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# Does style-shifting activity predict performance? Evidence from equity mutual funds☆

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ABSTRACT

This study introduces an innovative approach to measuring the "style-shifting activity" (*SSA*) of mutual funds using daily returns. Applying our new measure to a comprehensive sample of 2631 active US equity mutual funds, we show (i) that *SSA* predicts future performance, especially for current outperformers, and (ii) that *SSA* adds new information previously not captured by alternative return-based activity measures such as tracking error or *R*-squared. Comparing the three measures, we show that *SSA* captures activity very selectively, which makes it a stable and reliable predictor of future performance. Tracking error and *R*-squared, however, seem to additionally capture some unobserved fund characteristics, as the direction and power of their predictions depend heavily on the consideration of time- and fund-fixed effects. Moreover, investment strategies based on past *SSA* and past performance earn up to 2.4% (3.6%) p.a. risk-adjusted net (gross) returns which is economically and statistically significant.



## 1. Introduction and literature

One of the most frequently asked questions in mutual fund research is whether active fund management creates value for investors. We contribute to this debate by introducing an innovative approach to measuring the style-shifting activity of funds and by systematically testing its predictive power regarding future performance. Most studies document that, on average, actively managed funds underperform their passive benchmarks. Still, there might be substantial differences in the ability of fund managers to create value (see, e.g., Kosowski, Timmermann, Wermers, & White, 2006). In this context, recent research focuses on analyzing the impact of activity on performance. Among others, Cremers and Petajisto (2009) as well as Amihud and Goyenko (2013) show that higher management activity is related to higher future performance. The reasoning behind these studies is that a fund can only beat its benchmark if it deviates from it. Also, more activity might signal new investment ideas and therefore be proxy for skill. To measure activity, such studies apply both return-based and holdings-based approaches.

Holdings-based activity measures like "industry concentration index" (Kacperczyk, Sialm, & Zheng, 2005) or "active share" (Cremers & Petajisto, 2009), among others, define activity as a fund's deviation from the market portfolio or its benchmark index. Similar studies following this idea are Brands, Brown, and Gallagher (2005) and Kaplan and Sensoy (2005). Other holdings-based approaches determine a fund's activity as drift in its investment styles (see, e.g., Ainsworth, Fong, & Gallagher, 2008; Brown, Van Harlow, & Zhang, 2009; Brown, Van Harlow, & Zhang, 2012; Meier &

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Rombouts, 2009; Wermers, 2012), as deviation from its peer group (see, e.g., Gupta-Mukherjee, 2013), or as change in its total risk (see, e.g., Huang, Sialm, & Zhang, 2011). Nevertheless, implementing holdings-based approaches has several disadvantages.[2] First, a timely determination of fund activity can be difficult, because fund managers typically disclose portfolio holdings at the latest possible date, otherwise so-called copycat funds could steal a substantial portion of the copied fund's return (see, e.g., Frank, Poterba, Shackelford, & Shoven, 2004; Phillips, Pukthuanthong, & Rau, 2014). For this reason, current legal regulation allows funds to disclose quarterly portfolio holdings with a considerable lag of 60 days (U.S. Securities and Exchange Commission, 2004). Second, due to window dressing there may be substantial discrepancies between actual fund portfolio characteristics during a specific time period and the holdings reported at the beginning or at the end of that period (see, e.g., Agarwal, Gay, & Ling, 2014; Carhart, Kaniel, Musto, & Reed, 2002; Elton, Gruber, Blake, Krasny, & Ozelge, 2010; He, Ng, & Wang, 2004; Morey & O'Neal, 2006; Musto, 1999; Sias, 2007). Third, holding-based approaches often have to deal with incompleteness and therefore considerably smaller data samples caused by irregular and infrequent portfolio disclosure.[3]

Return-based activity measures like "tracking error" (e.g., Idzorek & Bertsch, 2004; Müller & Weber, 2014; Roll, 1992; Wermers, 2003) or "*R*-squared" (e.g., Amihud & Goyenko, 2013; Brown et al., 2009; Müller & Weber, 2014) usually measure activity as a fund's idiosyncratic return variance, either absolute or relative to its total return variance. We contribute to the existing research on mutual fund management activity by introducing an innovative measure that uses the fund's returns to measure its "style-shifting activity" (*SSA*), a specific type of activity previously analyzed based on holdings information only.

