
Hedge Funds

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Foundations and Trends[®] in Finance

Published, sold and distributed by:

now Publishers Inc.
PO Box 1024
Hanover, MA 02339
USA
Tel. +1 (781) 871 0245
www.nowpublishers.com
sales@nowpublishers.com

Outside North America:

now Publishers Inc.
PO Box 179
2600 AD Delft
The Netherlands
Tel. +31-6-51115274

A Cataloging-in-Publication record is available from the Library of Congress.

Printed on acid-free paper

ISBN: 1-933019-17-4; ISSNs: Paper version 1567-2395; Electronic version 1567-2409

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Introduction¹

In this survey, we attempt to summarize and provide an overview of the academic research on hedge funds and commodity trading advisors (CTAs). The hedge fund industry has grown tremendously over the recent years. It is difficult to accurately estimate the true size of the hedge fund industry since the Securities and Exchange Commission (SEC) imposes restrictions on advertising for hedge funds. One of the hedge fund advisory firms, Hedge Fund Research (HFR), estimates that the total assets under management (AUM) of hedge funds have increased from USD 39 million in 1990 to about USD 972 million in 2004. During this period, the total number of hedge funds has gone up from 610 in 1990 to 7,436 in 2004. Furthermore, the allocation between different hedge fund strategies has also changed significantly during the same period. In 1990, the macro strategy dominated the industry with 71% of total assets under management while in 2004; their share was only 11%. Instead, in 2004, Equity Hedge strategy had the largest share of AUM – 29%.² There has also been a shift in the average

¹ N.Y. Naik is thankful to the BNP Paribas Hedge Fund Centre at the London Business School and both authors are very grateful to Maria Strömqvist for excellent research assistance. They are responsible for all errors.

² Source: Hedge Fund Research (HFR) – <www.hedgefundresearch.com>

2 Introduction

investor in hedge funds from an individual investor to an institutional investor. In the early 1990s, the typical investor was a high net-worth individual investor who invested in macro funds, which then took levered bets on currencies and other assets. Today, the typical investor is an institutional investor, for example a pension fund, which invests in hedge funds for diversification reasons, seeking investment vehicles with low correlation with other traditional asset classes such as equities and bonds.

Though hedge funds have gained popularity in the last fifteen years or so with the rise of star hedge fund managers such as George Soros and Julian Robertson, they have been in existence for more than 50 years now. The first hedge fund is believed to be started by a former Fortune magazine writer named Alfred Winslow Jones. He employed a then novel idea of taking both long and short positions in stocks to “hedge” out the market risk. Using this strategy cleverly by buying undervalued securities and selling overvalued securities, his fund returned a whopping 670% return between May 1955 and May 1965.³ Although Jones’ original fund used “long-short” strategy to hedge, today not all the hedge funds necessarily hedge. In fact, there is no universally accepted definition of hedge funds. They can now be identified by their exemption from the Investment Company Act of 1940 and the unique compensation structure.

Given the enormous growth of this industry and the limited information available on hedge funds, a need for research has emerged from both investors’ and regulators’ point of view. Investors need research to better understand what they are investing in and what risks they are exposed to. Research on hedge funds may also help investors recognize what diversification benefits, if any, hedge funds offer in combination with investments in equity and bonds. Regulators need research to identify if there is a need for regulation to protect investors’ interests and what impact hedge funds may have on the stability of the financial markets.

The rest of the paper is outlined as follows. The first part of the paper summarizes the research on hedge fund performance, including

³ Source: Joseph Nocera, “The Quantitative, Data-Based, Risk-Massaging Road to Riches”, *New York Times*, June 5, 2005.

comparison of risk-return characteristics of hedge funds with those of mutual funds, factors driving hedge fund returns, and persistence in hedge fund performance. The second part of the paper covers research regarding the unique contractual features and characteristics of hedge funds and their influence on the risk-return tradeoffs. The third part of the paper reviews the research on the role of hedge funds in a portfolio including the extent of diversification benefits and limitations of standard mean-variance framework for asset allocation. Finally, the last part of the paper summarizes the research on the biases in hedge fund databases.

