The Absolute Return Wedge: A New Measure That Predicts Hedge Fund Performance

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We propose a new measure of hedge fund's activeness. Our activeness measure is a fund firm's absolute return wedge defined as the absolute value of a fund firm's reported return minus its hypothetical portfolio return derived from its disclosed long equity holdings. Fund firms with a high absolute return wedge outperform fund firms with a low absolute return wedge by more than 6% p.a. after accounting for typical risk factors that explain hedge fund performance. We find that the absolute return wedge is positively associated with measures of managerial incentives and discretion. Moreover, fund firms with greater value of long put options and confidential equity positions disclosed with a delay in their regulatory filings show high absolute return wedges. Taken together, these results are consistent with better incentivized hedge fund managers being more active and delivering superior performance.

Keywords: Absolute Return Wedge, Confidential Holdings, Derivatives, Hedge Funds, Investment Performance, Managerial Incentives

JEL Classification Numbers: G11, G23

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1. Introduction

Hedge funds have become an increasingly large and important player in the financial industry. According to one estimate by Barclayhedge, the total assets under management as of the second quarter of 2017 stand at approximately $3.2 trillion. However, due to lax regulation and their often opaque structure and limited disclosure, it is difficult for researchers and investors to observe what hedge funds are actually doing. Despite various promising attempts to better understand the drivers of hedge fund performance like their exposure to a plethora of risk factors, their incentive and fee structures (e.g., Agarwal, Daniel, and Naik, 2009; Lim, Sensoy, and Weisbach, 2015), predicting future hedge fund performance is still a challenging task.[1]

Since hedge funds are generally considered to be an epitome of active money management, in this paper, we propose a new measure for the activeness of a hedge fund, the absolute return wedge (ARW). To calculate a fund's ARW, we combine data on reported returns and on disclosed long only equity positions and compute the absolute value of the difference between the reported fund return and the hypothetical buy-and-hold return of the disclosed long equity positions. Hence, similar to mutual fund's tracking error, the ARW captures the magnitude of the fund firm's unobserved actions except from its disclosed long equity portfolio holdings. We find that a fund's ARW is a persistent characteristic and that funds with higher ARW perform better in the future.

[1] An incomplete list of papers that document the different risks explaining hedge fund performance include nonlinear risk (Agarwal and Naik, 2004; Fung and Hsieh, 2004), correlation risk (Buraschi, Kosowski, and Trojani, 2014), liquidity risk (Aragon, 2007; Sadka, 2010; Teo, 2011), macroeconomic uncertainty (Bali, Brown, and Caglayan, 2014), volatility risk (Bondarenko, 2004; Agarwal, Bakshi, and Huij, 2009; Agarwal, Arisoy, and Naik, 2017), rare disaster concerns (Gao, Gao, and Song, 2014), and tail risk (Agarwal, Ruenzi, and Weigert, 2017). For more details, see a recent survey by Agarwal, Mullally, and Naik (2015).

The motivation for the ARW measure we propose is three-fold. First, direct measures for the trading activity of a fund manager like the fund's turnover ratio are typically not available for hedge funds. Second, unlike mutual funds, the typical hedge fund often does not follow an explicitly observable benchmark. Thus, measures that define activeness as the deviation of fund return from the fund's benchmark return cannot be easily obtained. Third, comparing long-only equity holdings of hedge funds with the passive holdings of the benchmark to capture fund activity (e.g., via its active share or its industry concentration as in Cremers and Petajisto, 2009, and Kacperczyk, Sialm, and Zheng, 2005, for mutual funds) is also not possible for the same reason. However, some hedge fund firms have to report their long equity positions. For these, we can combine information on the reported fund returns and the disclosed holdings to compute a fund's ARW.

On a fundamental level, ARW can be driven by two components: unobserved actions within the long-only equity portfolio between reporting dates (as in the evidence for mutual funds in Kacperczyk, Sialm, and Zheng, 2006) and by the return-contribution of all other trading activities of hedge funds like derivative and short positions. The first prediction we aim to test in our paper is that both these components of more active hedge funds are associated with better future fund performance. Furthermore, to the extent that ARW captures unconventional strategies followed by fund managers, our second prediction is that the ARW measure should be larger for funds that have greater investment discretion. Finally, assuming that being active requires costly effort from the hedge fund managers, our third prediction is that funds with stronger performance incentives should have greater ARW measures.

To test these three predictions, we use data on hedge fund returns from the Union Hedge Fund database (see, e.g., Agarwal, Ruenzi, and Weigert, 2017) and on their reported long-equity positions of hedge fund companies from the 13F filings over the period 1994 through 2012. We find that returns computed based on disclosed equity long positions are much more volatile than actual fund returns, leading to a quite substantial difference between the two. When sorting fund firms into quintile based on their ARW measure, we find that there is a significant cross-sectional variation in the measure across funds. The ARW in the lowest quintile is below 1%, while it is more than 9% in the highest quintile. Furthermore, the difference in ARW between the quintiles is persistent up to 5 years. Funds with high ARW in the past perform significantly better than funds with low ARWs, consistent with our first prediction. The difference in average returns between the top and bottom quintile ARW funds amounts to 0.28% per month for raw returns and 0.54% (0.53%) for the Carhart (1997) four-factor alpha (the Fung and Hsieh (2004) seven-factor alpha). This result is not driven by differences in the exposure to alternative systeamtic risk factors like systematic liquidity (Pástor and Stambaugh, 2003), macroeonomic uncertainty (Bali, Brown, and Caglayan, 2014), correlation risk (Buraschi, Kosowski, and Trojani, 2014), volatility risk (Bondarenko, 2004; Agarwal, Bakshi, and Huij, 2009), rare disaster concerns (Gao, Gao, and Song, 2014), and tail risk (Agarwal, Ruenzi, and Weigert, 2017).

The return premium associated with ARW is stable over time and is observed in both times of high and low economic activity. It also holds after controlling for various fund characteristics. The return premium is more pronounced in times of high market volatility. The documented outperformance of high ARW funds also survives a battery of additional robustness checks.

The impact of ARW on fund performance is markedly different from and not subsumed by other related predictors of hedge fund performance that have been proposed in the literature and that might also capture different dimensions of the investment activeness of hedge funds. Particularly, our results are not driven by the R^2 of the fund (see Titman and Tiu, 2011) or its strategy distinctiveness index measure, SDI (see Sun, Wang, and Zheng, 2012).

Further analysis shows that larger and older hedge funds tend to be less active in terms of their ARW. If incentives to perform better are strong, i.e., if the delta of the incentive fee contract and the incentive fee are larger, funds are likely to be more active. We find support for this prediction. Consistent with the prediction that fund managers with more discretion should follow more active strategies, we also find that funds with longer lockup-periods and offshore funds are more active.

Our final set of tests attempts to shed some light on the kind of trading strategies funds with large ARW follow. While the opaqueness of the industry makes it extremely difficult to provide definitive answers here, data from 13F filings allows us to analyse option holdings and the extent to which hedge fund firms use confidential holdings, i.e., delay the disclosure of their long holdings by up to one year or longer in some cases (see Agarwal, Jiang, Tang, and Yang, 2013; Aragon, Hertzel, and Shi, 2013). We provide evidence that more active funds seem to use put options (but not call options) more actively and the value of their confidential holdings is higher. The latter finding is consistent with the notion that more informed managers that tend to hide or delay the disclosure of their positions are also the ones that eventually have higher ARW. In summary, these results are consistent with better incentivized hedge fund managers being more active and delivering superior performance

The structure of this paper is as follows. Section 2 describes the data and introduces our absolute return wedge measure. In Section 3 we analyze the future performance of funds with high versus low ARW and Section 4 investigates the determinants and sources of a fund's ARW. Section 5 concludes.

2. Data and the Absolute Return Wedge Measure

2.1. Data

We obtain hedge fund data from three distinct sources. The first source is the "Union Hedge Fund Database", which contains self-reported monthly time-series of returns and assets of hedge funds and a snapshot of fund characteristics. We create this union data by merging hedge fund data from four different commercial databases, namely Eureka, Hedge Fund Research (HFR), Morningstar, and Lipper TASS. As our second source, we employ the 13F equity portfolio holdings database from Thomson Reuters (formerly the CDA/Spectrum database). The third data source is the Securities and Exchange Commission's (SEC's) EDGAR (Electronic Data Gathering, Analyis, and Retrival) database. It consists of a fund firm's long positions in call and put options as well as long equity positions that are disclosed with a delay (referred to as "confidential" by Agarwal, Jiang, Tang, and Yang, 2013), all extracted from the 13F filings.

The Union Hedge Fund Database includes data for a total of 25,732 funds from 1994 to 2012. It is important to use this merging procedure to obtain a comprehensive database because 65% of all funds only report to one single database (e.g., Lipper TASS has only 22% unique funds). We display the overlap between the four databases in Figure A.1 in the Appendix. We use multiple standard filters for our sample selection. First, we start our sample period in 1994, the year in which commercial hedge fund databases started to track defunct hedge funds. Second, we require a fund to have at least 24 monthly return observations. Third, funds denoted in a currency other than US dollars are filtered out. Fourth, the first 12 months of a fund's return series are eliminated to avoid the backfill bias. This filtering process leaves us with a sample of 10,834 hedge funds in the sample period from January 1994 to December 2012.

The 13F Thomson Reuters Ownership database consists of quarterly long equity positions of 5,536 institutional investors during the period from 1980 (when Thomson Reuters data starts) to 2012. This database does not separately categorize hedge fund firms. Therefore, we follow Agarwal, Fos, and Jiang (2013) and classify hedge fund firms manually. We end up with a sample of 1,694 unique hedge fund firms among the 13F filing institutions holding a total value of $2.52 trillion of long equity positions in 2012.

We merge the hedge fund firms from the 13F filings with the firms listed in the Union Hedge Fund Database. Following Agarwal, Fos, and Jiang (2013), we match institutions by name allowing for minor variations. We compute for each hedge fund firm i in month t a *reported fund firm return* and an *equity portfolio return*. Since hedge funds, and not firms, report their returns to commercial databases, we compute the *reported fund firm return* as the value-weighted excess returns of the firm's individual funds. Using the 13F long equity positions, we compute the *equity portfolio return* as the value-weighted excess returns of the firm's disclosed equity positions. Since 13F positions are reported only on a quarterly basis, we use a firm i's equity positions in month t to compute the equity portfolio return over months $t+1$ to $t+3$ to obtain a return series of monthly observations.[2] We eliminate all pairs in which there are fewer than 24 overlapping periods of data from both data sources. We end up with 675 hedge fund firms managing 2,316 distinct funds during the period from 1994 to 2012.