Originally, return-based style-shifting was introduced by Herrmann and Scholz (2013) in the context of hybrid mutual funds to measure the performance created by actively shifting between different fixed income and equity styles.[4] As this information has not been used to measure management activity before, we define *SSA* as the difference between multifactor regression betas from two consecutive quarters where the factors represent different investment styles. This way, the measure is capable of providing style-shifting information of the same frequency as approaches that measure style-changes or style-drift with quarterly holdings data (see, e.g., Ainsworth et al., 2008; Brown et al., 2009, 2012; Meier & Rombouts, 2009; Wermers, 2012). To get reliable estimates for quarterly style betas we use daily returns in our main analysis. In Section 5, we will comment on the robustness of this approach using monthly return data.

We argue that *SSA* is a useful measure for three main reasons. First, as *SSA* is a return-based measure, it provides information about the fund activity level without a sizable delay, without the caveats imposed by window dressing and suffers less from incomplete data than holdings-based approaches. Moreover, the return-based approach is superior to holdings-based measurement of style-shifting as it allows calculations of *SSA* at each point in time, while holdings-based style-shifting is limited to the exact timing of quarterly holdings reports.

Second, in contrast to other popular return-based activity measures such as tracking error and *R*-squared, *SSA* in particular captures dynamic management activity and is not biased by constant style bets passively taking the fund away from its benchmark. For example, consider a fund which states the S&P 500 index as its benchmark. In addition, the fund deviates from the index to place a 20% factor bet on the S&P 600 Small Cap Index and afterwards stops actively managing the fund but simply keeps these style exposures constant. *SSA* will be low because style betas will not change considerably over time. However, tracking error, *R*-squared and even holdings-based measures such as active share (Cremers & Petajisto, 2009; Petajisto, 2013) will be quite high, despite the fund being in fact passive over time.

Third, there are different approaches to active management as well as the measurement thereof. On the one hand, stock picking might be measured using active share (Cremers & Petajisto, 2009) or *R*-squared (Amihud & Goyenko, 2013). On the other hand, market, sector or factor timing might be measured using the industry concentration index (Kacperczyk et al., 2005) or tracking error. Still, all such measures are rather unspecific and measure different aspects of activity in a relatively broad sense. Therefore, Petajisto (2013) combines active share and tracking error to define more distinctive activity types like the "diversified stock picker", the "concentrated stock picker" and the "factor better". With the "active style-shifter" we add another very specific type of activity which could be combined with these classifications to get an even more detailed and comprehensive picture of active fund management.

In our empirical analysis we examine two specific research questions. The first concerns the relationship between current fund activity and future performance. On the downside, more active funds may produce inferior risk-adjusted returns on average as more intensive research and higher trading costs might increase fund expenses to the point of diminishing relative performance.[5] Moreover, higher activity could also stem from noise trading or overconfidence. On the upside, many studies report a positive activity-performance relation arguing that a higher degree of activity signals skill and superior information (e.g., Amihud & Goyenko, 2013; Cremers & Petajisto, 2009). Thus, current high activity, mainly in the form of stock selection, market timing, or style-shifting activities, should be positively related to future performance.

**Hypothesis One.** Currently more active funds yield on average higher risk-adjusted returns going forward than less active funds.

With our second research question, we analyze the relation between *SSA* and other return-based activity measures. Specifically, we use the tracking error ("*TE*") and *R*-squared ("$R^2$") in combination with *SSA* to predict future performance. We argue that the three measures capture different aspects of management activity and that a combination should provide more information about future fund performance than single measures.

**Hypothesis Two.** Combining popular activity measures with *SSA* improves predictions of future risk-adjusted fund returns.

To test these hypotheses, we employ *SSA* to a large cross-section of active US domestic equity mutual funds. Following Herrmann and Scholz (2013), we use daily return data over two consecutive

[2] See also Amihud and Goyenko (2013) for a comprehensive discussion regarding the potential disadvantages of holdings data.

[3] For example, using monthly holdings data Elton, Gruber, Blake (2012) are only able to use 318 funds of their original fund sample of 2582 due to data issues.

[4] For example, in the hybrid fund performance models used by Comer (2007), Comer, Larrymore, and Rodriguez (2009a, 2009b), and Herrmann and Scholz (2013), the factors represent different fixed income asset classes (government, corporate, MBS, high yield) and maturities (long-term, mid-term) as well as different equity styles (high vs. low market beta, value vs. growth, large cap vs. small cap, momentum vs. contrarian).

[5] Among others, Carhart (1997) and Bogle (1998) document this negative relation between fund expenses and performance.