References

- [1] C. Ackermann, R. McEnally, and D. Ravenscraft, "The performance of hedge funds: Risk, return and incentives," *Journal of Finance*, vol. 54, no. 3, pp. 833–874, 1999.
- [2] V. Agarwal and Narayan Y. Naik, "Multi-period performance persistence analysis of hedge funds," *Journal of Financial and Quantitative Analysis*, vol. 35, no. 3, pp. 327–342, 2000.
- [3] V. Agarwal and Narayan Y. Naik, "Generalised style analysis of hedge funds," *Journal of Asset Management*, vol. 1, no. 1, pp. 93–109, 2000.
- [4] V. Agarwal and Narayan Y. Naik, "On taking the alternative route: Risks, rewards and performance persistence of hedge funds," *Journal of Alternative Investments*, vol. 2, no. 4, pp. 6–23, 2000.
- [5] V. Agarwal and Narayan Y. Naik, "Risks and portfolio decisions involving hedge funds," *Review of Financial Studies*, vol. 17, no. 1, pp. 63–98, 2004.
- [6] V. Agarwal, Naveen D. Daniel, and Narayan Y. Naik, "Role of managerial incentives, flexibility, and ability: Evidence from performance and money flows in hedge funds," Working Paper, Georgia State University and London Business School, 2005.
- [7] V. Agarwal, William H. Fung, Yee Cheng Loon, and Narayan Y. Naik, "Risks in hedge fund strategies: Case of convertible arbitrage," Working Paper, Georgia State University and London Business School, 2005.
- [8] G. J. Alexander and A. M. Baptista, "Conditional expected loss as a measure of risk: Implications for portfolio selection," Working Paper, University of Arizona, 2002.
- [9] G. S. Amin and H. M. Kat, "Portfolios of hedge funds: What investors really invest in," Working Paper, City University and University of Reading, 2002.

64 *References*

- [10] G. S. Amin and H. M. Kat, "Stocks, bonds and hedge funds: Not a free lunch!," Working Paper, City University and University of Reading, 2002.
- [11] G. Amin and H. Kat, "Welcome to the dark side: Hedge fund attrition and survivorship bias over the period 1994–2001," Working Paper, ISMA Centre, University of Reading, 2002.
- [12] G. S. Amin and H. M. Kat, "Hedge fund performance 1990–2000: Do the money machines really add value?," *Journal of Financial and Quantitative Analysis*, vol. 38, no. 2, pp. 251–274, 2003.
- [13] M. J. P. Anson, "Hedge fund incentive fees and the 'free option'," *Journal of Alternative Investments*, Fall, pp. 43–48, 2001.
- [14] G. O. Aragon, "Timing multiple markets: Theory and evidence," Working Paper, Boston College, 2003.
- [15] G. O. Aragon, "Share restrictions and asset pricing: Evidence from the hedge fund industry," Working Paper, Boston College, 2004.
- [16] C. Asness, R. Krail, and J. Liew, "Do hedge funds hedge?," *Journal of Portfolio Management*, vol. 28, no. 1, pp. 6–19, 2001.
- [17] W. Bailey, H. Li, and X. Zhang, "Hedge fund performance evaluation: A stochastic discount factor approach," Working Paper, Cornell University, 2004.
- [18] T. G. Bali, S. Gokcan, and B. Liang, "Value at risk and the cross section of hedge fund returns," Working Paper, Baruch College and University of Massachusetts, Amherst, 2005.
- [19] P.-A. Barès, R. Gibson, and S. Gyger, "Performance in the hedge funds industry: An analysis of short- and long-term persistence," *Journal of Alternative Investments*, Winter, pp. 25–41, 2003.
- [20] P.-A. Barès, R. Gibson, and S. Gyger, "Style consistency and survival probability in the hedge funds' industry," Working Paper, Swiss Banking Institute, 2001.
- [21] G. Baquero, J. ter Horst, and M. Verbeek, "Survival, look-ahead bias, and the persistence in hedge fund performance," *Journal of Financial and Quantitative Analysis*, vol. 40, no. 3, pp. 493–517, 2005.
- [22] Z. Bodie, A. Kane, and A. J. Marcus, *Investments*, McGraw-Hill Companies Inc., 2002.
- [23] O. Bondarenko, "Market price of variance risk and performance of hedge funds," Working Paper, University of Illinois, Chicago, 2004.
- [24] N. M. Boyson, "Another look at career concerns: A study of hedge fund managers," Working Paper, Northeastern University, 2005.
- [25] N. M. Boyson and M. J. Cooper, "Do hedge funds exhibit performance persistence? A new approach," Working Paper, Northeastern University and Purdue University, 2004.
- [26] C. Brooks and H. M. Kat, "The statistical properties of hedge fund index returns and their implications for investors," Working Paper, City University, 2001.
- [27] S. J. Brown and W. N. Goetzmann, "Performance persistence," *Journal of Finance*, vol. 50, pp. 679–698, 1995.
- [28] S. J. Brown and W. N. Goetzmann, "Hedge funds with style," *Journal of Portfolio Management*, vol. 29, no. 2, pp. 101–112, 2003.