We report the summary statistics of fund firms' excess returns (i.e., returns in excess of the risk-free rate) and characteristics in Panel A of Table 1. Summary statistics are calculated over all fund firms and months in our sample period. We define the variables in Table A.1 of the Appendix.

[Insert Table 1 around here]

Finally, we merge our sample with quarterly 13F filings of long option positions and confidential holdings of hedge fund firms in the period from April 1999 (when electronic filings become available) to March 2009 obtained from the SEC EDGAR database. The 13F filing institutions have to report holdings of long option positions on individual 13F securities and provide information whether the options are calls or puts and what the underlying security is. Moreover, 13F filing institutions can request confidential treatment from the SEC for certain holdings when delaying disclosure is "necessary or appropriate in the public interest or in for the protection of investors." If a request is denied, or after the approval period of confidentiality expires, the filers must reveal these holdings by filing "amendments" to their original Form 13F. Following Agarwal, Jiang, Tang, and Yang, (2013), we refer to these amendments as confidential holdings. Out of the 675 hedge fund firms that appear both in the Union Hedge Fund Database and in the 13F Thomson Reuters

[2] As an example, we use the disclosed 13F positions of a firm *i* at the end of December 2011 to compute the equity portfolio return for the months from January 2012 to March 2012. To compute the portfolio return for the months from April 2012 to June 2012, we use the disclosed positions at the end of March 2012, and so on.

Ownership database, 323 fund firms file at least one long option position and 97 fund firms file at least one confidential position. The sample period for derivative holdings is from April 1999 to December 2012, the sample period for confidential holdings is from April 1999 to March 2009. We use this sample in Sections 4.2 and 4.3 to study the relation between a fund firm's absolute return wedge and its exposure to derivatives and confidential holdings.

2.2. The Absolute Return Wedge Measure

To capture a fund firm's unobserved active management decisions, we define the absolute return wedge, a measure which indicates how closely a fund firm's reported return resembles its imputed equity portfolio return. The *absolute return wedge (ARW)* of fund firm *i* at month *t* is computed as the absolute value of a fund firm's reported return minus its imputed equity portfolio return,

$$ARW_{i,t} = \left|Fund\ Firm\ Return_{i,t} - \ Equity\ Portfolio\ Return_{i,t}\right|. \quad (1)$$

Hence, *ARW* captures the magnitude of the fund firm's unobserved actions *except* from its disclosed long equity portfolio holdings. Fund firms with high *ARW* strongly deviate from their disclosed long equity portfolio returns while reported returns of fund firms with low *ARW* are similar to their equity portfolio counterpart. Note, that *ARW* captures the magnitude of the deviation without lying emphasis on the direction of the deviation (as the return gap measure for mutual funds in Kacperczyk, Sialm, and Zheng, 2006). The *ARW* measure is comparable to a fund firm's tracking error (Roll, 1992) in which reported returns are benchmarked against its own equity portfolio returns.

We report summary statistics of the *ARW* measure in Panel B of Table 1. Average *ARW* is 3.92% across all funds and months in the sample. Among the different strategies, *ARW* is lowest for Equity Long Only, Equity Long-Short, and Event Driven fund firms, while it is highest for Relative Value, Global Macro, and CTA/Managed Futures fund firms. Correlations between *ARW* as well as contemporaneous returns and fund firm characteristics are reported in Panel C of Table 1. We find that *ARW* is positively related to a fund firm's standard deviation, incentive and management fee, offshore location, and leverage usage; it is negatively related to a fund firm's age and size. We will discuss the relation between *ARW* and fund firm characteristics in more details later in Section 4.1.

We now investigate the behavior of the aggregate *ARW* and its components over time. We first compute the fund firm's *aggregate reported returns* and *aggregate equity portfolio returns* as the monthly equal-weighted average of reported return and equity portfolio returns across all fund firms. Panel A of Figure 1 displays the time series of monthly aggregate reported returns and aggregate equity portfolio returns. Panel B displays the *aggregate return wedge* computed as the difference between aggregate reported returns and aggregate equity portfolio returns. Finally, in Panel C, we display the evolution of the *aggregate absolute return wedge (aggregate ARW)* computed as the absolute value of *aggregate reported returns* minus *aggregate equity portfolio returns*.

[Insert Figure 1 around here]

Visual inspection shows that the aggregate ARW in Panel C is highly persistent (monthly autocorrelation of 0.37) with periods of high and low *aggregate ARW* values; moreover, periods of high *aggregate ARW* frequently coincide with periods of financial crisis. The highest spike in *aggregate ARW* occurs in October 2008 (value of 10.68%), one month after the bankruptcy of Lehman Brothers and the beginning of a worldwide recession. Additional peaks in *aggregate ARW* occur in August 1998 (collapse of Long Term Capital

Management, value of 8.98%), September 2001 (series of airplane terrorist attacks in the United States, value of 8.31%), and October 2011 (European debt crisis where several Eurozone member states were unable to repay their government debt), suggesting that unobserved actions of hedge fund firms are particularly strong during crisis periods.

Besides looking at the time series of *aggregate ARW*, we also examine the persistence of *ARW* on an individual fund firm level. Therefore, we report the results of a *ARW* transition matrix in Table 2.

[Insert Table 2 around here]

This table reports the relative frequency by which a fund firm is sorted into *ARW* quintile portfolio *i* in month *t* given that it was in the *ARW* quintile portfolio *j* in month *t*-1 in our sample period from January 1994 to December 2012. In absence of persistence in *ARW*, all the frequencies should be 20% because a high/low *ARW* in month *t-1* should have no information/predictive ability about the *ARW* in month *t*. Instead we find clear evidence of persistence in *ARW*: Fund firms which are sorted into portfolio 5 (1) in month *t-1* show up again in portfolio 5 (1) with a likelihood of 34.73% (28.68%).

As an additional test for (longer-term) persistence of *ARW*, we compute the equal-weighted average *ARW* of fund firms in quintile portfolio over time. Fund firms are sorted into quintiles based on their *ARW* in month *t*. Figure 2 displays the evolution of the equal-weighted average *ARW* of these portfolios over the following four years *t+1* to *t+4*.

[Insert Figure 2 around here]

Our results indicate that the fund firms in quintile portfolio 5 (i.e., fund firms with high *ARW*) also have higher *ARW* in the following years than the fund firms in quintile portfolio 1 (i.e., fund firms with low *ARW*).

3. The Absolute Return Wedge and Hedge Fund Performance

3.1. Preliminary Analysis

To get a first impression about the relationship between a fund firm's *absolute return wedge (ARW)* and its returns, we estimate a simple univariate OLS regression of average reported fund firm returns and average *ARW* -- both measured over the entire time series of a fund firm. The estimated univariate regression together with a two-dimensial scatter plot is displayed in Figure 3.

[Insert Figure 3 around here]

Our results indicate that the coefficient estimate for the average *ARW* is positive with a value of 0.059. It is highly statistically significant at the 1% significance level indicating that there is a strong positive correlation between average reported fund firm returns and average *ARW* coefficients in our sample period from January 1994 to December 2012. We will now start to carefully investigate this relation and particularly focus on the association between past *ARW* and future hedge fund performance.

3.2. Univariate Portfolio Sorts

To assess the predictive power of differences in a fund firm's absolute *ARW* on the cross-section of future fund firm returns, we relate fund firm returns in month *t+1* to *ARW* measures in month *t*. We start our investigation by first looking at univariate portfolio sorts.

For each month *t*, we sort fund firms into quintile portfolios based on their *ARW* in increasing order. Then, we compute equally-weighted monthly average excess returns of these portfolios in month *t+1*. Table 3 reports the results.

[Insert Table 3 around here]

We find considerable cross-sectional variation in *ARW* across fund firms in the first column: Average *ARW* ranges from 0.69% in quintile portfolio 1 up to 9.04% in quintile portfolio 5. The second column documents that average *ARW* is positively associated with average future fund firm returns. Hedge fund firms in the portfolio with the lowest (highest) *ARW* earn a future fund firm return (in excess of the risk-free rate) of 0.49% (0.77%). The return spread between portfolios 0 and 5 is 0.28% per month, which is statistically significant at the 10% level with a *t*-statistic of 1.96. In columns (3) and (4) we report the results when we adjust fund firm returns for their exposures using the Carhart (1997) four-factor model and the Fung and Hsieh (2004) seven-factor model, respectively. Our results indicate that the risk-adjusted spread between quintile portfolios 5 and 0 widens: The (5 - 0) *ARW* spread amounts to 0.54% and 0.53% per month when we use alphas from Carhart (1997) four-factor model and Fung and Hsieh (2004) seven-factor model, respectively. These spreads translate into an economically large risk-adjusted return spread of 6.48% and 6.36% per annum that is significant at the 1%-level.

Next, we inspect the robustness of our results after controlling for other risk factors that have been shown to be important in explaining hedge fund performance. For this purpose, we regress the (5 - 0) *ARW* return spread on various extensions of the Fung and Hsieh (2004) model. Table 4 displays the results.

[Insert Table 4 around here]

In column (1) -- for the sake of comparison -- we report the results of the Fung and Hsieh (2004) seven-factor model as our baseline (which corresponds to the results from column (4) in Table 3). We include the MSCI Emerging Markets return to proxy for emerging market risk in the second column. In column (3) we include the Pástor and Stambaugh (2003) traded liquidity factor to control for liquidity exposure of fund firms. In columns (4) - (7), we control for the exposures to the Bali, Brown, and Caglayan (2014) macroeconomic uncertainty factor, the Buraschi, Kosowski, and Trojani (2014) correlation risk factor, the *VIX* (as in Agarwal, Bakshi, and Huij, 2009), and the Gao, Gao, and Song (2014) *RIX* factor, respectively. Finally, in column (8), we add the Agarwal, Ruenzi, and Weigert (2017) factor to our model to account for hedge funds' tail risk. In each case, our results indicate a significant positive alpha for the (5 - 0) *ARW* return spread ranging from 0.49% to 0.60% per month. These findings corroborate the importance of *ARW* as a predictor for abnormal hedge fund performance.

3.3. Bivariate Portfolio Sorts: The Relationship to R^2 and Strategy Distinctiveness

The *ARW* proxies for the magnitude of unobserved actions in a hedge fund firm that are not visible in its disclosed long portfolio holdings or its reported return time series alone. It is conceptually related to two measures that have been shown to affect hedge fund performance in the cross-section: the R^2 measure of Titman and Tiu (2011) and the strategy distinctiveness index (SDI) measure of Sun, Wang, and Zheng (2012). Hence, our results of higher risk-adjusted returns due to ARW could be driven by differences in R^2 and SDI. In this section we distentangle the return premium attributable to *ARW* from the previously documented return premia of the R^2 and SDI measures, respectively.

