of the 25 Fama-French portfolios.

Our results raise the question of why mutual fund performance varies over the business cycle. In particular, what are the economic mechanisms that cause managerial skill to vary? Why does this variation exhibit different patterns for different types of funds? We leave these questions to future research.

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Table 1: Conditional fund performance relative to the conditional Fama-French 3-factor model for Wiesenburger Fund Categories with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable DY is the dividend yield on the value-weighted NYSE. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.100	0.037		0.037
	(0.107)	(0.201)	47.0	(0.049)
e_{grow}	0.148	0.090		0.090
	(0.094)	(0.180)	47.5	(0.041)
$e_{\text{g\&i}}$	-0.007	-0.020		-0.020
	(0.083)	(0.159)	47.9	(0.030)
e_{misc}	0.031	-0.160		-0.160
	(0.114)	(0.157)	27.5	(0.115)
Avg e	0.068	-0.013		-0.013
f_{mcg}	0.009	0.047		0.038
	(0.162)	(0.314)	48.5	(0.053)
f_{grow}	0.003	0.049		0.051
	(0.140)	(0.272)	48.4	(0.042)
$f_{\text{g\&i}}$	0.018	0.043		0.041
	(0.125)	(0.243)	48.6	(0.037)
f_{misc}	-0.049	-0.170		-0.174
	(0.136)	(0.218)	37.5	(0.121)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.011		0.001
H_0: All e Same	0.000	0.006		0.000
H_0: Avg $e = 0$	0.432	0.936		0.748
H_0: All $f = 0$	0.913	0.410		0.187
H_0: All f Same	0.806	0.281		0.267
H_0: $f_{\text{mcg}} =$ Avg other f	0.772	0.507		0.196
H_0: $f_{\text{grow}} =$ Avg other f	0.810	0.201		0.068
H_0: $f_{\text{g\&i}} =$ Avg other f	0.443	0.155		0.083
H_0: $f_{\text{misc}} =$ Avg other f	0.602	0.156		0.056

Table 2: Conditional fund performance relative to the conditional Carhart 4-factor model for Wiesenburger Fund Categories with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger that have total net assets of $15 million or more and are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable DY is the dividend yield on the value-weighted NYSE. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses. % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	-0.037	-0.049		-0.049
	(0.139)	(0.267)	48.2	(0.043)
e_{grow}	0.062	0.059		0.059
	(0.122)	(0.236)	48.3	(0.037)
$e_{\text{g\&i}}$	-0.035	-0.040		-0.040
	(0.102)	(0.199)	48.7	(0.027)
e_{misc}	0.020	-0.007		-0.007
	(0.114)	(0.162)	29.4	(0.115)
Avg e	0.002	-0.009		-0.009
f_{mcg}	-0.003	0.011		-0.005
	(0.175)	(0.344)	49.1	(0.043)
f_{grow}	0.029	0.038		0.038
	(0.157)	(0.308)	49.0	(0.038)
$f_{\text{g\&i}}$	0.016	0.025		0.018
	(0.140)	(0.275)	49.0	(0.029)
f_{misc}	-0.196	-0.115		-0.102
	(0.160)	(0.257)	37.8	(0.125)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.982	0.965		0.812
H_0: All $f = 0$	0.347	0.795		0.398
H_0: All f Same	0.215	0.642		0.273
H_0: $f_{\text{mcg}} =$ Avg other f	0.487	0.807		0.834
H_0: $f_{\text{grow}} =$ Avg other f	0.066	0.318		0.159
H_0: $f_{\text{g\&i}} =$ Avg other f	0.082	0.375		0.294
H_0: $f_{\text{misc}} =$ Avg other f	0.093	0.404		0.319

Table 3: Conditional fund performance relative to the conditional Fama-French 3-factor model for Wiesenburger Fund Categories with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger that have total net assets of $15 million or more and are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable TS is the yield spread between 20-year and one-month Treasury securities. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses. % Reduction is the percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.128	0.059		0.059
	(0.150)	(0.289)	48.1	(0.051)
e_{grow}	0.097	0.066		0.066
	(0.139)	(0.269)	48.2	(0.046)
$e_{\text{g\&i}}$	-0.066	-0.025		-0.025
	(0.122)	(0.237)	48.6	(0.031)
e_{misc}	-0.085	-0.176		-0.176
	(0.119)	(0.175)	32.0	(0.122)
Avg e	0.019	-0.019		-0.019
f_{mcg}	0.027	0.032		0.033
	(0.184)	(0.358)	48.7	(0.046)
f_{grow}	-0.026	-0.033		0.007
	(0.161)	(0.313)	48.6	(0.043)
$f_{\text{g\&i}}$	0.000	-0.026		-0.019
	(0.122)	(0.240)	49.0	(0.028)
f_{misc}	-0.297	-0.240		-0.237
	(0.122)	(0.179)	32.2	(0.126)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.170		0.025
H_0: All e Same	0.000	0.386		0.018
H_0: Avg $e = 0$	0.878	0.935		0.677
H_0: All $f = 0$	0.007	0.093		0.184
H_0: All f Same	0.004	0.156		0.111
H_0: $f_{\text{mcg}} =$ Avg other f	0.095	0.338		0.018
H_0: $f_{\text{grow}} =$ Avg other f	0.224	0.575		0.104
H_0: $f_{\text{g\&i}} =$ Avg other f	0.010	0.304		0.331
H_0: $f_{\text{misc}} =$ Avg other f	0.025	0.242		0.055

