



Hedge Fund Incubation, Development and Performance

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Introduction

An important theme in the history of the hedge fund industry has been the disintermediation of the proprietary trading function of investment banks, and as such, the ‘privatization of the trading floor.’ Historically, many hedge funds were set up as independent businesses to pursue trading strategies originally pioneered by proprietary trading desks of large banks. The feasibility of such independent trading activity has depended in large part on the increasing availability of information, both in terms of depth/quality and scope, about trading flows, availability of shorts, or pricing models; the increasing availability of cheap technology; the increasing availability of investor capital; and a settling of the legal environment that has enabled both investors and trading counterparties to deal with non-regulated entities. The actual degree of independence adopted by hedge funds generally has depended on a wide variety of factors, including the nature of the trading strategies pursued, the assets traded, investor and counterparty preferences, and the extent to which hedge funds themselves have wished to develop stand-alone operational infrastructure.

Against this general backdrop, many hedge managers have chosen to set themselves up with *significant* and *direct* relationships to larger providers of capital and infrastructure, such as investment banks, fund of funds or other multi-strategy allocators, service providers, or other strategy-focused hedge funds themselves. It is generally acknowledged, though not empirically documented, that these substantive organizational and institutional relationships play a significant role in investor evaluation of hedge funds. But while much research exists on performance, risk and exposure characteristics, little published research exists on the nature and consequences of these organizational and institutional relationships, and in particular, whether these relationships have broad consequences for performance, risk and exposure characteristics of the hedge funds in these relationships. Some of these consequences may be associational—e.g. firms with more complicated operational requirements may be more likely to begin their lives associated with a large institution. Others may be causal, for example, affiliation with an operational platform allows hedge fund traders to focus on trading, rather than operations or capital raising, allowing fund managers to focus on their comparative strength (viz. trading), thus increasing performance. Institutional affiliation may also add substantially to the durability of a new management company, allow the manager to establish itself, its operations and trading activities over a longer time period and with diminished risk due to premature shut-down.¹

This paper presents new empirical information about the causal and associational consequences of some varying forms of institutional affiliation between hedge funds and larger investment organizations or service providers. We look at three types of relationships between hedge funds and outside organizations: Sample I contains funds that are seeded but receive no operational support from the seeding institution; Sample II contains funds that receive both seeding and operational support from the seeding institution; and, Sample III contains funds that receive operational support but no seed capital. We examine the risk, performance and exposure characteristics of each group. We conclude that the institutional commitment associated with seeding and operational support is positively correlated with risk-adjusted returns relative to the broader universe of hedge funds. To the best of our knowledge, no other existing research examines these questions directly. To set the stage for our analysis, we begin by outlining some important issues in understanding the economics of relationships between hedge funds and institutions.

1 Anecdotal evidence suggests that start-up firms are more sensitive to periods of poor performance, even if such diminished performance is the result of structurally unfavorable market conditions, rather than performance characteristics unique to a particular manager.

The Economics of Institutional Relationships

Generically, there are many possible reasons why hedge fund managers and providers of various types of resources, such as seed capital and operational capabilities, may find it in their mutual interest to work conjointly in longer-term, affiliated relationships. We briefly discuss some of the reasons, as pertain to the economics of seeding, scale in operations, specialization of investment management skills, and the raising of external capital.

The Economics of Seeding

The typical seeding relationship between an institution and a new hedge fund involves the provision of working capital to support the operations of the management company, as well as capital to be managed as assets. The exact mix will vary substantially from hedge fund to hedge fund, and will be a function of what the potential manager is bringing to the relationship—including: himself; other management company staff to whom varying degrees of fixed and variable compensation have been promised; tested trading models, deals or other immediate asset management opportunities; equity assignment to the seeding institution, capital commitments from external investors, and so forth—as well as what the seeding institution may bring to the table in terms of capital (amount, length of commitment, fee discounts on managed capital) as well as associated cost and benefits associated with operational and marketing support, and investment management relationships (including relationships with prime brokers, deal or trade sources, technology and information, implicit and explicit credit relationships, etc.). Further, seeding may occur in a sequential manner: initially only sufficient operational and trading capital is deployed to run the fund and the management company on a proprietary basis—i.e. without a corresponding effort to seek immediate funds from third parties—in order to validate the trading strategy and/or key operational building blocks of the fund at lowest initial cost to all parties. Thus, if the fund/strategy proved successful, additional commitments could be made,² allowing the seeder to take greatest advantage of the “real option” embedded in the seeding opportunity.

The seeding commitment is most valuable to a potential hedge fund manager when the size and other terms of the capital commitment increase the durability of a hedge fund operation, and are sufficient to ensure the viability of the hedge fund business for several years.³ Correspondingly, most seeding relationships require contractual or other economic commitment on behalf of the principals of the hedge fund management company to ensure that their time horizons and incentives are compatible with the seeding institution. Collectively, investors tend to view this mutual commitment, arrived at through negotiation and mutual due diligence, in a favorable light, as it credibly signals that both the seeding institution and principals of the hedge fund management company both believe in the long run success of the hedge fund management company.⁴

² Such incremental seeding tends to be rare with new managers, since it potentially requires a second round of negotiations with managers, which is sometimes costly and time consuming. It is more likely to occur when the seeder already has substantial knowledge of or a relationship with a hedge fund management company, or the trading strategy is relatively simple and can be operated by a single principal with few incremental resource needs relative to the seeding institution. Some firms will run “tournaments” of independent managers operating under the same organizational umbrella as a mechanism for selecting managers to whom they might offer more substantial resources as well as independence. Anecdotal evidence suggests that start-up firms are more sensitive to periods of poor performance, even if such diminished performance is the result of structurally unfavorable market conditions, rather than performance characteristics unique to a particular manager.

³ Follow-on investors will almost certainly require that the commitment behind the seeding exceeds any initial lockup that the fund requires of investors.

⁴ There is a substantial literature in the fields of finance and economics on structure and centrality of contracts that may *credibly* convey ‘private’ information—in this case, the mutual assessment of the viability of the hedge fund business—to third parties, most notably, “the market”.

Economies of Scale in Operations

Despite the wide variety of trading strategies pursued by hedge funds, there are a number of similar operational activities that each must perform.