Titman and Tiu (2011) find that hedge funds with low exposure to factor risk, i.e., low R^2 funds, tend to outperform hedge funds with high exposure to factor risk, i.e., high R^2 funds. We check whether the return premium due to *ARW* is different from the return premium due to R^2.[3] First, note that the correlation coefficient between *ARW* and R^2 is only −0.09 indicating that both factors are in fact slightly negatively correlated, and thus seem to capture different dimensions of fund's uniqueness or deviation from the benchmark. Then, we conduct dependent portfolio double-sorts based on R^2 and *ARW*. We first form quintile portfolios sorted on R^2. Then, within each R^2 quintile, we sort fund firms into five portfolios based on *ARW*. Panel A of Table 5 reports the results of the equal-weighted future monthly fund firm returns of the $R^2 \times ARW$ portfolios.

[Insert Table 5 around here]

In line with Titman and Tiu (2011) we find that low R^2 funds outperform high R^2 funds. More importantly in our context, we find that, within each R^2 quintile, the return of the high *ARW* fund firms is higher than the return of the low *ARW* fund firms. The spread is significant in all R^2 quintiles except for the lowest one. The average spread in returns (Fung and Hsieh (2004) alphas) between high *ARW* and low *ARW* fund firms after controlling for R^2 amounts to 0.44% (0.47%) per month and is statistically significant at the 5% level. Hence, *ARW* and R^2 seem to capture different return patterns in the cross section of hedge fund returns.

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[3] As defined in Table A.1 of the Appendix and as in Titman and Tiu (2011), we compute the R^2 of fund firm *i* in month *t* on a rolling basis by estimating Fung and Hsieh (2004) seven-factor model over prior 24 months.

Sun, Wang, and Zheng (2012) show that hedge funds which are behaving distinctly from the overall strategy have high future performance. They classify hedge funds according to a strategy distinctiveness index (SDI) which is defined as one minus the correlation between a fund's return and the average return of their strategy group.[4] The higher the SDI, the more distinct the fund's investment strategy. We find that *ARW* and SDI are only modestly correlated with a correlation coefficient of 0.08. Again, we conduct dependent portfolio double-sorts based on SDI and *ARW*. Panel B of Table 5 reports the results of the equal-weighted future monthly fund returns of the SDI × *ARW* portfolios.

As in Sun, Wang, and Zheng (2012), we confirm that high SDI funds outperform low SDI funds. Furthermore, we show that, within each SDI quintile, high *ARW* fund firms outperform low *ARW* fund firms. The average spread between high *ARW* and low *ARW* fund firm returns (Fung and Hsieh alphas) controlling for SDI amounts to 0.48% (0.51%) per month and is statistically significant at the 5% level (1% level). Thus, *ARW* and SDI are distinct predictors for the cross-section of future hedge funds returns.

3.4. Multivariate Evidence

To simultanously control for several control variables at the same time when investigating the impact of *ARW* on future fund firm returns, we estimate Fama and MacBeth (1973) regressions of future fund returns in month *t+1* on *ARW* and fund characteristics in month *t*:

$$r_{i,t+1} = \alpha + \beta_1 ARG_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t}, \tag{2}$$

[4] As defined in Table A.1 of the Appendix, we compute the SDI of fund firm *i* in month *t* based on the strategy definitions in the Union Hedge Fund Database on a rolling basis from regressions using prior 24 months of data.

where $r_{i,t+1}$ denotes fund firm *i'*s reported return in month *t+1* , $ARW_{i,t}$ a fund firm's *absolute return wedge*, and $X_{i,t}$ is a vector of fund firm characteristics. We use the Newey and West (1987) adjustment with 24 lags to adjust standard errors for potential serial correlation. As fund characteristics, all variables defined in Table A.1 of the Appendix are included. Panel A of Table 6 reports the results.

[Insert Table 6 around here]

Our results indicate that controlling for various fund characteristics at the same time, the impact of *ARW* on future fund firm returns is positive and statistically significant. Depending on the specification, the coefficient estimate for *ARW* ranges from 0.333 to 0.384, and are all statistically significant at conventional levels of significance. Hence, a one standard deviation increase of 4.27 for *ARW* over the whole sample period is associated with an annualized increase in future fund firm returns between 1.71% and 1.97%. Note that this impact remains statistically and economically strong when we control for both R^2 and SDI at the same time in column (4) of the panel.

In columns (1) - (6) of Panel B in Table 6, we examine the predictive power of *ARW* in different states of the world and across different time periods. We use the identical regression specification as in model (4) of Panel A, but only report the coefficient estimates of *ARW* for the sake of brevity. We find that the impact is statistically significant both during periods of both high and low economic activity (as measured by the Chicago FED National Activity Index, CFNAI), but economically stronger during economic downturns. The returns associated with *ARW* are economically strong in periods of high and low volatility; however, statistically significant only for the high volatility state. Finally, our results indicate that the impact of *ARW* on future fund firm returns is strong in both subperiods from 1994 - 2003 and 2004 - 2012.

Up to this point we have investigated the ability of *ARW* to predict next month's fund firm returns. A natural question is how far this predictability persists. Furthermore, this question is particularly important to investors who aim to invest in high *ARW* hedge funds: actual long equity portfolio holdings of hedge fund firms are not immediately available to investors but may be disclosed with a delay of 45 days after quarter ends. Panel C reports the results of regressions of future fund firm returns over different horizons on *ARW* after controlling for various fund characteristics measured in month *t*. Horizons range from fund firm return in month *t+1* (our baseline case) to returns in month *t+2*, month *t+3*. We also examine 2-month, 3-month, 6-month, and 12-month future horizon returns. Again, we use a regression specification identical to model (4) of Panel A, but only report the coefficient estimate of *ARW* for the sake of brevity. We find that *ARW* can significantly predict future fund firm returns up to six months into the future. Hence, investors can use the *ARW* to select hedge funds that are likely to perform better in the future, even if long equity positions are disclosed with a delay.

3.5 Robustness Checks

To confirm the results concerning *ARW* and future fund firm returns, we conduct a battery of robustness checks. For this purpose, we examine the stability of our results by (i) using value-weighted hedge fund firm portfolios instead of equal-weighted portfolios, (ii) using only hedge fund firms with a single fund, (iii) restricting our sample to hedge fund firms with an equity long-short strategy, (iv) assigning a delisting return of −1.61% as in

Hodder, Jackwerth, and Kolokolova (2014) to those hedge funds that leave the database, and (v) using the correction method of Getmansky, Lo, and Makarov (2004) to unsmooth hedge fund firm returns. Panel A of Table 7 report the results from univariate portfolio sorts using these robustness checks.

[Insert Table 7 around here]

We only report returns of the (5 – 0) *ARW* difference portfolio, after adjusting for the risk factors in the Fung and Hsieh (2004) seven-factor model. Panel B reports the results of Fama and MacBeth (1973) regressions (as in model (4) of Panel A in Table 6) of future fund firm returns in month *t+1* on *ARW* and different fund characteristics measured in month *t* using the same stability checks as above. We only report the coefficient estimate for *ARW*. Other control variables are included in the regressions, but suppressed in the table. For ease of comparison, we report the baseline results from Tables 4 and 6 in the first column of Panels A and B of Table 7. Across all robustness checks, we continue to find a positive and statistically significant effect of *ARW* on future fund firm returns.

4. Determinants and Sources of the Absolute Return Wedge

4.1 Absolute Return Wedge and Fund characteristics

Section 3 finds that *ARW* is a reliable measure to predict future hedge fund firm returns, both on a short-term and long-term horizon. We now examine the fund characteristics associated with high *ARW*. For this purpose, we estimate the following regression of *ARW* of hedge fund firm *i* in month *t+1* on the characteristics of its funds measured in month *t* using the Fama and MacBeth (1973) methodology:

$$ARG_{i,t+1} = \alpha + \beta_1 X_{i,t} + \varepsilon_{i,t}, \tag{3}$$

where $ARW_{i,t+1}$ denotes fund firm *i*'s *ARW* in month *t+1*, and $X_{i,t}$ is a vector of fund characteristics included in equation (3). To adjust the standard errors for serial correlation, we use the Newey and West (1987) adjustment with 24 lags. Table 8 reports the results.

[Insert Table 8 here]

In regression model (1), we include time-varying fund firm characteristics such as past yearly return, standard deviation, size, fund age, and delta as independent variables. We observe a significantly positive relation between *ARW* and delta, and a significantly negative relation with size and age. Hence, smaller, younger and better-incentivized managers tend to engage in unobserved trading strategies which are not displayed in their disclosed long equity portfolio holdings.

Model (2) includes time-invariant characteristics such as a fund firm's management and incentive fee, minimum investment, lockup and restriction period, as well as indicator variables for offshore domicile, leverage, high watermark, and hurdle rate. We find that *ARW* is significantly positively related to a fund firm's management and incentive fee, minimum investment and lockup period, as well as offshore, leverage, and hurdle rate dummy. Hence, our results are consistent with the idea that managers with greater discretion and leverage can increase the absolute return wedge through investments and trading activity not captured through their disclosed long equity portfolio holdings.

Model (3) includes all fund characteristics together. We continue to observe the previously mentioned relations. Finally, in model (4), we additionally include R^2 and SDI in the regression. As expected, we find that fund firms with high *ARW* show low R^2 measures to systematic hedge fund risk factors and high distinctiveness in their strategies expressed by a high SDI.

4.2 Absolute Return Wedge and Derivative Holdings

So far we have investigated which fund characteristics are related to a fund firm's *ARW*. Now, we take a closer look and examine potential channels through which a fund firm's *ARW* can be affected. First, we inspect the channel of derivatives usage.

We use long call and put option holdings data from 13F filings in the SEC EDGAR database in the sample period from April 1999 to December 2012. We find that during this period 47.9% of firms (i.e., 323 of 675 firms) file at least one long option position. To merge fund firms that disclose their derivative positions quarterly with monthly *ARW* estimates, we again apply the convention that dislosed positions in month *t* are carried forward for the subsequent months *t+1* to *t+3*. Then, we compute for hedge fund firm *i* in month *t*, (i) the number of different stocks on which funds hold call and put positions, (ii) the equivalent number of equity shares underlying these positions (in millions), and (iii) the equivalent value of equity shares underlying these positions (in millions).[5] To mitigate the the influence of outliers, we winsorize the number and value of equity shares at the 1% level. We observe that the average number of different stocks on which call (put) positions are held is 3.21 (3.28),

[5] To illustrate these measures, we provide the following example: A fund firm holds call options on 10,000 shares of stock A that trades at $20 and 5,000 shares of stock B that trades at $30. It holds put options on 20,000 shares of stock C that trades at $40. Then, (i) the number of stocks on which call options are held is 2 and the number of stocks on which put options are held is 1, (ii) the equivalent number of equity shares underlying the call options is 15,000 and the equivalent number of equity shares underlying the put options is 20,000, and (iii) the equivalent value of equity shares underlying the call options is 350,000 and the equivalent value of equity shares underlying the put options is $800,000.

the number of equity shares underlying the put (call) positions is 1.45 (1.49) million, and the value of equity shares underlying the put (call) positions is $15.75 (16.17) million.