Table 4: Conditional fund performance relative to the conditional Carhart 4-factor model for Wiesenburger Fund Categories with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable TS is the yield spread between 20-year and one-month Treasury securities. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.043	-0.049		-0.049
	(0.172)	(0.336)	48.7	(0.058)
e_{grow}	0.066	0.019		0.019
	(0.157)	(0.307)	48.8	(0.047)
$e_{\text{g\&i}}$	-0.039	-0.057		-0.057
	(0.130)	(0.255)	48.9	(0.028)
e_{misc}	0.028	0.034		0.034
	(0.119)	(0.189)	37.3	(0.120)
Avg e	0.025	-0.013		-0.013
f_{mcg}	0.043	0.038		0.026
	(0.355)	(0.702)	49.4	(0.047)
f_{grow}	0.003	0.000		0.012
	(0.297)	(0.585)	49.3	(0.047)
$f_{\text{g\&i}}$	0.009	-0.001		-0.015
	(0.231)	(0.457)	49.3	(0.031)
f_{misc}	-0.201	-0.137		-0.204
	(0.172)	(0.300)	42.8	(0.118)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.007	0.092		0.000
H_0: All e Same	0.006	0.049		0.001
H_0: Avg $e = 0$	0.857	0.960		0.765
H_0: All $f = 0$	0.128	0.627		0.283
H_0: All f Same	0.111	0.607		0.172
H_0: $f_{\text{mcg}} =$ Avg other f	0.441	0.752		0.029
H_0: $f_{\text{grow}} =$ Avg other f	0.424	0.774		0.131
H_0: $f_{\text{g\&i}} =$ Avg other f	0.192	0.664		0.368
H_0: $f_{\text{misc}} =$ Avg other f	0.222	0.643		0.073

Table 5: Conditional fund performance relative to the conditional Fama-French 3-factor model for Wiesenburger Fund Categories Bifucated on NAV with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable DY is the dividend yield on the value-weighted NYSE. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for six groups: the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, bifucated each year based on NAV at the end of the previous year. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
$e_{\text{mcg-Small}}$	0.031	-0.038		-0.038
	(0.111)	(0.205)	46.1	(0.060)
$e_{\text{mcg-Large}}$	0.168	0.110		0.110
	(0.106)	(0.200)	46.8	(0.048)
$e_{\text{grow-Small}}$	0.125	0.080		0.080
	(0.097)	(0.182)	46.5	(0.047)
$e_{\text{grow-Large}}$	0.170	0.101		0.101
	(0.094)	(0.179)	47.6	(0.040)
$e_{\text{g\&i-Small}}$	-0.070	-0.055		-0.055
	(0.084)	(0.157)	46.5	(0.037)
$e_{\text{g\&i-Large}}$	0.052	0.014		0.014
	(0.086)	(0.164)	47.5	(0.035)
Avg e	0.079	0.035		0.035
$f_{\text{mcg-Small}}$	0.083	0.127		0.119
	(0.167)	(0.322)	48.1	(0.061)
$f_{\text{mcg-Large}}$	-0.062	-0.031		-0.040
	(0.159)	(0.309)	48.5	(0.054)
$f_{\text{grow-Small}}$	0.024	0.079		0.074
	(0.142)	(0.273)	48.0	(0.049)
$f_{\text{grow-Large}}$	-0.017	0.020		0.029
	(0.140)	(0.272)	48.6	(0.039)
$f_{\text{g\&i-Small}}$	0.004	0.055		0.054
	(0.119)	(0.228)	48.1	(0.041)
$f_{\text{g\&i-Large}}$	0.029	0.031		0.028
	(0.134)	(0.260)	48.4	(0.045)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.394	0.844		0.314
H_0: All $f = 0$	0.001	0.000		0.005
H_0: All f Same	0.000	0.000		0.003
H_0: Avg Small $f = 0$	0.792	0.749		0.066
H_0: Avg Large $f = 0$	0.908	0.980		0.886
H_0: Avg Small $f =$ Avg Large f	0.008	0.004		0.001
H_0: All Small $f =$ Large f	0.000	0.001		0.001
H_0: $f_{\text{mcg-Small}} = f_{\text{mcg-Large}}$	0.000	0.000		0.000
H_0: $f_{\text{grow-Small}} = f_{\text{grow-Large}}$	0.176	0.147		0.160
H_0: $f_{\text{g\&i-Small}} = f_{\text{g\&i-Large}}$	0.517	0.662		0.549