These include:

- **Technology:** The technological infrastructure, including computers, software, data feeds, etc.
- **Compliance:** The review, reporting and control of trades and relationships with other institutions or individuals.
- **Risk Management:** The evaluation of the riskiness of securities, derivatives, and counterparties.
- **Administration:** The monitoring of portfolios, including their valuation, as well as handling of money transfers between a hedge fund and its investors.

Each hedge fund must determine how it will handle each one of these elements to its operations. It may handle a function internally (such as is typically done with risk management or compliance) or outsource it (such as is typically done in the case of administration to a third-party administrator). Depending on the size of the fund, and the volume and type of trades, each one these functions may require more or less than a full-time professional to monitor. For example, a small CTA or equity hedge fund may have few day to day compliance or technology issues, whereas a larger, multi-strategy fund may require multiple legal and professional staff on an ongoing basis to review and monitor trades and reporting issues.

To the extent that there are economies of scale in delivering these operational capabilities, hedge funds have an incentive to partner with providers of these capabilities to realize lower costs. Furthermore, to the extent that it is simpler and more readily managed from both the perspective of the fund manager and from the provider of operational services, there is a mutual incentive to bundle the delivery of such services. And lastly, by going to an established provider of such services, there are fewer risks,⁵ particularly for a start up fund, that it will not be able to efficiently and effectively establish the necessary operational infrastructure. Lack of sufficient operational infrastructure has been identified as a significant cause of hedge fund failure, and while no empirical evidence exists to demonstrate this claim, we believe that a significant reason for lack of operational infrastructure is initial undercapitalization of hedge funds by their managers.⁶

From a third-party's perspective, such as from the perspective of an investor, the existence of *positive* economic incentives, such as that support the bundled provision of operational services, is not reason enough to believe that the trading skill of managers who choose to receive such services in this manner are necessarily different from managers that do not.⁷ To that extent, there may not be substantial "informational" content (e.g. a sorting of higher quality managers from lower quality managers) in the choice. Nevertheless, there may be real effects of such choices, such as the reduction of overall operational risk, or the ability to pursue trading strategies that are more rewarding but more operationally complex, that result in performance differentials cross-sectionally among managers.

⁵ Such as those that pertain to the likelihood of completion of service projects and goods (e.g. firm-wide technology installation particularly when such projects have significant implications for firm productivity and efficiency as well as for expenditure of up-front costs prior to the establishment of corresponding up front revenues).

⁶ Capco (2003) finds that 50% of hedge fund failures can be attributed exclusively to operational risk.

⁷ If the economic incentives associated with participating in a relationship were on balance, negative, then there could be reason to believe that the acceptance of such a relationship by a manager could represent evidence that the market views the trading skills of a manager as substandard.

Economics of Specialization in Investment Management Skill

As the previous section indicates, the skill set necessary to operate a hedge fund goes far beyond the security selection and portfolio management functions of trading. There is no reason why an individual who is extremely skilled at trading necessarily has similarly outstanding operational skills (or vice versa), nor would that individual necessarily have the excess time to devote to operational matters. Larger institutions, by supplying operational services and expertise, broaden the range of managers that may effectively trade outside large organizations.⁸ Thus, to the extent that trading skill and operational skills are not necessarily correlated, we expect to see some positive selectivity towards hedge fund managers that affiliate themselves with larger institutions.

This begs the obvious question of whether traders attached directly and internally to large institutions are expected to deliver greater value. The answer depends on the extent to which the institution allows a trader to pursue trading strategies most consistent with his or her trading insights. Many large institutions actively constrain their traders for reasons that go beyond stand-alone risk management, such as overall risk management goals across prop desk, line of business issues, conflicts with other internal desks, etc. Almost all of these constraints are lifted when a manager sets up a fund outside a large, affiliated institution. A related question pertains to multi-strategy firms, some of which may set up internal trading groups with intermediate levels of independence. However, even with such intermediate levels of independence, the level of capital allocated to a trading group may fluctuate substantially and at short notice based on variables other than a trading team's own performance. While there may be reasons from a portfolio perspective to engage in asset allocation on a demand basis, it may also make it more difficult for a trading team to fully realize its trading strategy. With stand alone, affiliated entities, changes in capital are usually predictable and staggered based on pre-agreed lock up and redemption terms.

Economics of Scale in the Raising of External Capital

A key ingredient to the success of a hedge fund business is the ability to raise external investor capital. First and foremost, a large, affiliated institution typically brings with it a set of capital raising channels. Secondly, to the extent that an affiliated institution has relationships with multiple hedge funds, it can present that suite of funds to investors, who are typically in the market for multiple investment opportunities. This limits both the total personnel required to market funds (and hence the cost of marketing) as well as "congestion effects"⁹ on an investor seeking to source new investments.

In addition, Marketing activity typically takes a substantial toll on the time of the principals of a hedge fund. In a typical small to medium size independent hedge fund, marketing activity can take a substantial portion (30%-50%) of the key principal or principals' time, even with full-time dedicated marketing staff. This is because most investors will insist on meeting with the principals on multiple occasions as part of the due diligence and investment process. To the extent that affiliation with a larger institution brings an increased likelihood of successfully raising capital (e.g. number of investor meetings yielding actual investments), the amount of time that a manager has to devote to this non-core activity can be reduced and redirected toward trading. Obviously, we would therefore expect the possibility that funds that are

⁸ Most traders historically have operated within large institutions, on proprietary trading desks, where there is an emphasis on trading, not on management of broader operational functions. Within such large organizations, such skills in operational matters are separated for the economies of scale that can be realized by the division of labor, but also to allow for greater managerial control of the trading function and other related risk taking.

⁹ By which we mean, among other things, the cost to the potential investor of having to deal with an complete, unique relationship with a marketing agent and firm to evaluate a single manager, which involves all of the indirect costs associated with communication (meetings, due diligence, etc.) to evaluate a single manager. If an agent represents more than one manager, the agent and investor can quickly tailor communications to focus only on those managers of immediate interest, thus resulting in fewer meetings.

affiliated with large institutions tend to raise capital more quickly than non-affiliated funds. We would expect to see that funds with principals with less responsibility for capital raising would have improved performance characteristics. However, it is unlikely that one could demonstrate this empirically as evidence on the amount of time principals spend on marketing is both difficult to measure and not data that is generally available.