We regress *ARW* of hedge fund firm *i* in month *t+1* on its option holdings in month *t* using the Newey and West (1987) adjustment with 24 lags and display the results in Panel A of Table 9.

[Insert Table 9 here]

In specifications (1) through (3), *ARW* is regressed on the number of different call and put options, the number of shares underlying these call and put options, and the value of shares underlying these call and put options, respectively. We observe that the number of shares underlying the put options and the value of shares underlying the put options significantly increase a fund firm's *ARW*, whereas we do not find any significant impact of the call options. These relations remain stable when we include all explanatory variables in one regression as in model (4). In terms of economic significance, we find that a one standard deviation increase in the number of put options (value of shares underlying the put options) enhances a fund firm's *ARW* by 0.63% (0.26%). Overall, these results provide evidence that derivative usage of hedge fund firms, in particular, long put option usage, is an important channel that affects a fund firm's *ARW*.

4.3 Absolute Return Wedge and Confidential Holdings

Another potential channel through which a fund firm's *ARW* can be influenced is the request for confidential treatment for certain portfolio holdings from the SEC. If a request of this confiential treatment is denied, or after the approval period of confidentiality expires, the filers must reveal these holdings by filing "amendments" to their original Form 13F.

However, these amendments are not shown in the Thomson Reuters 13F data and hence not included in our imputed equity portfolio return of fund firms.

We retrieve confidential holdings data from 13F filings in the SEC EDGAR database in the sample period from April 1999 to March 2009. During this time period 14.4% of firms (i.e., 97 of 675 firms) file at least one confidential holdings position. In the same way as for derivative holdings, we apply the convention that dislosed positions in month t are carried forward for the subsequent months $t+1$ to $t+3$. We compute for hedge fund firm i in month t, (i) the number of different confidential positions, (ii) the equivalent number of equity shares underlying these positions (in millions), and (iii) the equivalent value of equity shares underlying these positions (in millions).[6] To mitigate the the influence of outliers, the number and value of equity shares is winsorized at the 1% level. We obtain that the average number of confidential positions is 0.64, the number of equity shares underlying the confidential positions is 0.25 million, and the value of equity shares underlying the confidential positions is \$3.25 million.[7]

We regress *ARW* of hedge fund firm i in month $t+1$ on its confiential holdings in month t using the Newey and West (1987) adjustment with 24 lags. Panel B of Table 9 reports the results. In specifications (1) through (3), we look at the univariate relationships between *ARW* and the number of different confidential positions, the equivalent number of equity shares underlying these positions, and the equivalent value of equity shares underlying

[6] To illustrate these measures, we provide the following example: A fund firm files confidential positions on 10,000 shares of stock A that trades at \$20 and 20,000 shares of stock B that trades at \$30. Then, (i) the number of different confidential positions is 2, (ii) the equivalent number of equity shares underlying these positions is 30,000, and (iii) the equivalent value of equity shares underlying these positions is \$800,000.

[7] These averages are computed over all hedge fund firms and months in the sample period. Conditionally that a fund firm is filing confidentially, the average number of confidential positions is 30.54, the number of equity shares underlying the confidential positions is 11.75 million, and the value of equity shares underlying the confidential positions is \$156.51 million.

these positions. Our results indicate that the value of equity shares underlying the confidential positions significantly increase a fund firm's *ARW*. In model (4) we perform a multivariate regression of *ARW* on the three explanatory variables: We observe significant relations between *ARW* as well as the equivalent number and value of equity shares underlying these confidential positions. In terms of economic significance, we find that a one standard deviation increase in the equivalent number (value) of equity shares underlying the confidential positions increases a fund firm's *ARW* by 0.11% (0.82%). Hence, we obtain empirical evidence that confidential holdings are an important channel that influences a fund firm's *ARW*. Since prior evidence in Agarwal, Jiang, Tang, and Yang (2013) and Aragon, Hertzel, and Shi (2013) shows that more skilled hedge fund managers with private information are more likely to have confidential holdings, it is intuitive to observe that funds with high ARW have a positive relation with the value of such holdings.

5. Conclusion

This paper proposes a new measure of hedge fund's activeness. Our activeness measure is a fund firm's absolute return wedge (ARW) defined as the absolute value of a fund firm's reported return minus its hypothetical portfolio return derived from its disclosed long equity holdings. The ARW measure captures the magnitude of the fund firm's unobserved actions only equity portfolio between reporting dates and the return comtribution of other trading activities such as derivative and short positions.

We document three main findings. First, fund firms with a high ARW outperform their counterparts by more than 6% p.a. after accounting for typical risk factors that explain hedge fund performance. Second, we find that ARW is positively associated with measures of managerial incentives and discretion. Finally, fund firms with greater value of long put options and confidential equity positions that are disclosed with a delay in their regulatory filings show high ARW. Taken together, these results are consistent with better incentivized hedge fund managers being more active and delivering superior performance.

Appendix

Figure A.1: Venn Diagram of the Union Hedge Fund Database

The Union Hedge Fund Database contains a sample of 25,732 hedge funds created by merging four commercial databases: Eureka, HFR, Morningstar, and Lipper TASS. This figure shows the percentage of funds covered by each database individually and by all possible combinations of multiple databases.

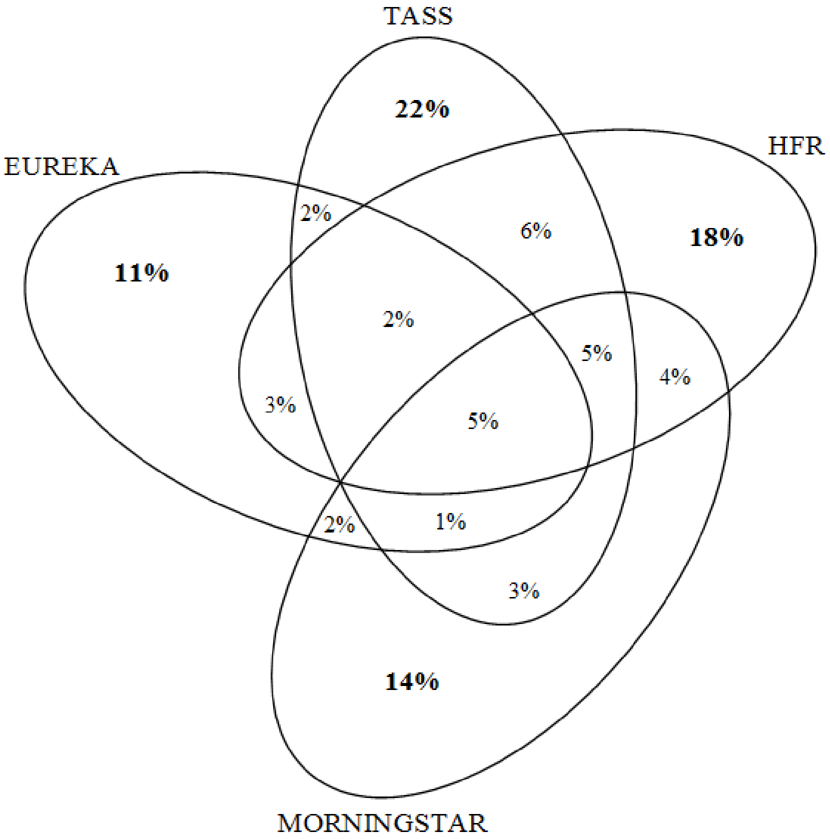

Table A.1: Definitions and Data Sources of Main Variables

This table briefly defines the main variables used in the empirical analysis. The data sources are; (i) UNION: Union Hedge Fund Database constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases, (ii) KF: Kenneth French Data Library, (iii) DH: David A. Hsieh's webpage, (iv) FRS: Data library of the Federal Reserve System, (v) FED: Data library of the Federal Reserve Bank of St.Louis. EST indicates that the variable is estimated or computed based on original variables from the respective data sources.

Panel A: Absolute Return Wedge, Excess Returns, and Fund Characteristics

Variable Name	Description	Source
ARW	Absolute Return Wedge of a hedge fund firm. Computed as the absolute value of a fund firm's reported return minus its imputed equity portfolio return as detailed in Section 2.2.	UNION, EST
Fund Return	Monthly excess return of a hedge fund firm computed as the AUM-weighted excess return over all funds within a fund firm. As risk-free rate, the 1-month T-Bill rate is used.	UNION, KF, EST
Equity PF Return	Value-weighted excess return of a fund firm's disclosed equity holdings as detailed in Section 2.1. As risk-free rate, the 1-month T-Bill rate is used.	UNION, KF, EST
Size	Natural logarithm of the hedge fund firm's asset under management (in million USD).	UNION
Age	The age of a hedge fund firm since its inception (in months).	UNION
Standard Deviation	Standard Deviation of a hedge fund firm’s reported returns over the past 24 months.	UNION, EST
Delta	Hedge fund manager’s delta computed as the expected dollar change in the manager's compensation for a 1% change in the fund’s net asset value (in $100 thousands). Delta per hedge fund firm is computed as the AUM-weighted delta over all funds within a fund firm.	Agarwal, Daniel, and Naik (2009)
Management Fee	The annual hedge fund management fee (in percentage). Computed as the AUM-weighted management fee over all funds within a fund firm.	UNION
Incentive Fee	The annual hedge fund incentive fee (in percentage). Computed as the AUM-weighted incentive fee over all funds within a fund firm.	UNION
Min Investment	Hedge fund’s minimum investment amount (in $100 thousands). Computed as the AUM-weighted minimum investment over all funds within a fund firm.	UNION
Lockup Period	The lockup period of a hedge fund, defined as the minimum amount of time that an investor is required to keep his money invested in the fund (in years). Computed as the AUM-weighted lockup period over all funds within a fund firm.	UNION
Restriction Period	The restriction period of a hedge fund, computed as the sum of its notice period and redemption period (in years). Computed as the AUM-weighted restriction period over all funds within a fund firm.	UNION
Offshore	Indicator variable that takes the value of one if the largest hedge fund in the fund firm is located outside of the USA and zero otherwise.	UNION
Leverage	Indicator variable that takes the value of one if the largest hedge fund in the fund firm uses leverage and zero otherwise.	UNION
HWM	Indicator variable that takes the value of one if the largest hedge fund in the fund firm uses a high-watermark and zero otherwise.	UNION
Hurdle Rate	Indicator variable that takes the value of one if the largest hedge fund in the fund firm uses a hurdle rate and zero otherwise.	UNION