Table 6: Conditional fund performance relative to the conditional Carhart 4-factor model for Wiesenburger Fund Categories Bifucated on NAV with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable DY is the dividend yield on the value-weighted NYSE. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for six groups: the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, bifucated each year based on NAV at the end of the previous year. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
$e_{\text{mcg-Small}}$	-0.118	-0.135		-0.135
	(0.140)	(0.268)	47.6	(0.056)
$e_{\text{mcg-Large}}$	0.042	0.035		0.035
	(0.140)	(0.269)	48.1	(0.043)
$e_{\text{grow-Small}}$	0.045	0.036		0.036
	(0.125)	(0.239)	47.7	(0.044)
$e_{\text{grow-Large}}$	0.078	0.083		0.083
	(0.121)	(0.234)	48.3	(0.037)
$e_{\text{g\&i-Small}}$	-0.079	-0.090		-0.090
	(0.102)	(0.197)	47.9	(0.037)
$e_{\text{g\&i-Large}}$	0.007	0.008		0.008
	(0.106)	(0.205)	48.3	(0.030)
Avg e	-0.004	-0.010		-0.011
$f_{\text{mcg-Small}}$	0.064	0.085		0.064
	(0.180)	(0.353)	48.9	(0.055)
$f_{\text{mcg-Large}}$	-0.067	-0.062		-0.071
	(0.172)	(0.336)	48.9	(0.043)
$f_{\text{grow-Small}}$	0.051	0.052		0.045
	(0.156)	(0.304)	48.7	(0.045)
$f_{\text{grow-Large}}$	0.008	0.024		0.031
	(0.159)	(0.313)	49.0	(0.037)
$f_{\text{g\&i-Small}}$	0.040	0.029		0.015
	(0.129)	(0.249)	48.4	(0.041)
$f_{\text{g\&i-Large}}$	-0.007	0.020		0.020
	(0.154)	(0.302)	48.9	(0.034)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.973	0.964		0.734
H_0: All $f = 0$	0.020	0.039		0.042
H_0: All f Same	0.012	0.022		0.023
H_0: Avg Small $f = 0$	0.736	0.854		0.304
H_0: Avg Large $f = 0$	0.889	0.985		0.828
H_0: Avg Small $f =$ Avg Large f	0.002	0.070		0.097
H_0: All Small $f =$ Large f	0.004	0.025		0.030
H_0: $f_{\text{mcg-Small}} = f_{\text{mcg-Large}}$	0.001	0.003		0.007
H_0: $f_{\text{grow-Small}} = f_{\text{grow-Large}}$	0.136	0.471		0.661
H_0: $f_{\text{g\&i-Small}} = f_{\text{g\&i-Large}}$	0.318	0.895		0.914

Table 7: Conditional fund performance relative to the conditional Fama-French 3-factor model for Wiesenburger Fund Categories Bifucated on NAV with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable TS is the yield spread between 20-year and one-month Treasury securities. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for six groups: the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, bifucated each year based on NAV at the end of the previous year. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
$e_{\text{mcg-Small}}$	-0.009	-0.043		-0.042
	(0.159)	(0.305)	47.7	(0.057)
$e_{\text{mcg-Large}}$	0.263	0.159		0.159
	(0.144)	(0.276)	47.8	(0.055)
$e_{\text{grow-Small}}$	0.091	0.061		0.061
	(0.140)	(0.268)	47.5	(0.052)
$e_{\text{grow-Large}}$	0.102	0.070		0.070
	(0.141)	(0.272)	48.4	(0.045)
$e_{\text{g\&i-Small}}$	-0.079	-0.051		-0.051
	(0.118)	(0.228)	48.2	(0.037)
$e_{\text{g\&i-Large}}$	-0.055	-0.001		-0.001
	(0.128)	(0.248)	48.3	(0.036)
Avg e	0.052	0.032		0.033
$f_{\text{mcg-Small}}$	0.084	0.073		0.091
	(0.186)	(0.360)	48.4	(0.051)
$f_{\text{mcg-Large}}$	-0.027	-0.007		-0.024
	(0.184)	(0.357)	48.6	(0.053)
$f_{\text{grow-Small}}$	-0.016	-0.028		0.016
	(0.160)	(0.312)	48.6	(0.048)
$f_{\text{grow-Large}}$	-0.036	-0.039		-0.002
	(0.162)	(0.315)	48.5	(0.042)
$f_{\text{g\&i-Small}}$	0.033	0.000		0.018
	(0.119)	(0.231)	48.4	(0.039)
$f_{\text{g\&i-Large}}$	-0.031	-0.052		-0.055
	(0.128)	(0.250)	48.7	(0.031)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.701	0.902		0.376
H_0: All $f = 0$	0.016	0.146		0.048
H_0: All f Same	0.010	0.215		0.037
H_0: Avg Small $f = 0$	0.825	0.960		0.284
H_0: Avg Large $f = 0$	0.843	0.915		0.447
H_0: Avg Small $f =$ Avg Large f	0.002	0.063		0.006
H_0: All Small $f =$ Large f	0.010	0.198		0.029
H_0: $f_{\text{mcg-Small}} = f_{\text{mcg-Large}}$	0.004	0.050		0.016
H_0: $f_{\text{grow-Small}} = f_{\text{grow-Large}}$	0.447	0.732		0.516
H_0: $f_{\text{g\&i-Small}} = f_{\text{g\&i-Large}}$	0.099	0.283		0.084