Other, Related Empirical Research

Recent institutional and thematic-related research by Martin (2007) addresses some similar issues that involve institutional relationships between hedge funds and larger organizations, and the implications for the actual operations of hedge funds as well as the investor due diligence process.¹⁰

Investors, as part of the due diligence process, routinely factor into their investment decision the quality of service providers selected by hedge fund managers. This derives in part from the idea that there is selectivity on behalf of service providers, and therefore the willingness of a reputable service provider to do business with a particular hedge fund represents an implicit legitimization of a fund. Secondly, the use of a “quality” service provider is indicative of the actual level of operational service that will be delivered to the fund and its investors. Such use can be construed as a credible indicator of the quality of investment results as well as of reduced operational risk.

Martin examines over 3,000 current fund/prime brokerage relationships,¹¹ and shows that there is informational content in a hedge fund’s choice of prime broker. For example, Martin finds that, after controlling for strategy, assets under management (AUM), and fund age effects, the choice of prime broker is associated with a differential in recent (2005-6) risk-adjusted returns. Specifically, the Analysis Of Variance analysis below shows statistically significant F-values for variables that measure hedge fund strategy (HFRStrategy), fund age (MonthsOLD), and the identity of the funds prime broker (PB) in explaining fund Sharpe ratios. Variations in selected prime broker typically explain changes in Sharpe ratio of +/- .05, which, while modest, is nevertheless of value to the sophisticated investor. Martin further shows that the prime broker effect is primarily, but not fully, explained by the interaction between prime broker and its market share in a particular hedge fund strategy. The below Exhibit shows that roughly 80% of explanatory power of the “prime broker effect” can be explained by the market leadership effect in 12 key hedge fund strategies.

Exhibit 1: The Informational Content of the Prime Brokerage Relationship

ANOVA Analysis of Significance of PB Relationship for Fund Sharpe Ratio					
	Df	Sum of Sq	Mean Sq	F Value	Pr.(F)
HFR.Strategy	32	677.6600	21.1769	24.0970	0.0000
LastAUM	1	0.0040	0.0035	0.0040	0.9495
MonthsOLD	1	11.9240	11.9240	13.5682	0.0002
PB	14	53.2870	3.8062	4.3311	0.0000
Residuals	3154	2771.7940	0.8788		

¹⁰ It is worth noting that the research by Martin examines a widespread but not necessarily deep relationship between hedge fund and institution. The current research examines much more substantial relationships between hedge funds and institutions, in which prime brokerage is a very small element of the overall set of relationships.

¹¹ From a database of over 6,000 “alive” and “dead” funds listed with HFR, but incorporating prime broker info from five other commercial databases.

Exhibit 1: The Informational Content of the Prime Brokerage Relationship *(Continued)*

ANOVA Analysis of Significance of PB Relationship for Fund Sharpe Ratio for PB Market Leaders					
	Df	Sum of Sq	Mean Sq	F Value	Pr.(F)
HFR.Strategy	32	677.6600	21.1769	24.0202	0.0000
LastAUM	1	0.0040	0.0035	0.0040	0.9496
MonthsOLD	1	11.9240	11.9240	13.5250	0.0002
CA.G	1	2.3080	2.3077	2.6176	0.1058
CTA.C	1	1.3170	1.3173	1.4942	0.2217
DS.A	1	11.7140	11.7136	13.2863	0.0003
ED.A	1	5.0660	5.0655	5.7456	0.0166
EMG.K	1	0.4900	0.4899	0.5556	0.4561
EMN.K	1	9.8700	9.8698	11.1950	0.0008
FIARB.A	1	9.9750	9.9754	11.3147	0.0008
HE.G	1	0.0700	0.0698	0.0792	0.7784
MACRO.G	1	0.2430	0.2426	0.2751	0.5999
OTHER.A	1	0.3900	0.3902	0.4426	0.5059
RV.G	1	1.0500	1.0505	1.1915	0.2751
SECTOR.K	1	0.1740	0.1736	0.1969	0.6573
Residuals	3156	2782.4150	0.8816		

Variable names are a composite, representing the intersection of hedge fund strategy and label of leading Prime Broker.

Strategy	Market Share of Dominant PB
CA	25%
CTA	55%
DS	36%
ED	24%
EMG	17%
EMN	27%
FIARB	20%
HE	26%
MACRO	21%
OTHER	12%
RV	19%
SECTOR	25%

Source: Martin (2007).

Further, research by Gupta and Bouges (2007) addresses other issues that involve the relationship between hedge funds and other service providers, viz. law firms and audit firms.

Related Research on Size and Manager Tenure

There has been some empirical research done to examine factors that are potentially related to the incubation process, including:

1. Research on the relationships between fund AUM and performance; and
2. Research on the performance characteristics of “emerging managers”.

In order to understand our results on institutional affiliation, we need to be confident that such results are not merely the consequence of age and/or AUM characteristics of managers that are institutionally affiliated. We present some new empirical results which suggest that AUM in itself is not a globally significant predictor of performance. We do, however, find some very modest evidence that “emerging managers” do add some performance improvement to investor portfolios, but that effect is modest and declining, and no longer statistically significant.

Much of the research on the effects of AUM is difficult because fund AUM is:

- imperfectly reported by commercially available sources
- changing over time (presumably dynamic in effect)
- of differential consequence by hedge fund strategy
- affected by entry and exit of funds from databases

To partially address these questions, we utilize a database constructed from all funds (“live” and “dead”) that have reported to the HFR database, and segregate fund returns by strategy and contemporaneous AUM—i.e. for a given date, we identify all funds with returns in a particular AUM bucket based on the reported AUM at that date.¹²

Exhibit 2A: Performance vs. AUM by Strategy

Sharpe Ratio (7/2000-6/2007)												
AUM	CA	DS	ED	EH	EMK	EMN	FIA	FIMBS	FOF	GM	MA	RV
<25	1.07	2.52	1.25	0.85	1.29	1.18	0.04	2.38	0.87	1.42	0.62	3.57
25-100	1.41	1.89	1.34	0.90	1.78	0.44	0.33	3.22	1.13	1.42	0.89	2.67
100-500	1.02	1.66	1.36	0.84	1.99	0.87	0.54	1.28	1.24	1.14	1.11	2.36
500+	1.43	2.54	2.22	0.71	2.18	-0.02	0.91		1.05	0.68		1.68

There is no obvious pattern to the data that arises from casual inspection. To test formally the hypothesis that there is a monotonic relationship between AUM and performance, we conduct a nonparametric Jonckheere-Terpstra test, which is inconclusive.