Panel B: Hedge Fund Risk Factors

Variable Name	Description	Source
Market	The CRSP US value-weighted monthly market return,	KF
S&P	The S&P 500 index monthly total return.	DH
SCMLC	The size spread factor, computed as the difference between the Russell 2000 index monthly return and the S&P 500 monthly return.	DH
BD10RET	The bond market factor, computed as the monthly change in the 10-year treasury maturity yield.	FRS
BAAMTSY	The credit spread factor, computed as the monthly change in the Moody's Baa yield less 10-year treasury constant maturity yield.	FRS
PTFSBD	Monthly return on trend-following risk factor in bonds.	DH
PTFSFX	Monthly return on trend-following risk factor in currencies.	DH
PTFSCOM	Monthly return on trend-following risk factor in commodities.	DH
MSCI EM	The MSCI Emerging Market index monthly total return.	DH
SMB	Monthly return on Fama and French (1993) small-minus-big size factor.	KF
HML	Monthly return on Fama and French (1993) high-minus-low value factor.	KF
UMD	Monthly return on Carhart (1997) momentum factor.	KF
PS Liqui	Monthly return on Pástor and Stambaugh (2003) liquidity risk factor.	Pástor and Stambaugh (2003)
Return Macro	Monthly return on Bali, Brown, and Caglayan (2014) macroeconomic uncertainty factor.	Bali, Brown, and Caglayan (2014)
Return Corr	Monthly return on Buraschi, Kosowski, and Trojani (2014) correlation risk factor.	Buraschi, Kosowski, and Trojani (2014)
Return VIX	Monthly relative changes in the CBOE volatility index (VIX).	FED
Return RIX	Monthly return on Gao, Gao, and Song (2014) RIX factor.	Gao, Gao, and Song (2014)
Return Tailrisk	Monthly return on Agarwal, Ruenzi, and Weigert (2017) tail risk factor.	Agarwal, Ruenzi, and Weigert (2017)

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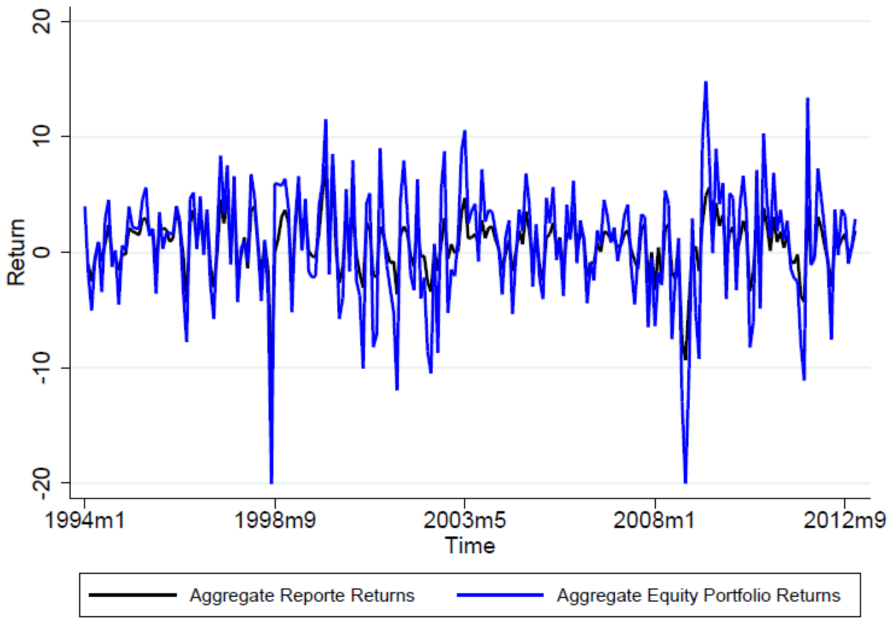
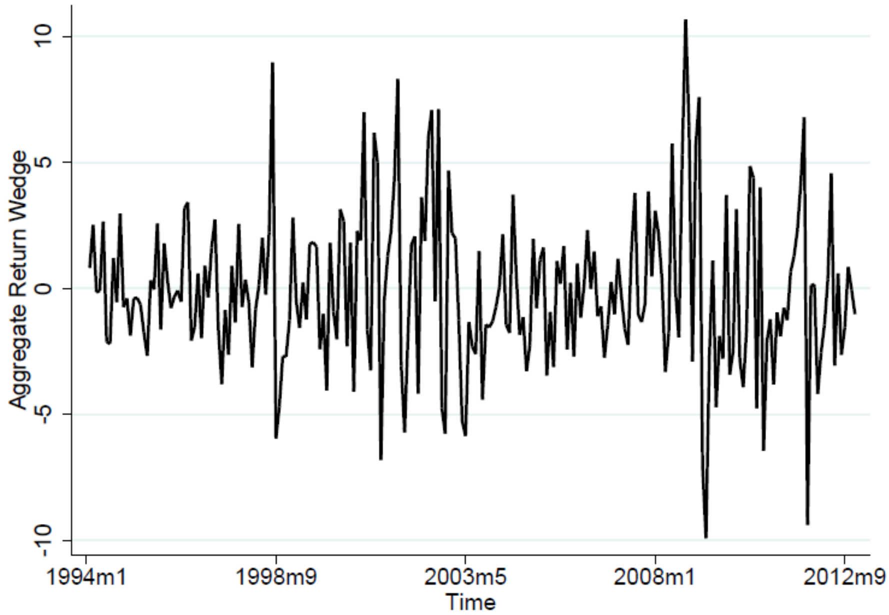
Figure 1: Aggregate Reported Returns, Equity Portfolio Returns, Return Wedge, and Absolute Return Wedge

Panel A displays the evolution of the aggregate reported returns and aggregate equity portfolio returns. Panel B displays the evolution of the aggregate return wedge and Panel C displays the evolution of the aggregate Absolute Return Wedge. Our sample covers hedge fund firms from the Union Hedge Fund Database constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases who report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012.

Panel A: Aggregate Reported Returns and Equity Portfolio Returns



Panel B: Aggregate Return Wedge



Panel C: Aggregate Absolute Return Wedge

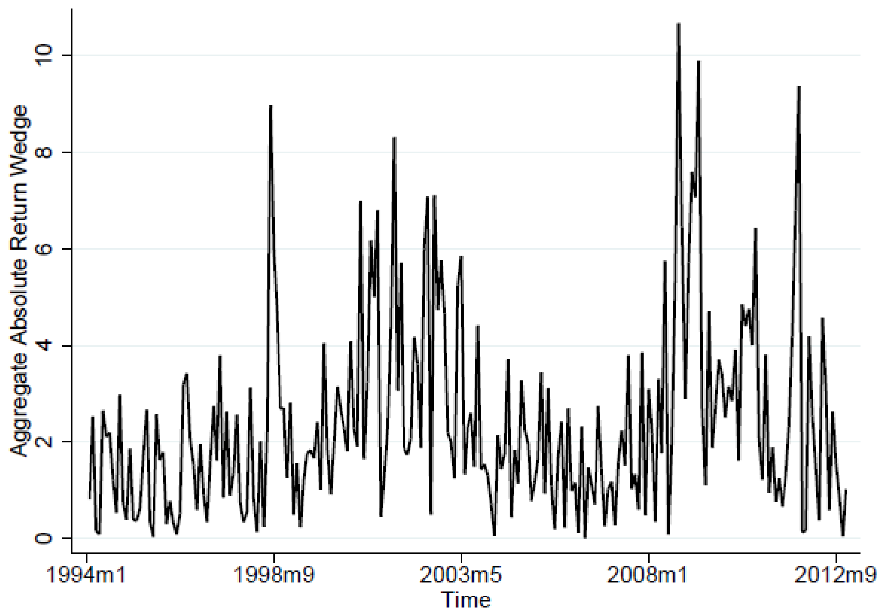


Figure 2: Persistence of the Absolute Return Wedge

This figure displays the evolution of the average equal-weighted Absolute Return Wedge of quintile portfolios. Firms are sorted into quintiles based on their Absolute Return Wedge in month *t*. Then, the equal-weighted average of the Absolute Return Wedge of these portfolios is computed in the following four months. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012.

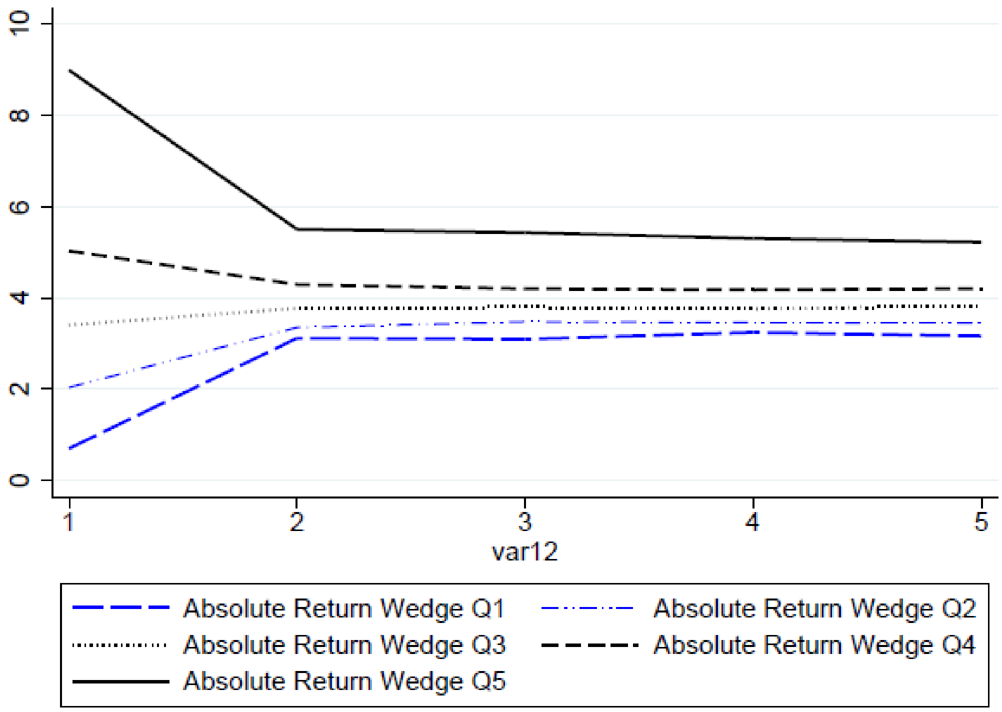


Figure 3: Average Return per Fund and Average Absolute Return Wedge

This figure displays the relation between average monthly return and average Absolute Return Wedge per fund. The estimated underlying univariate regression specification between average monthly return per fund and Absolute Return Wedge is:

$$\text{Fund Return} = 0.21^{***} + 0.059^{***}\ \textit{Absolute Return Wedge}$$

with the coefficient estimate of the intercept showing a *t*-statistic of 2.72 and the coefficient estimate of Absolute Return Wedge displaying a *t*-statistic of 3.57. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012.