Table 8: Conditional fund performance relative to the conditional Carhart 4-factor model for Wiesenburger Fund Categories Bifucated on NAV with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (22) when the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable TS is the yield spread between 20-year and one-month Treasury securities. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for six groups: the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, bifucated each year based on NAV at the end of the previous year. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
$e_{\text{mcg-Small}}$	-0.102	-0.179		-0.179
	(0.177)	(0.344)	48.5	(0.061)
$e_{\text{mcg-Large}}$	0.184	0.077		0.077
	(0.171)	(0.331)	48.5	(0.064)
$e_{\text{grow-Small}}$	0.057	0.004		0.004
	(0.157)	(0.304)	48.3	(0.052)
$e_{\text{grow-Large}}$	0.075	0.033		0.033
	(0.159)	(0.312)	48.9	(0.046)
$e_{\text{g\&i-Small}}$	-0.069	-0.091		-0.091
	(0.128)	(0.249)	48.6	(0.037)
$e_{\text{g\&i-Large}}$	-0.011	-0.023		-0.024
	(0.134)	(0.262)	48.7	(0.035)
Avg e	0.022	-0.030		-0.030
$f_{\text{mcg-Small}}$	0.105	0.064		0.077
	(0.359)	(0.709)	49.4	(0.052)
$f_{\text{mcg-Large}}$	-0.016	0.013		-0.024
	(0.352)	(0.695)	49.3	(0.053)
$f_{\text{grow-Small}}$	-0.008	-0.006		0.020
	(0.303)	(0.597)	49.2	(0.053)
$f_{\text{grow-Large}}$	0.013	0.006		0.005
	(0.291)	(0.575)	49.3	(0.045)
$f_{\text{g\&i-Small}}$	0.039	0.020		0.023
	(0.227)	(0.446)	49.2	(0.042)
$f_{\text{g\&i-Large}}$	-0.019	-0.021		-0.051
	(0.238)	(0.468)	49.3	(0.033)
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.883	0.920		0.445
H_0: All $f = 0$	0.040	0.739		0.143
H_0: All f Same	0.045	0.845		0.142
H_0: Avg Small $f = 0$	0.877	0.964		0.349
H_0: Avg Large $f = 0$	0.980	0.999		0.530
H_0: Avg Small $f =$ Avg Large f	0.014	0.343		0.017
H_0: All Small $f =$ Large f	0.015	0.657		0.085
H_0: $f_{\text{mcg-Small}} = f_{\text{mcg-Large}}$	0.001	0.258		0.034
H_0: $f_{\text{grow-Small}} = f_{\text{grow-Large}}$	0.489	0.792		0.594
H_0: $f_{\text{g\&i-Small}} = f_{\text{g\&i-Large}}$	0.129	0.409		0.093

Table 9: Unconditional fund performance relative to the conditional Fama-French 3-factor model for Wiesenburger Fund Categories with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (23) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable DY is the dividend yield on the value-weighted NYSE. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.097	0.037		0.035
	(0.107)	(0.202)	47.0	(0.048)
e_{grow}	0.147	0.090		0.088
	(0.094)	(0.180)	47.5	(0.040)
$e_{\mathrm{g\&i}}$	-0.011	-0.020		-0.022
	(0.083)	(0.159)	47.9	(0.029)
e_{misc}	0.043	-0.159		-0.151
	(0.115)	(0.159)	27.3	(0.120)
Avg e	0.069	-0.013		-0.013
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.012		0.001
H_0: All e Same	0.000	0.006		0.001
H_0: Avg $e = 0$	0.425	0.936		0.757

Table 10: Unconditional fund performance relative to the conditional Carhart 4-factor model for Wiesenburger Fund Categories with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (23) when the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger that have total net assets of $15 million or more and are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable DY is the dividend yield on the value-weighted NYSE. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses. % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	-0.037	-0.049		-0.048
	(0.137)	(0.264)	48.1	(0.042)
e_{grow}	0.057	0.059		0.057
	(0.121)	(0.234)	48.3	(0.037)
$e_{\text{g\&i}}$	-0.038	-0.040		-0.041
	(0.101)	(0.197)	48.7	(0.027)
e_{misc}	0.041	-0.007		0.000
	(0.114)	(0.158)	27.9	(0.117)
Avg e	0.006	-0.009		-0.008
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.958	0.964		0.829

Table 11: Unconditional fund performance relative to the conditional Fama-French 3-factor model for Wiesenburger Fund Categories with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (23) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable TS is the yield spread between 20-year and one-month Treasury securities. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.129	0.059		0.063
	(0.150)	(0.288)	48.0	(0.050)
e_{grow}	0.087	0.066		0.066
	(0.141)	(0.272)	48.3	(0.044)
$e_{\text{g\&i}}$	-0.069	-0.025		-0.027
	(0.122)	(0.238)	48.6	(0.031)
e_{misc}	-0.125	-0.176		-0.201
	(0.133)	(0.200)	33.2	(0.129)
Avg e	0.005	-0.019		-0.025
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.281		0.021
H_0: All e Same	0.000	0.387		0.015
H_0: Avg $e = 0$	0.966	0.937		0.585

Table 12: Unconditional fund performance relative to the conditional Carhart 4-factor model for Wiesenburger Fund Categories with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (23) when the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger that have total net assets of $15 million or more and are not restricted. For disappearing funds, returns are included through until disappearance. The conditioning variable TS is the yield spread between 20-year and one-month Treasury securities. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses. % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.045	-0.049		-0.047
	(0.170)	(0.331)	48.7	(0.056)
e_{grow}	0.066	0.019		0.020
	(0.155)	(0.303)	48.8	(0.046)
$e_{\text{g\&i}}$	-0.038	-0.057		-0.058
	(0.129)	(0.252)	48.9	(0.028)
e_{misc}	0.024	0.034		0.016
	(0.127)	(0.204)	37.7	(0.120)
Avg e	0.024	-0.013		-0.017
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.005	0.085		0.000
H_0: All e Same	0.006	0.042		0.002
H_0: Avg $e = 0$	0.858	0.960		0.700

Table 13: Unconditional fund performance relative to the unconditional Fama-French 3-factor model for Wiesenburger Fund Categories.