- [29] S. J. Brown, W. N. Goetzmann, and R. G. Ibbotson, "Offshore hedge funds: Survival and performance 1989–1995," *Journal of Business*, vol. 72, no. 1, pp. 91–117, 1999.
- [30] S. J. Brown, W. N. Goetzmann, and B. Liang, "Fees on fees in funds of funds," *Journal of Investment Management*, vol. 2, no. 4, pp. 39–46, 2004.
- [31] S. J. Brown, W. N. Goetzmann, and J. Park J., "Careers and survival: Competition and risk in the hedge fund and CTA industry," *Journal of Finance*, vol. 56, no. 5, pp. 1869–1886, 2001.
- [32] M. K. Brunnermeier and S. Nagel, "Hedge funds and the technology bubble," *Journal of Finance*, vol. 59, no. 5, pp. 2013–2040, 2004.
- [33] M. Carhart, "On persistence in mutual fund performance," *Journal of Finance*, vol. 52, no. 1, pp. 57–82, 1997.
- [34] N. Chan, M. Getmansky, S. M. Haas, and A. W. Lo, "Systemic risk and hedge funds," Working Paper, MIT and University of Massachusetts, Amherst, 2005.
- [35] Y. Chen, "Timing ability in the focus market of hedge funds," Working Paper, Boston College, 2004.
- [36] J. Cvitanic, A. Lazrak, L. Martellini, and F. Zapatero, "Optimal investment in alternative portfolio strategies," Working Paper, University of Southern California, 2001.
- [37] R. J. Davies, H. M. Kat, and S. Lu, "Fund of hedge funds portfolio selection: A multiple-objective approach," Working Paper, City University, 2004.
- [38] R. J. Davies, H. M. Kat, and S. Lu, "Single strategy funds of hedge funds," Working Paper, City University, 2004.
- [39] A. B. Dor and R. Jagannathan, "Understanding mutual fund and hedge fund styles using return based style analysis," Working Paper, Northwestern University, 2002.
- [40] A. B. Dor, R. Jagannathan, and Iwan Meier, "Understanding mutual funds and hedge funds styles using return-based style analysis," *Journal of Investment Management*, vol. 1, no. 1, pp. 97–137, 2003.
- [41] F. R. Edwards and M. O. Caglayan, "Hedge fund performance and manager skill," *Journal of Futures Markets*, vol. 21, no. 11, pp. 1003–1028, 2001.
- [42] B. Eichengreen and D. Mathieson, "Hedge funds and financial market dynamics," Occasional Paper 166, International Monetary Fund, 1998.
- [43] W. Fung and D. A. Hsieh, "Empirical characteristics of dynamic trading strategies: The case of hedge funds," *Review of Financial Studies*, vol. 10, no. 2, pp. 275–302, 1997.
- [44] W. Fung and D. A. Hsieh, "Survivorship bias and investment style in the returns of CTAs," *Journal of Portfolio Management*, vol. 24, no. 1, pp. 30–41, 1997.
- [45] W. Fung and D. A. Hsieh, "Is mean-variance analysis applicable to hedge funds?," *Economic Letters*, vol. 62, no. 1, pp. 53–58, 1999.
- [46] W. Fung and D. A. Hsieh, "Measuring the market impact of hedge funds," *Journal of Empirical Finance*, vol. 7, no. 1, pp. 1–36, 2000.
- [47] W. Fung and D. A. Hsieh, "Performance characteristics of hedge funds and CTA funds: Natural versus spurious biases," *Journal of Financial and Quantitative Analysis*, vol. 35, no. 3, pp. 291–307, 2000.