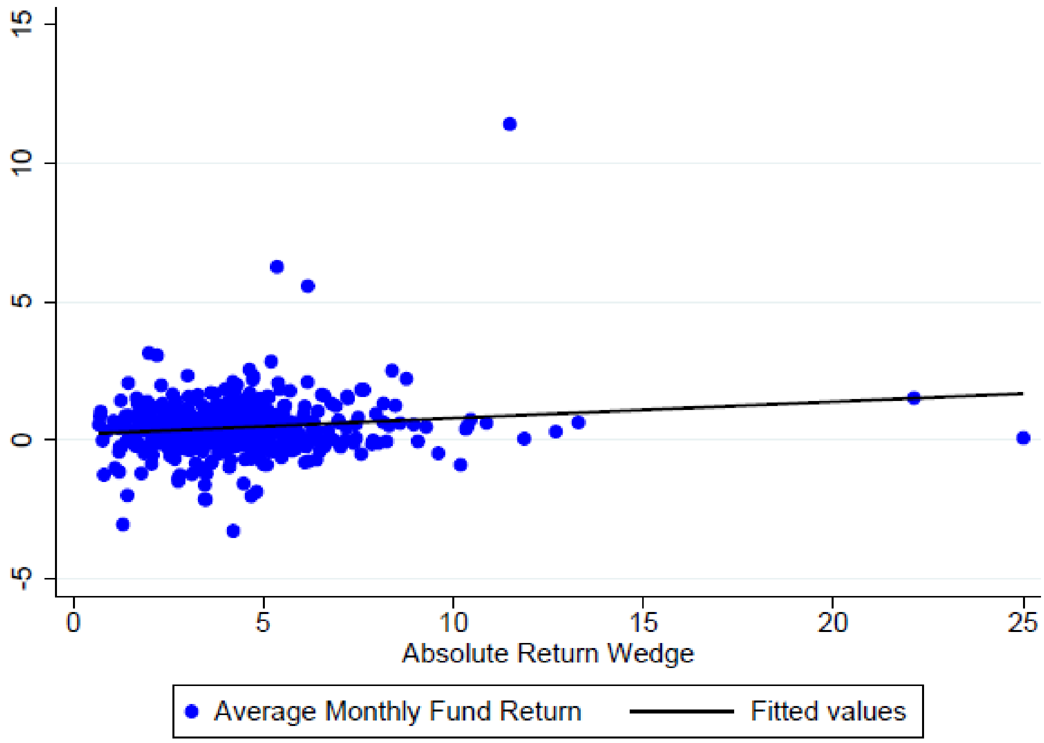


Table 1: Summary Statistics

This table provides summary statistics for the main variables in our empirical study. Panel A displays summary statistics for the monthly excess returns (over the risk-free rate) of hedge funds and fund characteristics. Panel B displays summary statistics for the Absolute Return Wedge. Summary statistics are calculated over all hedge funds and months in our sample period. We also display correlations between Absolute Return Wedge, returns and fund characteristics in Panel C. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012.

Panel A: Returns and Fund Characteristics

Variable	Mean	25%	Median	75%	StdDev
Fund Return	0.49%	-1.09%	0.55%	2.17%	4.43
Equity PF Return	0.61%	-2.70%	0.99%	4.20%	6.90
Size	5.38	4.38	5.53	6.62	1.80
Age (in months)	95.92	45.00	83.00	134.00	66.51
Standard Deviation	3.54	1.76	2.83	4.53	2.59
Delta (in $100 thousands)	5.06	0.47	1.89	6.57	6.84
Management Fee (in %)	1.41	1.00	1.46	1.65	0.52
Incentive Fee (in %)	18.76	20.00	20.0	20.00	4.35
Min Investment (in $100 thousands)	25.23	5.00	10.00	18.54	198.10
Lockup Period (in years)	0.46	0.00	0.22	1.00	0.56
Restriction Period (in years)	0.41	0.21	0.33	0.47	0.28
Offshore	0.42	0.00	0.00	1.00	0.49
Leverage	0.68	0.00	1.00	1.00	0.46
HWM	0.85	1.00	1.00	1.00	0.35
Hurdle Rate	0.32	0.00	0.00	1.00	0.47

Panel B: Absolute Return Wedge

Strategy	Number of Fund Firms	Mean	25%	Median	75%	StdDev
CTA / Managed Futures	11	4.68%	1.71%	3.54%	6.43%	4.18%
Emerging Markets	14	4.06%	1.52%	3.31%	5.49%	3.66%
Event Driven	95	3.65%	1.08%	2.51%	4.73%	4.18%
Global Macro	34	4.78%	1.65%	3.42%	6.27%	4.66%
Equity Long-Short	320	3.63%	1.11%	2.53%	4.87%	3.83%
Equity Long Only	12	3.54%	1.15%	2.48%	4.38%	4.03%
Equity Market Neutral	33	4.22%	1.45%	3.10%	5.62%	4.23%
Multi-Strategy	58	3.87%	1.27%	2.73%	5.31%	3.67%
Relative Value	68	4.99%	1.43%	3.26%	6.39%	6.31%
Short Bias	3	4.11%	1.19%	2.95%	5.81%	3.58%
Sector	17	3.88%	1.20%	2.84%	5.35%	3.80%
Others	10	4.45%	1.58%	3.30%	6.49%	3.86%
All	675	3.92%	1.20%	2.71%	5.20%	4.27%

Table 1: Continued

Panel C: Correlations between Absolute Return Wedge, Returns, and Fund Characteristics

	Absolute Return Wedge	Fund Return	Equity PF Return	Size	Age	Standard Deviation	Delta	Management Fee	Incentive Fee	Min Investment	Lockup Period	Restriction Period	Offshore	Leverage	HWM	Hurdle Rate
Absolute Return Wedge	+1.00															
Fund Return	+0.04	+1.00														
Equity PF Return	+0.02	+0.56	+1.00													
Size	-0.02	-0.01	-0.00	+1.00												
Age	-0.07	-0.02	-0.00	0..27	+1.00											
Std. Dev.	+0.09	+0.04	+0.02	-0.15	+0.03	+1.00										
Delta	+0.02	+0.05	+0.03	+0.62	+0.33	-0.06	+1.00									
Mgmt. Fee	+0.06	+0.00	-0.00	+0.12	-0.04	-0.05	+0.21	+1.00								
Inc. Fee	+0.04	+0.01	-0.00	+0.03	-0.09	-0.01	+0.16	+0.27	+1.00							
Min Inv	+0.01	-0.00	-0.00	+0.04	+0.02	-0.00	+0.02	+0.06	+0.01	+1.00						
Lockup	+0.02	+0.00	+0.01	-0.08	-0.05	+0.06	-0.06	-0.07	+0.17	+0.12	+1.00					
Restriction	+0.01	+0.02	-0.00	+0.09	+0.07	-0.03	+0.17	-0.07	+0.11	+0.04	+0.19	+1.00				
Offshore	+0.05	-0.00	-0.00	+0.17	-0.14	-0.10	+0.17	+0.19	+0.10	-0.04	-0.16	-0.14	+1.00			
Leverage	+0.05	+0.01	+0.01	-0.04	-0.07	+0.06	-0.02	+0.18	+0.18	-0.12	+0.08	-0.00	+0.11	+1.00		
HWM	-0.00	-0.01	-0.00	+0.01	-0.09	-0.04	+0.05	-0.00	-0.00	+0.02	+0.15	+0.19	-0.02	+0.19	+1.00	
Hurdle Rate	+0.03	+0.01	+0.00	-0.13	+0.09	+0.06	-0.14	-0.07	-0.07	-0.03	+0.17	+0.18	-0.52	+0.01	-0.02	+1.00

Table 2: Transition Matrix

This table reports the results of a transition matrix based on Absolute Return Wedge. It shows the relative frequency that a stock is sorted into Absolute Return Wedge quintile portfolio *i* in month *t* given that it was in Absolute Return Wedge quintile portfolio *j* in month *t*-1. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012.

	Qunitile Portfolio 1 (month *t*)	Qunitile Portfolio 2 (month *t*)	Qunitile Portfolio 3 (month *t*)	Qunitile Portfolio 4 (month *t*)	Qunitile Portfolio 5 (month *t*)
Qunitile Portfolio 1 (month *t-1*)	28.68%	23.17%	18.91%	16.43%	12.80%
Qunitile Portfolio 2 (month *t-1*)	23.68%	23.95%	20.45%	18.29%	13.62%
Qunitile Portfolio 3 (month *t-1*)	19.75%	20.48%	22.80%	20.53%	16.44%
Qunitile Portfolio 4 (month *t-1*)	16.10%	18.41%	20.82%	23.40%	21.27%
Qunitile Portfolio 5 (month *t-1*)	13.06%	14.11%	16.82%	21.28%	34.73%

Table 3: Absolute Return Wedge and Future Returns: Univariate Portfolio Sorts

This table reports the results from the analysis of the relation between the Absolute Return Wedge of hedge funds in month *t* and their future monthly excess returns in month *t*+1. Panel A reports the results from equal-weighted univariate portfolio sorts based on Absolute Return Wedge in month *t* and risk-adjusted returns in month *t*+1. In each month *t*, we sort all hedge funds into quintile portfolios based on their Absolute Return Wedge in increasing order. We then compute equally-weighted monthly average excess returns of these portfolios in month *t+1*. The column "Excess Return" reports the average portfolio return in excess of the one-month T-bill rate in the following month. The columns labeled "Car-4-Factor" and "FH-7-Factor" report the monthly alpha using the Carhart (1997) four-factor model and the Fung and Hsieh (2004) seven-factor model. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Portfolio	(1) Absolute Return Wedge	(2) Fund Return	(3) Car-4-Factor	(4) FH-7-Factor
1 (Lowest)	0.69%	0.49%	0.06%	0.07%
			(0.67)	(0.88)
2	2.03%	0.55%	0.22%**	0.23%**
			(2.42)	(2.55)
3	3.39%	0.61%	0.31%***	0.33%***
			(3.52)	(3.55)
4	5.03%	0.71%	0.54%***	0.47%***
			(4.74)	(4.91)
5 (Highest)	9.04%	0.77%	0.59%***	0.60%***
			(4.98)	(4.91)
5-1	8.35%***	0.28%*	0.54%***	0.53%***
	(34.51)	(1.96)	(4.74)	(4.46)

Table 4: Absolute Return Wedge and Future Returns: Univariate Portfolio Sorts with Additional Factors