Estimation of moment conditions (24) and (17) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	0.071	0.050		0.050
	(0.105)	(0.195)	46.1	(0.048)
e_{grow}	0.085	0.079		0.079
	(0.095)	(0.178)	46.6	(0.039)
$e_{\text{g\&i}}$	-0.050	-0.026		-0.026
	(0.088)	(0.167)	47.5	(0.029)
e_{misc}	-0.126	-0.162		-0.162
	(0.127)	(0.163)	22.5	(0.124)
Avg e	-0.005	-0.015		-0.015
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.028		0.002
H_0: All e Same	0.000	0.015		0.001
H_0: Avg $e = 0$	0.956	0.928		0.716

Table 14: Unconditional fund performance relative to the unconditional Carhart 4-factor model for Wiesenburger Fund Categories.

Estimation of moment conditions (24) and (17) when the factors are the excess return on the market and the returns on the SMB and HML portfolios. The mutual fund data is from Elton, Gruber and Blake (1996) and the sample consists of the 188 common stock funds in the 1977 edition of Wiesenberger's Investment Companies that have total net assets of $15 million or more and that are not restricted. For disappearing funds, returns are included through until disappearance. Mutual fund data are available from 1977 to 1993 (the short data period) while factor and instrument data are available from 1927 to 1993. Panel A reports abnormal performance parameters for the three Wiesenburger fund categories, maximum capital gain, growth, and growth and income, and a fourth group that includes all other funds in our sample. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. Panel B reports the p-values for Wald tests of joint significance based on Newey-West covariances.

	Full (se)	Short (se)	% Reduction	Reg-based (se)
Panel A: Abnormal Performance Parameters (Return in % per Month)				
e_{mcg}	-0.037	-0.041		-0.041
	(0.108)	(0.204)	46.9	(0.046)
e_{grow}	0.052	0.044		0.044
	(0.096)	(0.183)	47.2	(0.037)
$e_{\mathrm{g\&i}}$	-0.042	-0.050		-0.050
	(0.084)	(0.162)	48.0	(0.026)
e_{misc}	0.028	0.004		0.004
	(0.122)	(0.150)	18.8	(0.120)
Avg e	0.001	-0.011		-0.011
Panel B: Hypothesis Test P-values				
H_0: All $e = 0$	0.000	0.000		0.000
H_0: All e Same	0.000	0.000		0.000
H_0: Avg $e = 0$	0.995	0.948		0.783

Table 15: Conditional performance relative to the conditional Fama-French 3-factor model for the 25 Fama-French portfolios with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (22) where the factors are the returns on the market, SMB, and HML portfolios, and the "funds" are the 25 Fama-French size and book-to-market portfolios. The conditioning variable DY is the dividend yield on the value-weighted NYSE. The short data period runs from 1977 to 1993 (to mirror the fund data) while factor and instrument data are available from 1927 to 1993. Panel A reports the parameter e and its standard error and Panel B reports the parameter f and its standard error. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. "Small" refers to the bottom size quintile "Big", to the top size quintile, "Low" to the bottom book-to-market quintile, and "High" to the top book-to-market quintile. Panel C reports p-values for Wald tests of the hypothesis that the fs for the 5 low book-to-market portfolios are all zero.

Panel A: Estimates (left) and standard errors (right) for e

		Low				High	Low				High
Full	Small	-0.524	-0.014	0.036	0.221	0.194	0.161	0.138	0.144	0.133	0.157
		-0.255	0.107	0.032	0.063	-0.063	0.148	0.148	0.148	0.142	0.160
		0.071	0.208	-0.113	0.046	0.039	0.142	0.141	0.138	0.130	0.162
		0.242	-0.064	-0.060	0.060	-0.035	0.128	0.135	0.139	0.132	0.151
	Big	0.168	-0.071	-0.041	0.003	-0.168	0.120	0.127	0.112	0.109	0.138
Short	Small	-0.671	-0.048	-0.009	0.121	0.056	0.247	0.251	0.255	0.229	0.282
		-0.191	0.054	0.158	0.225	-0.018	0.270	0.256	0.270	0.252	0.299
		0.104	0.181	-0.050	0.071	0.070	0.258	0.247	0.246	0.232	0.294
		0.227	-0.034	-0.154	-0.089	0.023	0.226	0.236	0.240	0.220	0.256
	Big	0.224	0.081	0.026	-0.148	-0.091	0.187	0.209	0.176	0.168	0.218
Reg-based	Small	-0.671	-0.048	-0.010	0.121	0.056	0.160	0.071	0.075	0.084	0.085
		-0.191	0.054	0.158	0.225	-0.018	0.080	0.092	0.088	0.088	0.071
		0.104	0.181	-0.050	0.071	0.070	0.086	0.081	0.076	0.074	0.089
		0.227	-0.034	-0.154	-0.089	0.023	0.085	0.084	0.095	0.092	0.104
	Big	0.224	0.081	0.026	-0.148	-0.091	0.106	0.094	0.108	0.092	0.110

Table 15 (cont.): Conditional performance relative to the conditional Fama-French 3-factor model for the 25 Fama-French portfolios with DY as the Conditioning Variable.