66 *References*

- [48] W. Fung and D. A. Hsieh, "The risk in hedge fund strategies: Theory and evidence from trend followers," *Review of Financial Studies*, vol. 14, no. 2, pp. 313–341, 2001.
- [49] W. Fung and D. A. Hsieh, "Asset-based factors for hedge funds," *Financial Analysts Journal*, vol. 58, no. 5, pp. 16–27, 2002.
- [50] W. Fung and D. A. Hsieh, "Hedge-fund benchmarks: Information content and biases," *Financial Analysts Journal*, vol. 58, no. 1, pp. 22–34, 2002.
- [51] W. Fung and D. A. Hsieh, "Risk in fixed-income hedge fund styles," *Journal of Fixed Income*, vol. 12, no. 2, pp. 1–21, 2000.
- [52] W. Fung and D. A. Hsieh, "Extracting portable alphas from equity long/short hedge funds," *Journal of Investment Management*, vol. 2, no. 4, pp. 1–19, 2004.
- [53] W. Fung and D. A. Hsieh, "Hedge fund benchmarks: A risk based approach," *Financial Analysts Journal*, vol. 60, no. 5, pp. 65–80, 2004.
- [54] W. Fung, D. Hsieh, N. Naik, and T. Ramadorai, "Lessons from a decade of hedge fund performance: Is the party over or the beginning of a new paradigm?," Working Paper, Duke University and London Business School, 2005.
- [55] H.-G. Fung, X. E. Xu, and J. Yau, "Global hedge funds: Risk, return, and market timing," *Financial Analysts Journal*, pp. 19–30, Nov/Dec, 2002.
- [56] M. Getmansky, "The life cycle of hedge funds: Fund flows, size and performance," Working Paper, University of Massachusetts, Amherst, 2004.
- [57] M. Getmansky, A. W. Lo, and I. Makarov, "An econometric model of serial correlation and illiquidity in hedge fund returns," *Journal of Financial Economics*, vol. 74, no. 3, pp. 529–609, 2004.
- [58] M. Getmansky, A. W. Lo, and S. X. Mei, "Sifting through the wreckage: Lessons from recent hedge-fund liquidations," Working Paper, MIT and University of Massachusetts, Amherst, 2004.
- [59] D. Giamouridis and I. D. Vrontos, "Hedge funds portfolio construction: A dynamic approach," Working Paper, Athens University of Economics and Business and City University, 2005.
- [60] W. N. Goetzmann, J. E. Ingersoll, and S. A. Ross, "High-water marks and hedge fund management contracts," *Journal of Finance*, vol. 58, no. 4, pp. 1685–1717, 2003.
- [61] W. N. Goetzmann, J. E. Ingersoll, M. Spiegel, and I. Welch, "Sharpening sharpe ratios," Working Paper, Yale University, 2002.
- [62] Mark Grinblatt and Sheridan Titman, "Mutual fund performance: An analysis of quarterly portfolio holdings," *Journal of Business*, vol. 62, pp. 393–416, 1989.
- [63] A. Gupta and B. Liang, "Do hedge funds have enough capital? A value-at-risk approach," *Journal of Financial Economics*, vol. 77, pp. 219–253, 2005.
- [64] N. Hagelin and B. Pramborg, "Evaluating gains from diversifying into hedge funds using dynamic investment strategies," Working Paper, Stockholm University, 2003.
- [65] M. J. Howell, "Fund age and performance," *Journal of Alternative Investments*, vol. 4, no. 2, Fall, pp. 57–60, 2001.
- [66] P. Jorion, "Risk management lessons from Long-Term Capital Management," *European Financial Management*, vol. 6, no. 3, pp. 277–300, 2000.
- [67] H. M. Kat and F. Menexe, "Persistence in hedge fund performance: The true value of a track record," Working Paper, City University, 2002.