In this table, we regress the return of a portfolio consisting of funds in portfolio 1 with the lowest Absolute Return Wedge subtracted from the returns of the funds in portfolio 5 with the highest Absolute Return Wedge, on different risk factors. As risk factors, we use in addition to the factors in the Fung and Hsieh (2004) seven-factor model presented in the first column, the MSCI Emerging Markets factor (*MSCI EM*), the Pástor and Stambaugh (2003) traded liquidity factor (*PS Liqui*), and the returns of a long-short hedge fund portfolio with regard to the Bali, Brown, and Caglayan (2014) macroeconomic uncertainty factor (*Return Macro*), the Buraschi, Kosowski, and Trojani (2014) correlation risk factor (*Return CORR*), the VIX (*Return VIX*), the Gao, Gao, and Song (2014) RIX factor (*Return RIX*), and the Agarwal, Ruenzi, and Weigert (2017) tail risk factor. The seven factors in Fung and Hsieh (2004) model include the three trend-following risk factors constructed using portfolios of lookback straddle options on currencies (*PTFSFX*), commodities (*PTFSCOM*), and bonds (*PTFSBD*); two equity-oriented risk factors constructed using excess S&P 500 index returns (*S&P*), and the return difference of Russell 2000 index and S&P 500 index (*SCMLC*); two bond-oriented risk factors constructed using 10-year Treasury constant maturity bond yields (*BD10RET*), and the difference in yields of Moody's Baa bonds and 10-year Treasury constant maturity bonds (*BAAMTSY*), all yields adjusted for the duration to convert them into returns. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012. The sample period is from January 1994 to December 2012. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) 5 - 1 PF	(2) 5 - 1 PF	(3) 5 - 1 PF	(4) 5 - 1 PF	(5) 5 - 1 PF	(6) 5 - 1 PF	(7) 5 - 1 PF	(8) 5 - 1 PF
S&P	-0.271***	-0.309***	-0.272***	-0.268***	-0.319***	-0.408***	-0.273***	-0.336***
	(-10.23)	(-7.86)	(-10.23)	(-10.65)	(-6.62)	(-8.52)	(-11.29)	(-7.29)
SCMLC	-0.0486	-0.0624*	-0.0488	-0.0428	-0.0557	-0.115***	-0.0618**	-0.0708**
	(-1.46)	(-1.78)	(-1.46)	(-1.34)	(-1.61)	(-2.99)	(-2.00)	(-1.99)
BD10RET	-0.000936	0.000456	-0.00142	-0.000805	-0.0110	0.00470	0.0144	0.00934
	(-0.01)	(0.01)	(-0.02)	(-0.01)	(-0.17)	(0.08)	(0.24)	(0.14)
BAAMTSY	0.0377	0.0245	0.0311	0.0424	-0.000319	-0.0219	0.0865	0.0139
	(0.58)	(0.37)	(0.47)	(0.67)	(-0.00)	(-0.35)	(1.41)	(0.21)
PTFSBD	-0.00280	-0.00191	-0.00293	0.00362	-0.000127	-0.000559	-0.00738	-0.00594
	(-0.34)	(-0.23)	(-0.35)	(0.45)	(-0.02)	(-0.07)	(-0.94)	(-0.70)
PTFSFX	-0.00402	-0.00418	-0.00376	-0.00955	-0.00878	-0.00870	-0.00640	-0.00398
	(-0.57)	(-0.59)	(-0.53)	(-1.40)	(-1.29)	(-1.31)	(-0.99)	(-0.57)
PTFSCOM	0.0167*	0.0169*	0.0169*	0.0188**	0.0185**	0.0205**	0.0162**	0.0180**
	(1.86)	(1.89)	(1.88)	(2.19)	(2.15)	(2.44)	(1.98)	(2.01)
MSCI EM		0.0343						
		(1.30)						
PS Liqui			0.0154					
			(0.54)					
Return Macro				0.0503*				
				(1.84)				
Return CORR					0.0544			
					(1.16)			
Return VIX						0.136***		
						(3.34)		
Return RIX							0.116***	
							(4.44)	
Return Tailrisk								0.0838*
								(1.71)
Constant	0.530***	0.530***	0.520***	0.531***	0.574***	0.601***	0.488***	0.500***
	(4.46)	(4.47)	(4.33)	(4.55)	(5.03)	(5.39)	(4.40)	(4.19)
Observations	204	204	204	202	202	202	202	204
Adjusted R^2	0.393	0.398	0.394	0.427	0.421	0.449	0.471	0.402

Table 5: Bivariate Portfolio Sorts

This table reports the results the results of dependent bivariate portfolio sorts based on Absolute Return Wedge and the R^2 measure of Titman and Tiu (2011) as well based on Absolute Return Wedge and the strategy distinctiveness (SDI) measure of Sun, Wang, and Zheng (2012). Panel A reports equal-weighted future average returns of 25 portfolios double-sorted on R^2 and Absolute Return Wedge. First, we form quintile portfolios based on R^2 in month t. Then, within each quintile, we sort hedge funds into quintile portfolios based on Absolute Return Wedge in month t. The last column shows the average of the future return of the respective Absolute Return Wedge quintile portfolio across the R^2 quintiles in month t+1. Panel B reports equal-weighted future average returns of 25 portfolios double-sorted on SDI and Absolute Return Wedge. First, we form quintile portfolios based on SDI in month t. Then, within each quintile, we sort stocks into quintile portfolios based on Absolute Return Wedge in month t. The last column shows the average of the future return of the respective Absolute Return Wedge quintile portfolio across the R^2 quintiles in month t+1. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012. The sample period is from January 1994 to December 2012. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: R^2 and Absolute Return Wedge

	R^2 PF 1	R^2 PF 2	R^2 PF 3	R^2 PF 4	R^2 PF 5	Average
ARW PF 1	0.55%	0.30%	0.10%	0.27%	0.10%	0.26%
ARW PF 2	0.42%	0.49%	0.39%	0.38%	0.30%	0.40%
ARW PF 3	0.43%	0.60%	0.53%	0.49%	0.30%	0.47%
ARW PF 4	0.75%	0.56%	0.72%	0.52%	0.395%	0.59%
ARW PF 5	0.75%	0.82%	0.65%	0.70%	0.61%	0.71%
PF 5 - PF 1	0.20%	0.52%**	0.55%**	0.43%***	0.51%*	0.44**
	(1.11)	(2.36)	(2.52)	(3.18)	(1.67)	(2.17)
FH-7-Factor	0.17%	0.64%***	0.55%**	0.51%***	0.47%*	0.47%**
	(0.92)	(2.97)	(2.54)	(3.68)	(1.64)	(2.35)

Panel B: SDI and Absolute Return Wedge

	SDI PF 1	SDI PF 2	SDI PF 3	SDI PF 4	SDI PF 5	Average
ARW PF 1	0.28%	0.13%	0.29%	0.38%	0.35%	0.29%
ARW PF 2	0.37%	0.35%	0.38%	0.37%	0.48%	0.39%
ARW PF 3	0.29%	0.57%	0.37%	0.51%	0.59%	0.47%
ARW PF 4	0.49%	0.70%	0.56%	0.67%	0.71%	0.63%
ARW PF 5	0.72%	0.66%	0.81%	0.78%	0.84%	0.76%
PF 1 - PF 5	0.44%***	0.53%***	0.52%***	0.40%	0.49%*	0.48%**
	(3.47)	(2.85)	(2.71)	(1.50)	(1.74)	(2.45)
FH-7-Factor	0.66***	0.63***	0.44***	0.35*	0.48**	0.51%***
	(3.67)	(3.56)	(2.82)	(1.71)	(2.45)	(2.84)

Table 6: Absolute Return Wedge and Future Returns: Fama-Macbeth (1973) Regressions

Panel A of this table reports the results of Fama and MacBeth (1973) regressions of excess returns in month *t+1* on Absolute Return Wedge and different fund characteristics in month *t*. For fund characteristics, we include a fund's monthy return, standard deviation (estimated over the previous 24 months), size, age, delta of the incentive fee contract, a fund's management and incentive fee (in %), minimum investment amount (in 100 thousands), the length of a fund's lockup and restriction period (in months), indicator variables that equal one if the fund employs leverage, is an offshore fund, has a hurdle rate and a high water mark, the R2 measure of Titman and Tiu (2011) and the SDI measure of Sun, Wang, and Zheng (2012). In Panel B, we report the results of Fama and MacBeth (1973) regressions of excess returns in month *t+1* on Absolute Return Wedge and different fund characteristics (as in model (4) of Panel A) in times of high/low economic activitiy (based on the Chicago Fed National Activity Index, CFNAI > 0 / CFNAI < 0), high (low) market volatility, and in subsamples in the period from 1996 – 2003 and 2004 – 2012. We compute market volatility as the standard deviation of the CRSP value-weighted market return over the past 24 months. We classify *t* as a high (low) market volatility period if the standard deviation is above (below) the median standard deviation over the whole sample period from 1996 - 2012. Panel C of this table reports the results of Fama and MacBeth (1973) regressions of future excess returns with different horizons on Absolute Return Wedge and different fund characteristics in month *t*. As fund characteristics, we use the same set of variables as in model (4) of Panel A. As the dependent variable we use the one-month ahead, two-months ahead, three-months ahead, six-months ahead, and twelve-months ahead future excess returns. Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012. The sample period is from January 1994 to December 2012. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table 6: Continued

Panel A: Fama-Macbeth (1973) Regressions

	(1) Fund Return	(2) Fund Return	(3) Fund Return	(4) Fund Return
Absolute Return	0.0384***	0.0333*	0.0378**	0.0359**
Wedge	(2.61)	(1.77)	(2.53)	(2.44)
Past Return	0.121***		0.128***	0.142***
	(6.28)		(6.03)	(6.92)
Standard Deviation	0.0545*		0.0436	0.0185
	(1.72)		(1.30)	(0.49)
Size	-0.0741**		-0.0767**	-0.0630*
	(-2.19)		(-2.19)	(-1.77)
Age	0.000171		0.0000970	-0.0000201
	(0.19)		(0.09)	(-0.02)
Delta	0.0154*		0.0145*	0.136*
	(1.66)		(1.77)	(1.78)
Management Fee		-0.0218	0.0665	0.116
		(-0.23)	(0.77)	(1.32)
Incentive Fee		0.000811	-0.00294	-0.00802
		(0.09)	(-0.30)	(-0.76)
Minimum Investment		-0.00136	0.000388	0.00135**
		(-0.95)	(0.54)	(2.16)
Lockup Period		0.125*	0.0841*	0.123*
		(1.88)	(1.78)	(1.65)
Restriction Period		0.0798	0.248**	0.189**
		(0.78)	(2.39)	(1.99)
Offshore		0.0668	0.0731	0.0956
		(0.92)	(1.33)	(1.60)
Leverage		0.0949*	0.0516	0.0232
		(1.93)	(1.21)	(0.62)
High Watermark		-0.103	-0.0556	-0.00808
		(-1.03)	(-0.79)	(-0.11)
Hurdle Rate		0.0705	0.142***	0.166***
		(1.35)	(4.16)	(3.98)
R2				0.440*
				(1.79)
SDI				0.430
				(1.28)
Constant	0.531**	0.474	0.392	0.704*
	(2.38)	(1.65)	(1.36)	(1.78)
Observations	39448	32041	27982	23730
Adjusted R^2	0.246	0.128	0.323	0.344