Panel B: Estimates (left) and standard errors (right) for f

		Low				High	Low				High
Full	Small	0.077	-0.071	0.036	-0.070	-0.229	0.267	0.214	0.209	0.197	0.229
		0.039	0.145	-0.141	0.072	-0.003	0.223	0.200	0.206	0.191	0.208
		-0.041	-0.031	-0.025	-0.068	-0.072	0.203	0.206	0.185	0.173	0.218
		-0.123	-0.137	0.127	0.007	0.098	0.176	0.179	0.181	0.161	0.182
	Big	-0.072	-0.112	0.047	0.211	-0.326	0.169	0.167	0.147	0.141	0.185
Short	Small	0.050	-0.002	0.032	-0.056	-0.129	0.490	0.407	0.396	0.369	0.434
		0.023	0.129	-0.115	0.115	0.046	0.425	0.378	0.391	0.360	0.400
		0.023	0.031	-0.002	-0.156	-0.055	0.391	0.382	0.355	0.328	0.409
		-0.090	-0.031	0.068	-0.135	-0.006	0.334	0.339	0.339	0.290	0.336
	Big	-0.035	0.074	0.037	0.055	-0.148	0.281	0.296	0.262	0.240	0.314
Reg-based	Small	0.098	0.040	0.004	-0.020	-0.095	0.147	0.076	0.074	0.082	0.089
		0.038	0.114	-0.133	0.137	0.049	0.093	0.080	0.091	0.088	0.076
		0.010	-0.005	-0.018	-0.168	-0.080	0.084	0.094	0.070	0.077	0.084
		-0.104	0.004	0.047	-0.210	-0.011	0.080	0.076	0.087	0.097	0.105
	Big	-0.032	0.090	0.053	0.032	-0.118	0.127	0.101	0.103	0.106	0.144

Panel C: Joint hypothesis tests

	Full	Short	Reg-based
H0: All Lowest 5 $f = 0$	0.608	0.710	0.608

Table 16: Conditional performance relative to the conditional Carhart 4-factor model for the 25 Fama-French portfolios with DY as the Conditioning Variable.

Estimation of moment conditions (21) and (22) where the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios, and the "funds" are the 25 Fama-French size and book-to-market portfolios. The conditioning variable DY is the dividend yield on the value-weighted NYSE. The short data period runs from 1977 to 1993 (to mirror the fund data) while factor and instrument data are available from 1927 to 1993. Panel A reports the parameter e and its standard error and Panel B reports the parameter f and its standard error. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. "Small" refers to the bottom size quintile "Big", to the top size quintile, "Low" to the bottom book-to-market quintile, and "High" to the top book-to-market quintile. Panel C reports p-values for Wald tests of the hypothesis that the fs for the 5 low book-to-market portfolios are all zero.

Panel A: Estimates (left) and standard errors (right) for e

		Low				High	Low				High
Full	Small	-0.726	-0.055	0.003	0.128	0.063	0.188	0.169	0.164	0.151	0.176
		-0.142	0.069	0.155	0.217	-0.021	0.187	0.179	0.166	0.151	0.181
		0.115	0.219	-0.019	0.190	0.032	0.183	0.161	0.153	0.144	0.177
		0.218	-0.016	0.008	0.082	-0.046	0.169	0.158	0.155	0.144	0.172
	Big	0.246	0.073	-0.077	-0.063	-0.055	0.136	0.135	0.124	0.124	0.153
Short	Small	-0.786	-0.033	-0.008	0.144	0.052	0.322	0.313	0.301	0.269	0.312
		-0.196	0.088	0.197	0.233	0.002	0.351	0.318	0.306	0.276	0.343
		0.121	0.201	-0.001	0.176	0.061	0.336	0.288	0.281	0.261	0.326
		0.229	0.005	-0.025	0.030	-0.006	0.310	0.292	0.279	0.245	0.302
	Big	0.326	0.039	-0.110	-0.107	-0.079	0.231	0.234	0.210	0.215	0.247
Reg-based	Small	-0.786	-0.033	-0.008	0.144	0.052	0.145	0.087	0.078	0.084	0.093
		-0.196	0.088	0.197	0.233	0.002	0.083	0.100	0.089	0.080	0.074
		0.121	0.201	-0.001	0.176	0.061	0.095	0.086	0.073	0.076	0.087
		0.229	0.005	-0.025	0.030	-0.006	0.090	0.080	0.086	0.100	0.099
	Big	0.326	0.039	-0.110	-0.107	-0.079	0.097	0.090	0.085	0.086	0.119

Table 16 (cont.): Conditional performance relative to the conditional Carhart 4-factor model for the 25 Fama-French portfolios with DY as the Conditioning Variable.