¹² We thank Alternative Investment Analytics, LLC for access to this database.

Exhibit 2B: AUM vs. Performance

Jonckheere-Terpstra			
Group	N	Mean	St. Dev.
USD25M	12	1.42	0.96
USD100M	12	1.45	0.85
USD500M	12	1.28	0.51
USD500Mplus	10	1.34	0.82
W* = -0.1370	One Sided Test	0.4454	
Alternative H	USD25M, USD100M, USD500M, USD500Mplus in decreasing order		

Similarly, research on the performance characteristics of “emerging managers” has suffered from a number of difficulties:

- unaccounted survivorship or other reporting biases
- lack of consensus on the definition of what constitutes “emerging” (Fund AUM? Manager AUM? Fund Age? Manager Experience? Some combination thereof?)
- time varying flows of managers into particular strategies and corresponding differences in risk and factor exposures

There are many possible approaches to identifying the characteristics of such managers in the literature. However, we prefer to take a somewhat indirect approach and examine the returns of Funds of Funds (FOF) that claim to be invested in “emerging managers”. We identify 49 such funds from a comprehensive database,¹³ and construct an index based on available returns from those FOF’s.

Plotting the cumulative outperformance of our “emerging manager” FOFs relative to the HFR FOF Index, we see that over time, “emerging managers” have outperformed. However, this relative performance may be because of greater risk, and/or other factors. We find that while our “emerging manager” FOFs have outperformed the HFR FOF index, that outperformance is not robust. While mildly favoring the performance of our Emerging Manager FOF index, a t-test of the difference in mean returns between the two indices for the period 7/2004-6/2007 shows them to be statistically indistinguishable.

Exhibit 2C: Emerging Manager FOF’s vs. HFR FOF Index

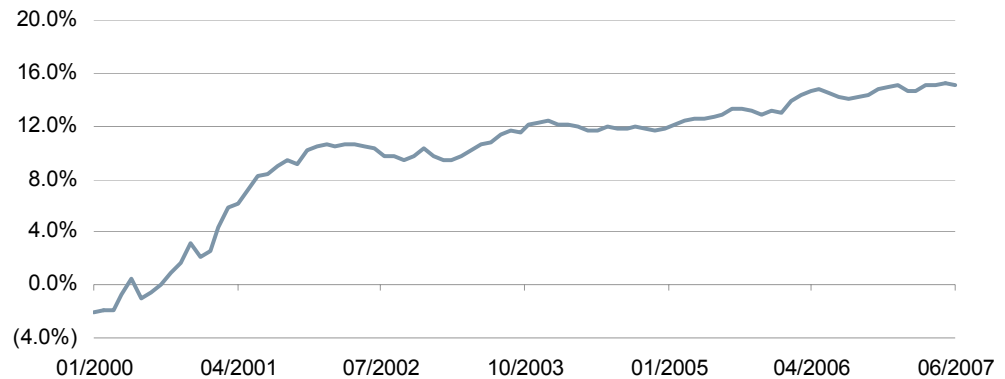
Emerging Manager FOF’s vs. HFR FOF Index					
Emerging Manager FOF’s		Annualized Return	Volatility	Sharpe	T-Test Prob
2000-6/2007	Emerging Manager FOF	8.93%	4.28%	1.1509	0.0066
	HFR FOF	6.90%	4.35%	0.6672	
7/2004-6/2007	Emerging Manager FOF	11.41%	4.37%	1.9214	0.7877
	HFR FOF	10.41%	3.97%	1.8677	

Together, these results suggest that for funds in our sample, which tend to be smaller and younger funds, results on performance related to institutional affiliation are unlikely to be the direct consequence of factors such as assets under management and fund age.

¹³ We thank Alternative Investment Analytics, LLC for access to this data as well.

Relative Outperformance of FOF's Investing in Emerging Managers Relative to HFR FOF Index

Cumulative Outperformance



Other Related Prescriptive Research

While there is little existing research that examines empirically the characteristics and consequences of institutional relationships, there is a wide body of prescriptive literature that addresses operational and organizational issues investors should be concerned with when evaluating hedge funds. For example Capco (2003) identifies and studies, with some subjectivity, the operational and other causes of hedge fund failure. In a recent article, Davidson and Meziani (2007) examine 10 operational risks that investors should know about. These include:

- Concentration of Strategy
- Inexperienced or Untested Staff
- Unclear Overall Business Viability
- Service Provider Track-Record
- Haphazard Risk Management
- No Written Valuation Procedures
- Inappropriate Leverage and Liquidity
- Governance Practices
- Technology Infrastructure
- Non-comprehensive Business Continuity Plan

As a courtesy to the reader, we provide a list, drawn directly Davidson and Meziani, of recent failures and the category of risk as defined above in Appendix I. However, the goal of this paper is not to address these prescriptions directly, rather it is to provide empirical results that may be helpful to the potential investor in prioritizing the evaluation of operational and other related risks.

Data and Methodology

Data, Limitations and Biases

In order to study the characteristics and effects of hedge fund affiliation with larger institutions, we establish three classes of funds that pertain to their receipt of seed capital, operational services, and/or both, conjointly, from large institutions.

The data for this study was hand-collected from various sources (including CISDM, HFR and Morningstar Direct databases), using our knowledge of the industry as well as that of other industry experts. We further examined ADV forms filed with the Securities and Exchange Commission to identify funds that may be using operational platforms. We also identified funds that are affiliated with large institutions that have other lines of business in financial services. After careful review, we identify three classes of managers (Samples) and corresponding funds as described below:

Sample I: This sample consists of funds that are seeded by major institutions but receive neither administration nor operational support from the seeding institution. Examples of funds included in this sample are those incubated by Larch Lane and Focus Group.

Sample II: This sample consists of funds that are seeded by major institutions and also receive operational and administrative support from the seeding institution. Examples include Jefferies Asset Management and Front Point.

Sample III: This sample consists of funds that are established or find a home on administrative and operational platforms but receive no seed capital from the platform provider. Examples include Bear Stearns and Bank of America. We emphasize that a prime brokerage relationship alone is insufficient for a fund to be included in this Sample. For example, the relationship between a hedge fund and its hedge fund “hotel” would satisfy the criteria to be included in Sample III.

Global Sample: An equally-weighted composite of portfolios of Samples I,II, and III.