Table 6: Continued

Panel B: Returns associated with Absolute Return Wedge in Different States of the World

	(1) CFNAI > 0	(2) CFNAI < 0	(3) High Market Volatility	(4) Low Market Volatility	(5) Subsample 1994 - 2003	(6) Subsample 2004 - 2012
Absolute Return Wedge	0.0269*	0.0379**	0.0402***	0.0353	0.0556***	0.0325**
	(1.79)	(2.39)	(2.73)	(1.55)	(2.81)	(2.53)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9521	14209	12333	11397	7135	16595
Adjusted R^2	0.322	0.360	0.362	0.320	0.406	0.301

Panel C: Longer-Term Returns

	(1) Fund Return *t+1*	(2) Fund Return *t+2*	(3) Fund Return *t+3*	(4) Fund Return Two-months	(5) Fund Return Three-months	(6) Fund Return Six months	(7) Fund Return Twelve months
Absolute Return Wedge	0.0359**	0.0247**	0.0169**	0.0593**	0.0806**	0.103**	0.166
	(2.44)	(2.01)	(1.98)	(2.31)	(2.32)	(2.12)	(1.56)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23730	23423	23107	20891	20658	19976	18604
Adjusted R^2	0.344	0.327	0.323	0.340	0.339	0.342	0.360

Table 7: Absolute Return Wedge and Hedge Fund Performance: Robustness Checks

This table reports the results from robustness checks of the relation between Absolute Return Wedge of hedge funds in month *t* and their monthly excess returns in month *t+1*. We investigate the robustness if we apply a value-weighted sorting procedure instead of an equal-weighted sorting procedure, use only single hedge fund firms in the analysis, restrict our sample to hedge fund firms with an equity long-short strategy, assign a delisting return of –1.61% to those hedge funds that leave the database, and use the correction method of Getmansky, Lo, and Makarov (2004) to unsmooth hedge fund returns. Panel A displays the results of from the same univariate portfolio sorts as in Table 3, risk-adjusted for the Fung and Hsieh seven-factor model. Panel B reports the results of Fama and MacBeth (1973) regressions as in Table 6 of future excess returns in month *t+1* on Absolute Return Wedge and different fund characteristics measured in month *t.* Our sample is the intersection of hedge fund firms from the Union Hedge Fund Database (constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases) and firms that report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012. The sample period is from January 1994 to December 2012. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. We only display the results of the relation between *Absolute Return Wedge* and future excess returns (control variables are included but suppressed in the table).

Panel A: Portfolio Sorts

	(1) Baseline	(2) Value-Weighted	(3) Single Hedge Funds	(4) Only Equity Long-Short Fund Firms	(5) Delisting Return	(6) Return Smoothing
5 - 1 PF	0.53%***	0.36%*	0.62%***	0.58%***	0.52%***	0.38%***
	(4.46)	(1.83)	(3.32)	(3.14)	(4.41)	(2.97)

Panel B: Fama-MacBeth Regressions

	(1) Baseline	(2) Value-Weighted	(3) Single Hedge Funds	(4) Only Equity Long-Short Fund Firms	(5) Delisting Return	(6) Return Smoothing
Absolute	0.0359**	0.0354**	0.0429***	0.0521***	0.0332**	0.0287**
Return Wedge	(2.44)	(2.32)	(2.76)	(3.07)	(2.25)	(2.01)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23730	23582	6284	13638	23730	23730
Adjusted R^2	0.344	0.344	0.473	0.481	0.344	0.349

Table 8: Determinants of the Absolute Return Wedge

This table reports the results of Fama and MacBeth (1973) regressions of Absolute Return Wedge in month *t+1* on fund characteristics in month *t*. For fund characteristics, we include a fund's monthy return, standard deviation (estimated over the previous 24 months), size, age, delta of the incentive fee contract, a fund's management and incentive fee (in %), minimum investment amount (in 100 thousands), the length of a fund's lockup and restriction period (in months), indicator variables that equal one if the fund employs leverage, is an offshore fund, has a hurdle rate and a high water mark, respectively, and zero otherwise, the R2 measure of Titman and Tiu (2011) and the SDI measure of Sun, Wang, and Zheng (2012). Our sample covers hedge fund firms from the Union Hedge Fund Database constructed from combining the Eureka, HFR, Morningstar, and Lipper TASS databases who report 13F long equity holdings to the SEC. The sample period is from January 1994 to December 2012. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Absolute Return Wedge	(2) Absolute Return Wedge	(3) Absolute Return Wedge	(3) Absolute Return Wedge
Past Return	0.0185		0.0219	0.0120
	(1.25)		(1.50)	(0.94)
Standard Deviation	0.0898**		0.104***	0.0915***
	(2.16)		(2.72)	(2.80)
Size	-0.0627*		-0.0965*	-0.0361
	(-1.83)		(-1.88)	(-0.98)
Age	-0.00515***		-0.00478***	-0.00458***
	(-7.12)		(-7.06)	(-4.59)
Delta	0.0448***		0.0286***	0.0216***
	(5.37)		(2.91)	(4.01)
Management Fee		0.331**	0.394***	0.441***
		(2.43)	(3.50)	(4.89)
Incentive Fee		0.0424***	0.0240*	0.00755
		(3.94)	(1.69)	(0.40)
Minimum		0.00671***	0.00791***	0.00778***
Investment		(3.68)	(3.84)	(5.05)
Lockup Period		0.255***	0.260***	0.381***
		(2.87)	(3.17)	(4.26)
Restriction Period		-0.255	-0.165	-0.0764
		(-1.28)	(-0.79)	(-0.30)
Offshore		0.455***	0.445***	0.361***
		(4.24)	(5.05)	(3.21)
Leverage		0.152*	0.132*	0.116*
		(1.74)	(1.79)	(1.88)
High Watermark		0.115	-0.00840	0.124
		(1.31)	(-0.09)	(0.95)
Hurdle Rate		0.259**	0.429***	0.352**
		(2.30)	(3.86)	(2.20)
R^2				-1.939***
				(-5.85)
SDI				0.223*
				(1.80)
Constant	4.495***	2.194***	3.194***	4.129***
	(8.55)	(5.34)	(4.98)	(6.11)
Observations	39446	32040	27982	23731
Adjusted R^2	0.082	0.100	0.180	0.205

Table 9: Trading Strategies Associated with Absolute Return Wedge

Panel A of this table reports the results of Fama and MacBeth (1973) regressions of Absolute Return Wedge of hedge fund firm *i* in month *t+1* on hedge fund firm *i*'s long positions in call and put options in month *t*. We compute a hedge fund firm *i*'s number of different stocks on which call positions are held (*Number of Different Call Positions*), number of different stocks on which put positions are held (*Number of Different Put positions*), the number of equity shares underlying the call positions (*Number of Equity Shares Underlying the Call Positions*, in millions), the number of equity shares underlying the put positions (*Number of Equity Shares Underlying the Put Positions*, in millions), the value of equity shares underlying the call positions (*Value of Equity Shares Underlying the Call Positions*, in millions of dollars), and the value of equity shares underlying the put positions (*Value of Equity Shares Underlying the Put Positions*, in millions of dollars). Our sample covers hedge fund firms from the Union Hedge Fund Database constructed from combining the Eureka, Hedge Fund Research, Morningstar, and Lipper TASS databases that report long call and put positions to the Securities and Exchange Commission in their 13F filings. The sample period is from April 1999 to December 2012. Panel B of this table reports the results of Fama and MacBeth (1973) regressions of Absolute Return Wedge of hedge fund firm *i* in month *t+1* on hedge fund firm *i*'s confidential 13F positions in month *t*. Confidential holdings are quarter-end equity holdings that are disclosed with a delay through amendments to form 13F. We compute a hedge fund firm *i*'s number of different confidential holding stocks (*Number of Different Confidential Holdings*), the number of equity shares underlying the confidential holdings (*Number of Equity Shares Underlying the Confidential Holdings*, in millions), and the value of equity shares underlying the confidential holdings positions (*Value of Equity Shares Underlying the Confidential Holdings*, in millions of dollars). Our sample covers hedge fund firms from the Union Hedge Fund Database constructed from combining the Eureka, Hedge Fund Research, Morningstar, and Lipper TASS databases that report confidentially to the Securities and Exchange Commission in their 13F filing amendments. The sample period for long derivate holdings is from April 1999 to December 2012, the sample period for confidential holdings is from April 1999 to March 2009. We use the Newey-West (1987) adjustment with 24 lags to adjust the standard errors for serial correlation. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Derivatives

Derivatives holdings–based variables	(1) Absolute Return Wedge	(2) Absolute Return Wedge	(3) Absolute Return Wedge	(4) Absolute Return Wedge
Number of Different Call Positions	-0.0130			-0.0212
	(-1.09)			(-1.30)
Number of Different Put Positions	0.0238*			0.0237*
	(1.70)			(1.66)
Number of Equity Shares Underlying the Call Positions		0.0152		-0.0653
		(0.48)		(-0.37)
Number of Equity Shares Underlying the Put Positions		0.0716		0.0773
		(1.48)		(0.54)
Value of Equity Shares Underlying the Call Positions			-0.000934	0.00118
			(-0.94)	(0.28)
Value of Equity Shares Underlying the Put Positions			0.00183*	0.00186**
			(1.90)	(1.99)
Constant	4.041***	4.032***	4.034***	4.032***
	(9.75)	(9.79)	(9.73)	(9.72)
Observations	41539	41539	41539	41539
Adjusted R^2	0.006	0.009	0.009	0.022

Panel B: Confidential Holdings

Confidential holdings variable	(1) Absolute Return Wedge	(1) Absolute Return Wedge	(1) Absolute Return Wedge	(1) Absolute Return Wedge
Number of Different Confidential Holdings	0.0434			-0.0197
	(0.89)			(-0.24)
Number of Equity Shares Underlying the Confidential Holdings		0.0417		0.0365*
		(1.45)		(1.83)
Value of Equity Shares Underlying the Confidential Holdings			0.00631*	0.0137**
			(1.87)	(2.15)
Constant	4.098***	4.099***	4.100***	4.096***
	(21.22)	(21.23)	(21.24)	(21.21)
Observations	28781	28781	28781	28781
Adjusted R^2	0.003	0.003	0.003	0.009