Panel B: Estimates (left) and standard errors (right) for f

		Low				High	Low				High
Full	Small	0.007	0.003	-0.078	-0.077	-0.206	0.286	0.227	0.220	0.210	0.232
		0.047	0.146	-0.136	0.192	0.072	0.243	0.216	0.212	0.187	0.201
		0.086	0.032	0.034	-0.029	-0.094	0.221	0.214	0.189	0.178	0.220
		-0.063	0.012	0.123	0.021	0.062	0.199	0.198	0.188	0.167	0.190
	Big	-0.023	0.016	0.058	0.070	-0.264	0.182	0.177	0.161	0.154	0.201
Short	Small	-0.011	-0.012	-0.003	-0.033	-0.141	0.532	0.436	0.419	0.394	0.434
		0.009	0.147	-0.103	0.154	0.040	0.471	0.413	0.402	0.351	0.382
		0.060	0.038	0.015	-0.098	-0.105	0.424	0.403	0.361	0.333	0.415
		-0.068	0.020	0.088	-0.058	0.004	0.377	0.378	0.353	0.303	0.351
	Big	-0.002	0.034	0.015	0.048	-0.187	0.331	0.326	0.297	0.275	0.337
Reg-based	Small	-0.042	-0.023	-0.036	-0.018	-0.149	0.151	0.077	0.077	0.081	0.095
		-0.007	0.135	-0.109	0.167	0.047	0.094	0.079	0.090	0.081	0.077
		0.063	0.046	0.030	-0.080	-0.108	0.090	0.100	0.069	0.084	0.093
		-0.058	0.051	0.089	-0.074	0.020	0.085	0.072	0.080	0.105	0.105
	Big	0.011	0.025	0.017	0.024	-0.208	0.115	0.092	0.087	0.103	0.150

Panel C: Joint hypothesis tests

	Full	Short	Reg-based
H0: All Lowest 5 $f = 0$	0.472	0.666	0.721

Table 17: Conditional performance relative to the conditional Fama-French 3-factor model for the 25 Fama-French portfolios with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (22) where the factors are the returns on the market, SMB, and HML portfolios, and the "funds" are the 25 Fama-French size and book-to-market portfolios. The conditioning variable TS is the term spread between 20-year and one-month Treasury securities. The short data period runs from 1977 to 1993 (to mirror the fund data) while factor and instrument data are available from 1927 to 1993. Panel A reports the parameter e and its standard error and Panel B reports the parameter f and its standard error. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. "Small" refers to the bottom size quintile "Big", to the top size quintile, "Low" to the bottom book-to-market quintile, and "High" to the top book-to-market quintile. Panel C reports p-values for Wald tests of the hypothesis that the fs for the 5 low book-to-market portfolios are all zero.

Panel A: Estimates (left) and standard errors (right) for e

		Low				High	Low				High
Full	Small	-0.628	-0.120	-0.024	0.021	-0.008	0.196	0.187	0.177	0.175	0.199
		-0.100	-0.013	0.193	0.062	-0.074	0.202	0.201	0.175	0.174	0.197
		0.195	0.180	0.028	0.134	0.073	0.200	0.186	0.166	0.164	0.194
		0.473	0.027	-0.110	0.099	0.197	0.174	0.176	0.179	0.163	0.176
	Big	0.055	-0.037	-0.054	-0.002	-0.034	0.168	0.165	0.143	0.134	0.161
Short	Small	-0.669	-0.105	0.016	0.051	0.008	0.344	0.354	0.332	0.324	0.367
		-0.183	0.005	0.190	0.197	-0.068	0.386	0.372	0.327	0.323	0.376
		0.106	0.149	-0.030	0.083	0.148	0.381	0.342	0.307	0.304	0.361
		0.248	-0.079	-0.159	-0.022	0.087	0.329	0.322	0.331	0.287	0.310
	Big	0.166	0.074	0.002	-0.131	-0.155	0.296	0.293	0.242	0.230	0.277
Reg-based	Small	-0.670	-0.105	0.016	0.051	0.008	0.146	0.067	0.078	0.089	0.091
		-0.183	0.005	0.190	0.197	-0.068	0.091	0.086	0.084	0.084	0.080
		0.106	0.149	-0.030	0.083	0.148	0.082	0.080	0.078	0.080	0.085
		0.248	-0.079	-0.158	-0.022	0.087	0.098	0.090	0.088	0.122	0.106
	Big	0.166	0.074	0.002	-0.131	-0.155	0.107	0.104	0.107	0.099	0.120

Table 17 (cont.): Conditional performance relative to the conditional Fama-French 3-factor model for the 25 Fama-French portfolios with TS as the Conditioning Variable.

Panel B: Estimates (left) and standard errors (right) for f

		Low				High	Low				High
Full	Small	0.320	0.105	-0.102	0.016	-0.127	0.244	0.186	0.159	0.135	0.135
		0.157	-0.021	-0.153	0.043	-0.055	0.256	0.186	0.152	0.147	0.128
		0.033	-0.167	-0.145	-0.071	0.077	0.241	0.175	0.148	0.132	0.151
		-0.021	-0.105	-0.001	0.002	-0.051	0.229	0.192	0.157	0.127	0.134
	Big	-0.105	0.090	-0.092	0.117	0.021	0.190	0.172	0.140	0.132	0.131
Short	Small	0.402	0.143	-0.088	0.007	-0.181	0.451	0.351	0.298	0.245	0.235
		0.128	-0.048	-0.189	0.010	-0.137	0.501	0.355	0.284	0.270	0.237
		-0.030	-0.153	-0.078	-0.103	-0.006	0.466	0.329	0.271	0.235	0.265
		-0.058	-0.053	-0.111	-0.033	-0.017	0.439	0.360	0.272	0.213	0.234
	Big	-0.141	-0.050	-0.074	0.174	0.009	0.336	0.296	0.233	0.213	0.193
Reg-based	Small	0.325	0.090	-0.109	0.030	-0.118	0.128	0.074	0.081	0.080	0.081
		0.128	0.008	-0.177	0.012	-0.040	0.080	0.081	0.080	0.084	0.067
		-0.031	-0.123	-0.098	-0.113	-0.008	0.082	0.071	0.069	0.086	0.075
		-0.018	-0.041	-0.039	0.006	-0.025	0.100	0.084	0.118	0.112	0.088
	Big	-0.077	0.005	-0.044	0.104	0.026	0.118	0.108	0.101	0.108	0.127

Panel C: Joint hypothesis tests

	Full	Short	Reg-based
H0: All Lowest 5 $f = 0$	0.326	0.309	0.037

Table 18: Conditional performance relative to the conditional Carhart 4-factor model for the 25 Fama-French portfolios with TS as the Conditioning Variable.