The analyses are conducted using monthly data over the time period 2002-2006 at the portfolio level and 2005-2006 at the fund level. To be clear, the “portfolio level” analysis involves the month-by-month pooling of the returns of all extant funds into a single, equally-weighted portfolio level return, but may not include the same funds over time. The time series of these returns therefore represents the properties of the funds within the Samples as if they were held as a portfolio by an investor. Similarly, it also reflects (in part) the properties of an overall line of business for an institution interested in providing seeding and/or operational support to a group of hedge fund managers. The “Global Sample” is an equally-weighted composite of the portfolio level returns of Samples I, II and III. “Portfolio level” analysis is to be distinguished from “fund level”, in that fund level analysis takes place at the level of individual fund, and any properties of those individual funds are summarized as an average across funds within that group. This analysis provides more information about the *typical* fund within a Sample, not the overall properties of the sample in aggregate.¹⁴

We conduct the analyses on the universe level, pooling managers from across multiple strategies. A more detailed, strategy-level analysis will become possible in a few years once more data is available. Exhibit 3 lists the funds in each category. While our sample is small, it is somewhat representative of the larger universe as it relates to fund size. Exhibit 4 compares the number of funds based on asset-sizes.

¹⁴ The properties of the typical fund may differ from that of the portfolio. For example, the typical fund may have a low Sharpe ratio, but also a low correlation with other funds, thus generating portfolio level returns with a substantially higher Sharpe ratio than any individual component. This diversification across strategies is likely a reflection of a conscious business strategy to reduce overall risk to the affiliated institution, as well as offer a wider range of manager choices for investors.

We note that there are a number of issues that affect data sourced in part from commercial hedge fund databases, including survivorship bias, backfill bias, selection bias, and multi-period sampling bias (See Gupta et al. (2003)). These issues are difficult to address directly and thoroughly in the context of our sampling methodology. We believe that there are no obvious reasons that they should differentially affect the reporting of data on independent managers more so than the affiliated managers.¹⁵

Exhibit 3: Sample Characteristics

Number of Funds at the Portfolio Level: 2002-2006		
Sample	Characteristics	Number of Funds
I	Seed Capital	25
II	Seed Capital and Operational Support	29
III	Operational Support Only	16
Number of Funds at the Fund Level: 2005-2006		
Sample	Characteristics	Number of Funds
I	Seed Capital	15
II	Seed Capital and Operational Support	17
III	Operational Support Only	12

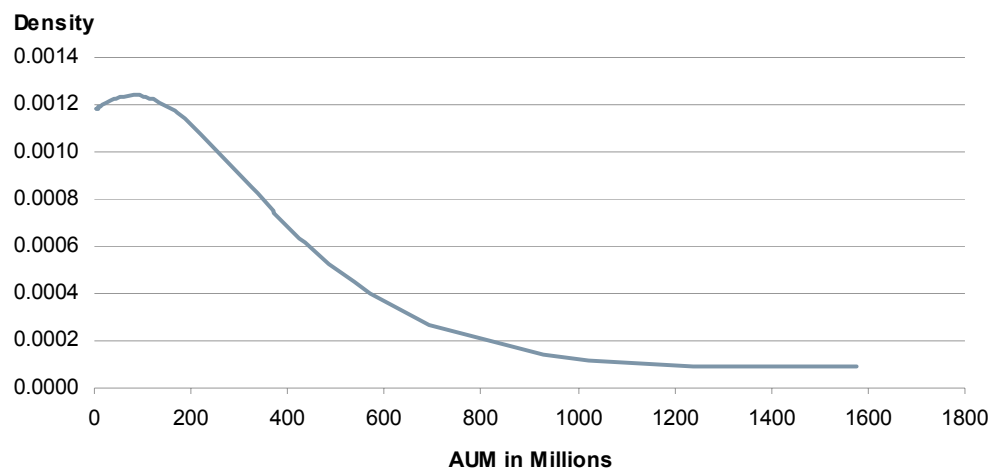
Exhibit 4: Fund AUM

Fund AUM by sample		
Sample	Characteristics	Median Fund AUM
I	Seed Capital	\$39,300,000
II	Seed Capital and Operational Support	\$369,000,000
III	Operational Support Only	\$46,600,000
	Overall Sample	\$86,100,000

¹⁵ We do recognize, however, that to the extent that their institutional relationships afford improved marketing, institutionally-affiliated managers tend to have less incentive to report to commercial data providers than unaffiliated funds.

Exhibit 4: Fund AUM (Continued)

Distribution of Fund AUM



Methodology

We use various statistical methodologies to examine the differences in performance characteristics between the Samples, portfolios of the Samples, and the broader hedge fund universe. In particular, our empirical goals are to determine:

1. Are there any standalone performance differences between Samples and the broader hedge fund universe?
2. Are there any institutional characteristics, either at the manager level or at the portfolio level, which explain differences in performance within and between our Samples?
3. Are there any systematic differences in factor exposures associated with our Samples that might have an impact on our evaluation of performance?

Stand-Alone Performance

First, we present summary statistics for each of the Samples as well as various hedge fund and traditional stock and bond indices both at the portfolio level and at the fund level. For *portfolio level* analysis of the Samples, we start with the funds that existed in January 2002 and added funds to the portfolio as they became available. At the *fund level* we examined funds that had complete data for the 2005-2006 period. We examine Sharpe ratios as the primary measure of standalone performance, recognizing that each manager or portfolio of managers may have different levels of risk. We also use measures of alpha, and risk-adjusted alpha,¹⁶ as a basis for comparison, in order to control for differential market exposures across managers and portfolios of managers

Institutional Characteristics

We examine performance measures, such as Sharpe Ratios, of funds according to the nature of their institutional affiliation in order to detect possible effects of that institutional affiliation.

¹⁶ We define "risk adjusted alpha" as alpha divided by the volatility of the fund. This is to control for the fact that two funds, with identical trading strategies and hence factor exposures, but different leverage, would produce different measures of alpha. By standardizing alpha by total risk of the investment, we have performance measure that is more portable across managers with different risk appetites.