- [68] H. Kazemi and T. Schneeweis, "Hedge funds: Stale prices revisited," Working Paper, University of Massachusetts, Amherst, 2004.
- [69] F. Koh, W. T. H. Koh, and M. Teo, "Asian hedge funds: Return persistence style and fund characteristics," Working Paper, Singapore Management University, 2003.
- [70] R. Kosowski, N. Y. Naik, and M. Teo, "Is stellar hedge fund performance for real?," Working Paper, INSEAD, London Business School, and Singapore Management University, 2004.
- [71] R. Kouwenberg and W. T. Ziemba, "Incentives and risk taking in hedge funds," Working Paper, Erasmus University and University of British Columbia, 2004.
- [72] F.-S. Lhabitant and M. Learned, "Hedge fund diversification: How much is enough?," Working Paper, Thunderbird School of Management, 2002.
- [73] B. Liang, "On the performance of hedge funds," *Financial Analysts Journal*, vol. 55, no. 4, pp. 72–85, 1999.
- [74] B. Liang, "Hedge funds: The living and the dead," *Journal of Financial and Quantitative Analysis*, vol. 35, no. 3, pp. 309–326, 2000.
- [75] B. Liang, "The accuracy of hedge fund returns," *Journal of Portfolio Management*, vol. 29, no. 3, pp. 111–122, 2003.
- [76] B. Liang, "Alternative investments: CTAs, hedge funds and fund-of-funds," Working Paper, University of Massachusetts, Amherst, 2003.
- [77] J. Liew, "Hedge fund index investing examined," *Journal of Portfolio Management*, vol. 29, no. 2, pp. 113–123, 2003.
- [78] A. W. Lo, "The statistics of Sharpe Ratios," *Financial Analysts Journal*, vol. 58, no. 4, pp. 36–52, 2002.
- [79] A. W. Lo, "Risk management for hedge funds: Introduction and overview," *Financial Analysts Journal*, vol. 57, no. 6, pp. 16–33, 2001.
- [80] A. Lucas and A. Siegmann, "Explaining hedge fund investment strategies by management reward structures," Working Paper, Vrije Universiteit, Amsterdam, 2002.
- [81] A. Lucas and A. Siegmann, "Hedge fund payoffs and loss aversion," Working Paper, Vrije Universiteit, Amsterdam, 2003.
- [82] B. Maillet and P. Rousset, "Classifying hedge funds: An application of kohonen map," Working Paper, University of Paris, Pantheon-Sorbonne, 2001.
- [83] Burton Malkiel, "Returns from investing in equity mutual funds 1971 to 1991," *Journal of Finance*, vol. 50, pp. 549–572, 1995.
- [84] R. C. Merton, "On market timing and investment performance I: An equilibrium theory of value for market forecasts," *Journal of Business*, vol. 54, pp. 363–406, 1981.
- [85] M. Mitchell and T. Pulvino, "Characteristics of risk in risk arbitrage," *Journal of Finance*, vol. 56, no. 6, pp. 2135–2175, 2001.
- [86] P. Monteiro, "Forecasting hedge funds volatility: A risk management approach," Working Paper, ISCTE, 2004.
- [87] N. Naik, M. Stromqvist, and T. Ramadorai, "Learning while investing: Characterizing hedge fund investor behaviour," Working Paper, BNP Paribas Hedge Fund Centre, London Business School, 2005.

68 *References*

- [88] S. Panageas and M. M. Westerfield, “High water marks: High risk appetites? Hedge fund compensation and portfolio choice,” Working Paper, University of Southern California and Wharton School, 2004.
- [89] A. J. Patton, “Are ‘market neutral’ hedge funds really market neutral?,” Working Paper, London School of Economics, 2004.
- [90] T. Schneeweis and R. Spurgin, “Multifactor analysis of hedge fund, managed futures, and mutual fund return and risk characteristics,” *Journal of Alternative Investments*, pp. 1–24, 1998.
- [91] W. F. Sharpe, “Asset allocation: Management style and performance measurement,” *Journal of Portfolio Management*, vol. 18, pp. 7–19, 1992.