Estimation of moment conditions (21) and (22) where the factors are the excess return on the market and the returns on the SMB, HML and momentum (UMD) portfolios, and the "funds" are the 25 Fama-French size and book-to-market portfolios. The conditioning variable 20-year and one-month Treasury securities. The short data period runs from 1977 to 1993 (to mirror the fund data) while factor and instrument data are available from 1927 to 1993. Panel A reports the parameter e and its standard error and Panel B reports the parameter f and its standard error. The parameters are calculated using the Adjusted Moment method (Full) and GMM using only the short data period (Short) with standard errors calculated using the adjusted-moment coefficients. Abnormal performance parameters are also reported for the regression-based (Reg-based) approach of Ferson and Harvey. Newey-West standard errors are in parentheses % Reduction is the average percent reduction in standard error. "Small" refers to the bottom size quintile "Big", to the top size quintile, "Low" to the bottom book-to-market quintile, and "High" to the top book-to-market quintile. Panel C reports p-values for Wald tests of the hypothesis that the fs for the 5 low book-to-market portfolios are all zero.

Panel A: Estimates (left) and standard errors (right) for e

		Low				High	Low				High
Full	Small	-0.722	-0.099	-0.010	0.073	0.100	0.249	0.216	0.187	0.173	0.194
		-0.095	-0.069	0.239	0.059	-0.051	0.245	0.219	0.183	0.172	0.192
		0.157	0.265	0.082	0.291	0.106	0.235	0.188	0.171	0.166	0.184
		0.397	-0.052	0.042	0.342	0.125	0.214	0.196	0.179	0.160	0.178
	Big	0.211	0.022	-0.189	0.059	-0.010	0.183	0.168	0.146	0.139	0.159
Short	Small	-0.749	-0.077	0.008	0.051	0.013	0.458	0.410	0.351	0.316	0.351
		-0.185	0.016	0.245	0.202	-0.056	0.472	0.409	0.341	0.321	0.365
		0.099	0.142	0.027	0.199	0.123	0.449	0.349	0.321	0.309	0.343
		0.235	-0.041	-0.031	0.128	0.068	0.405	0.367	0.334	0.284	0.313
	Big	0.260	0.032	-0.150	-0.083	-0.162	0.333	0.307	0.262	0.250	0.257
Reg-based	Small	-0.749	-0.077	0.008	0.051	0.013	0.148	0.089	0.081	0.094	0.104
		-0.185	0.016	0.245	0.202	-0.056	0.092	0.093	0.088	0.082	0.086
		0.099	0.142	0.027	0.199	0.123	0.094	0.091	0.078	0.088	0.091
		0.235	-0.041	-0.031	0.128	0.068	0.112	0.084	0.091	0.120	0.110
	Big	0.260	0.033	-0.150	-0.083	-0.162	0.094	0.097	0.081	0.103	0.133

Table 18 (cont.): Conditional performance relative to the conditional Carhart 4-factor model for the 25 Fama-French portfolios with TS as the Conditioning Variable.

Panel B: Estimates (left) and standard errors (right) for f

		Low				High	Low				High
Full	Small	0.059	-0.040	-0.174	-0.016	-0.218	0.479	0.369	0.347	0.283	0.300
		0.096	0.073	-0.137	0.087	0.022	0.473	0.353	0.309	0.300	0.288
		0.083	-0.099	-0.029	-0.027	0.063	0.430	0.336	0.297	0.264	0.306
		0.025	-0.096	0.114	0.128	-0.011	0.385	0.326	0.300	0.238	0.291
	Big	-0.034	0.068	-0.092	0.029	-0.080	0.261	0.263	0.224	0.235	0.193
Short	Small	0.153	-0.006	-0.076	0.050	-0.168	0.933	0.723	0.676	0.548	0.580
		0.056	-0.013	-0.119	0.120	-0.062	0.935	0.695	0.602	0.586	0.567
		0.035	-0.074	0.016	-0.030	-0.022	0.846	0.658	0.578	0.514	0.596
		0.015	-0.038	0.062	0.144	-0.015	0.758	0.638	0.583	0.451	0.559
	Big	-0.016	-0.031	-0.131	0.123	-0.082	0.490	0.503	0.416	0.446	0.340
Reg-based	Small	0.258	0.052	-0.107	0.034	-0.115	0.134	0.074	0.081	0.080	0.080
		0.110	0.014	-0.152	0.035	-0.013	0.082	0.083	0.072	0.072	0.067
		-0.023	-0.103	-0.072	-0.093	-0.010	0.083	0.070	0.065	0.087	0.073
		-0.008	-0.040	0.018	0.059	-0.026	0.098	0.079	0.109	0.099	0.090
	Big	-0.038	0.012	-0.066	0.085	0.007	0.104	0.109	0.102	0.106	0.126

Panel C: Joint hypothesis tests

	Full	Short	Reg-based
H0: All Lowest 5 $f = 0$	0.824	0.989	0.302