Factor Exposures

To examine the exposures of the funds to various market factors we will conduct a multi-factor regression of the following specification:

$$y_t = \alpha + \sum_{i=1}^6 \beta_i x_{it} + \varepsilon_t$$

Where y_t is the excess return over 3M Libor for the fund, x_i 's represent six factors, in our case: 1) the (excess) return on the S&P 500 index (equity), 2) the return of the Lehman U.S. Government (interest rate factor), 3) the return of the Lehman U.S. Corporate High Yield index over the Lehman Government index (credit factor), 4) the change in VIX (volatility factor), 5) the return to large cap stocks relative to small cap (market cap style factor), and 6) the return to growth stocks versus value stocks (valuation style factor). In addition to providing insight into the types of market exposure, this multifactor analysis allows us to evaluate manager performance through factor-adjusted performance measures such as alpha, and risk-adjusted alpha.

To examine the nature of the exposures of funds within the various Samples we will also conduct principal components analysis. This analysis provides us some insight into the nature of the factor exposures across funds within particular Samples, and helps us identify the extent to which our Samples represent managers exposed to a diversity of market factors, rather than the same market factor or factors.

Results and Discussion

Portfolio Level

Stand-Alone Statistics

Summary statistics for the three samples are displayed in Exhibit 5. Recall from the previous section, Sample I contains funds that are seeded but receive no operational support from the seeding institution, Sample II contains funds that receive both seeding and operational support from the seeding institution and Sample III contains funds that receive operational support but no seed capital. Over the period 2002-2006, Sample II performs the best across all three samples on a risk-adjusted basis with an annualized return of 8.59% and notable a volatility of only 3.22%. Sample II also displayed the lowest volatility across all three samples for the period 2002-2006. An equally-weighted portfolio of our three samples (Sample Global Portfolio) has the highest risk-adjusted return, with a Sharpe ratio of 1.92, of all Samples and benchmarks. One of the interesting aspects of the results is that all but one of the sample-based portfolios outperform both non-investable as well as investable indices on an absolute basis.

On a risk-adjusted basis the blended portfolio of Samples outperforms both investable as well as non-investable indices. The volatilities of the investable as well as non-investable indices are lower than Samples I and III; this is to be expected since the number of funds used in constructing the non-investable indices is far greater than the number of funds used in the individual samples.¹⁷ This represents a substantial hurdle for the risk-adjusted performance measures of Sample-based portfolios. This effect is mitigated when we blend the Samples, and therefore represents the point at which risk-adjusted performance metrics are most comparable between Samples and benchmarks.

Exhibit 5: Summary Statistics

Summary Statistics							
	Annualized Return	Standard Deviation	Skew	Kurtosis	Sharpe Ratio	Min	Max
Sample I	13.03%	6.82%	1.17	3.37	1.51	-3.28%	8.84%
Sample II	8.59%	3.22%	-0.22	-0.42	1.83	-1.54%	2.63%
Sample III	11.96%	7.17%	-0.47	0.04	1.29	-4.39%	5.50%
Sample Global Portfolio	11.19%	4.42%	-0.33	0.18	1.92	-2.27%	3.63%
CISDM Equal Weighted Hedge Fund Index	9.98%	4.57%	-0.48	-0.04	1.59	-2.62%	3.54%
CSFB Hedge Fund Index	9.48%	3.58%	-0.14	-0.25	1.89	-1.46%	3.23%
HFR Fund Weighted Composite Index	9.35%	4.75%	-0.42	-0.09	1.40	-2.86%	3.58%
CSFB/Tremont Investable Index	6.81%	2.65%	-0.18	-0.63	1.55	-1.09%	1.86%
S&P 500 Total Return Index	6.79%	12.39%	-0.61	1.54	0.33	-10.87%	8.80%
Lehman U.S. Aggregate Index	5.02%	3.82%	-0.96	1.77	0.60	-3.36%	2.65%
3M Libor	2.71%						

¹⁷ In reality, one cannot really invest in the non-investable index and an argument can be made that they do not represent an actual return that an investor will receive. However a strong argument can be made that the samples represent actual returns that certain investors have received.

The results are even more significant when compared to the performance of stocks and bonds over the period 2002-2006. All three Samples outperform both stocks and bonds over the period 2002-2006 both on an absolute basis as well as a risk-adjusted basis. The volatilities of all three samples were lower than stocks but higher than bonds. The Sample Global Portfolio has a volatility that is comparable to the Lehman U.S. Aggregate Index, which is consistent with the views of some investors that hedge funds can be viewed as a substitute for a fixed income allocation.

In the next section, we look at factor-based performance metrics like alpha and risk-adjusted alpha, and we see that those performance measures for Sample-based portfolios are substantially stronger than those of the corresponding benchmarks.

Factor Exposures

Results from the six-factor regression model are displayed in Exhibit 6. Our choice of factors has been motivated by ones that have been most commonly used in articles conducting multi-factor analysis of hedge fund returns. As the results indicate, the significance of each of these factors can vary significantly by the composition of the Sample as well as the time period analyzed. The factor exposures exhibited by each sample vary. Sample I has statistically significant exposure to changes in implied volatility; Sample II has statistically significant exposure to credit and implied volatility; Sample III has statistically significant exposure to credit and an equity market valuation style factor. On a blended basis, the blended global portfolio has significant credit and implied volatility exposures. The benchmarks similarly tend to have significant credit and implied volatility exposures, as well as exposures to the two equity style factors. The benchmark with the closest factor exposure (comparing factor t-stats) to the blended global portfolio is the CSFB investable hedge fund index. The R-squares in the three cases were 0.33, 0.43 and 0.42 respectively. The low R-squares can be attributed in part, to the fact that funds in each of the samples followed diverse strategies. The factors however, explain more when major hedge fund indices are regressed against them. Results from regressions of the CSFB Hedge Fund Index, the CISDM Equal Weighted Hedge Fund Index, HFR Fund Weighted Composite Index, and the CSFB Investable Hedge Fund Index are presented in Exhibit 7. The R-squares are much higher in each the three cases on non-investable indices. What is also clear is that R-squares of the CSFB indices, which use asset weighting, rather than equal weighting, are substantially lower, suggesting that asset-based weighting schemes may have a material affect on estimates of what constitutes “representative” factor exposure for hedge funds.

Turning now toward the performance measures associated with each multi-factor regression, we find that the level of alpha produced by each Sample (measured and reported on a monthly return basis) is at least as great as any of the indices, and that for the blended global Sample, we see that, at 56 bps per month, no index produces a comparable level of alpha. Sample I produces the greatest monthly alpha (at 76 bps), but this Sample also has the highest volatility of all the Samples and benchmarks. In order to better measure the quality of alpha production, we can look at the risk-adjusted alpha—the amount of alpha per unit of volatility. Here we see that Samples I, II and the global portfolio outperform all of the benchmarks, with Sample II having the highest quality of alpha production of each of individual samples, and the blended global portfolio having the highest quality of alpha production of all.

Exhibit 6 and 7: Portfolio Level Multi-Factor Regression Results

Portfolio Level Multi-Factor Regression Results											
		Alpha	SP500	Credit	Rates	VIX	Size	Grwth vs Value	R2	Asset Risk	Alpha/Vol
Sample I	Coef	0.0076	0.1224	0.0277	0.0269	0.8771	0.1352	-0.1187	0.3340	0.0686	0.1112
	s.e.	0.0025	0.1257	0.0813	0.1235	0.2034	0.1374	0.1195			
	T-Stat	3.0840	0.9738	0.3402	0.2177	4.3115	0.9844	-0.9936			
Sample II	Coef	0.0039	0.0740	0.1501	-0.0158	0.2229	0.0349	0.0509	0.4292	0.0320	0.1226
	s.e.	0.0011	0.0543	0.0351	0.0534	0.0879	0.0594	0.0516			
	T-Stat	3.6738	1.3620	4.2720	-0.2952	2.5358	0.5884	0.9863			
Sample III	Coef	0.0051	-0.0042	0.2611	0.0006	0.2090	-0.0013	0.3030	0.4241	0.0712	0.0720
	s.e.	0.0024	0.1213	0.0784	0.1191	0.1963	0.1325	0.1153			
	T-Stat	2.1476	-0.0350	3.3295	0.0052	1.0647	-0.0098	2.6284			
Global	Coef	0.0056	0.0641	0.1463	0.0039	0.4363	0.0563	0.0784	0.3100	0.0442	0.1260
	s.e.	0.0016	0.0823	0.0532	0.0809	0.1332	0.0899	0.0783			
	T-Stat	3.4326	0.7781	2.7479	0.0484	3.2753	0.6257	1.0020			
Portfolio Multi-Factor Regression Results: Index Comparisons											
		Alpha	SP500	Credit	Rates	VIX	Size	Grwth vs Value	R2	Asset Risk	Alpha/Vol
CISDM	Coef	0.0039	0.0440	0.1863	0.0287	0.1991	0.1287	0.2243	0.7829	0.0459	0.0842
	s.e.	0.0009	0.0480	0.0310	0.0471	0.0776	0.0524	0.0456			
	T-Stat	4.0890	0.9179	6.0039	0.6089	2.5644	2.4546	4.9175			
CSFB Hedge Fund Index	Coef	0.0040	0.0358	0.1358	0.0645	0.2547	0.1056	0.1519	0.5350	0.0357	0.1109
	s.e.	0.0011	0.0546	0.0353	0.0537	0.0884	0.0597	0.0519			
	T-Stat	3.6829	0.6556	3.8454	1.2023	2.8810	1.7685	2.9250			
HFR Fund Weighted Composite Index	Coef	0.0033	0.0466	0.2049	0.0418	0.1948	0.1075	0.2502	0.8034	0.0474	0.0698
	s.e.	0.0009	0.0472	0.0305	0.0463	0.0763	0.0515	0.0448			
	T-Stat	3.5653	0.9888	6.7200	0.9014	2.5529	2.0854	5.5821			
CSFB/Tremont Investable Index	Coef	0.0023	0.0235	0.0965	0.0219	0.2257	0.0797	0.0494	0.3381	0.0266	0.0853
	s.e.	0.0010	0.0487	0.0315	0.0478	0.0787	0.0532	0.0462			
	T-Stat	2.3732	0.4833	3.0691	0.4590	2.8663	1.4991	1.0677			

Fund Level

Stand-Alone Statistics: Individual Fund Level

Summary statistics at the fund level are presented in Exhibit 8 for funds within each Sample that have complete data for the period 2005-2006. The annualized return represents the average annualized return across all funds in each Sample, while the annualized standard deviation represents the average annualized standard deviation across all funds in each Sample. The skew, kurtosis, minimum, maximum and Sharpe ratios are calculated in a similar manner. Over the time period, we can see that the average Sample manager returns are comparable to the non-investable hedge fund indices and outperform the CSFB Investable Hedge Fund Index.

We can also see that there is a substantial difference in the typical risk characteristics of Samples I and Sample II versus Sample III. Recall that Samples I and II represent managers with that are partially owned by institutions, whereas Sample III represents funds that only have a service provider relationship (which may include some combination of prime brokerage, administrative and other operational support) with an institution. We thus conjecture that institutional ownership has a material affect on the risk profile of the fund. This may be for many of the reasons discussed at the outset of this paper, not just the obvious possibility of institutional risk aversion: In particular, we believe that with seed capital available, managers of newer funds have less incentive to merely “swing for the fences” in order to establish a track record and garner assets. Service providers, on the other hand, as non-equity owners, have less risk exposure to a manager, and therefore are likely to be less sensitive to the choice of fund risk. In fact, in the case of service providers which provide services based on trading volumes--which may be correlated with fund volatility--such service providers may actually benefit from increased fund volatility.

Exhibit 8: Fund-Based Summary Statistics

Fund-Based Summary Statistics								
	Return	Vol	Sharpe	Skewness	Kurtosis	Max DD	min ret	max ret
Sample I	10.76%	7.67%	0.99	-0.36	0.73	-6.53%	-4.19%	4.96%
Sample II	10.14%	5.46%	1.12	-0.40	0.45	-3.74%	-2.80%	3.70%
Sample III	14.13%	13.71%	0.99	0.15	0.20	-10.69%	-6.52%	9.41%
Sample Global Portfolio	12.86%	3.92%	2.24	-0.71	0.59	-1.85%	-1.85%	2.66%
CISDM Equal Weighted Hedge Fund Index	10.79%	4.49%	1.50	-0.47	-0.37	-2.24%	-1.68%	3.28%
CSFB Hedge Fund Index	10.69%	4.18%	1.59	-0.22	-0.51	-1.46%	-1.46%	3.23%
HFR Fund Weighted Composite Index	11.04%	4.67%	1.50	-0.35	-0.55	-2.36%	-1.56%	3.49%
CSFB/Tremont Investable Index	6.52%	2.93%	0.84	-0.18	-0.66	-1.17%	-1.09%	1.86%
S&P 500 Total Return Index	10.22%	6.88%	0.90	-0.27	-0.91	-4.00%	-2.88%	3.78%
Lehman U.S. Aggregate Index	3.38%	2.88%	-0.24	-0.26	-1.32	-1.81%	-1.03%	1.53%
3M Libor	4.43%							

Factor Exposures: Fund Level

We now examine the results of the multi-factor regressions. These results are presented in Exhibit 9. Exhibit 9A presents results for Sample I, Exhibit 9B for Sample II and Exhibit 9C for Sample III. In contrast to the portfolio level regressions conducted earlier, the R-squares range from low to fairly high (.11 to .80). We see that measured alpha varies significantly over managers, but that it is generally positive: the per month median alpha for Sample 1 is 57 bps; for Sample II it is 31 bps; for Sample III, it is 94 bps. This compares favorably to measured alpha for each of the non-investable hedge fund indices for this time period of between 4 and 10 bps per month.

These results are significantly different from the portfolio level regressions conducted earlier, though in part this is due to the fact that we are looking at a shorter time period than we did for portfolio level results. We can see that there is a diversity of factor exposures across managers even within samples that showed significant portfolio level exposures to market factors. We can also see, for example, that managers in Samples II and III tend to have more equity exposure than those in Sample I.

In order to examine significant factor components for each group we conducted principal components analysis on the correlation matrices of each sample. We find that Sample I is the most diversified Sample set, with five factors required to explain 80% of the variation across managers. Sample III requires five factors as well, but the explanatory power of each factor is less evenly distributed. Sample II is the least diversified in terms of factor exposure, requiring only three factors to explain 80% of the variation in returns across managers.

Overall, our fund level results show that funds on operational platforms exhibit modest but measurable advantages as compared to the universe funds that are not. Although we worked with a small sample, we found that such funds do outperform investable and non-investable indices at the portfolio level as well as at the fund level in certain cases. Our results are most clear and consistent at the blended global Sample, a portfolio of all funds with institutional relationships; unfortunately due to relatively small samples, our results do not allow us to definitively distinguish specific performance effects according to the type of institutional relationship (seed, operational platform, or both).

Exhibit 9: Factor Regression Results for Individual Funds

Coefficients Sample I								T-Stats Sample I							
Alpha	SP500	Credit	Rates	VIX	Size	Gro vs Val	R2	Alpha	SP500	Credit	Rates	VIX	Size	Gro vs Val	
0.0091	0.363	0.279	0.006	-0.338	0.361	-0.160	0.298	1.6499	0.675	0.945	0.016	-0.473	0.532	-0.332	
0.0091	0.253	0.177	0.334	-0.273	-0.472	-0.058	0.120	1.5284	0.438	0.559	0.875	-0.357	-0.648	-0.112	
0.0019	-0.023	-0.067	0.028	0.005	0.115	0.095	0.257	1.8494	-0.223	-1.193	0.408	0.040	0.885	1.028	
0.0057	0.116	-0.006	0.045	0.089	0.471	-0.086	0.458	3.6617	0.771	-0.076	0.456	0.445	2.478	-0.640	
-0.0003	-0.574	0.429	-0.408	0.918	-0.523	0.305	0.603	-0.0875	-1.589	2.168	-1.710	1.916	-1.149	0.943	
0.0027	-0.122	0.074	-0.447	0.462	-0.446	0.482	0.699	0.9784	-0.447	0.498	-2.482	1.278	-1.299	1.972	
-0.0040	-0.789	0.596	-0.222	0.959	-0.395	0.023	0.378	-0.7726	-1.571	2.164	-0.669	1.439	-0.623	0.052	
-0.0003	0.273	-0.057	-0.196	-0.593	-0.185	0.955	0.411	-0.0411	0.379	-0.143	-0.412	-0.620	-0.203	1.479	
0.0111	0.172	-0.216	0.516	-0.122	0.102	-0.299	0.172	1.1528	0.183	-0.422	0.834	-0.098	0.087	-0.357	
0.0121	0.126	-0.203	0.467	-0.087	0.150	-0.356	0.169	1.2581	0.134	-0.395	0.751	-0.069	0.126	-0.422	
-0.0005	-0.006	0.071	0.075	0.255	0.585	-0.033	0.496	-0.2266	-0.031	0.668	0.582	0.986	2.375	-0.190	
0.0039	0.098	0.157	0.159	-0.014	-0.370	0.026	0.244	1.7868	0.456	1.336	1.117	-0.048	-1.366	0.135	
0.0130	0.815	0.054	-0.357	0.209	1.513	-0.735	0.457	2.2446	1.441	0.174	-0.955	0.279	2.121	-1.450	
0.0065	0.923	-0.276	0.282	0.317	0.917	0.369	0.542	1.3807	2.004	-1.094	0.926	0.519	1.579	0.895	
0.0081	0.969	0.116	-0.273	-0.402	0.144	-0.479	0.320	1.3799	1.692	0.370	-0.722	-0.529	0.200	-0.934	

Coefficients Sample II								T-Stats Sample II							
Alpha	SP500	Credit	Rates	VIX	Size	Gro vs Val	R2	Alpha	SP500	Credit	Rates	VIX	Size	Gro vs Val	
0.0112	1.177	-0.167	-0.191	0.429	0.425	-0.037	0.563	2.6725	2.873	-0.743	-0.706	0.789	0.822	-0.102	
0.0077	0.528	-0.013	0.257	-0.028	-0.040	0.196	0.449	3.3166	2.324	-0.104	1.712	-0.094	-0.140	0.961	
0.0002	0.172	-0.119	0.156	-0.324	-0.049	-0.063	0.569	0.1776	1.323	-1.666	1.818	-1.883	-0.297	-0.538	
0.0029	-0.032	0.082	-0.185	0.172	0.289	0.180	0.702	1.6446	-0.182	0.861	-1.606	0.746	1.315	1.154	
0.0091	0.146	0.409	-0.339	0.740	0.581	0.232	0.689	2.0445	0.337	1.720	-1.182	1.286	1.062	0.596	
0.0035	0.511	-0.025	-0.106	-0.157	0.280	-0.119	0.665	2.1505	3.222	-0.284	-1.010	-0.744	1.397	-0.837	
0.0071	0.328	-0.040	0.066	-0.010	0.426	-0.278	0.269	3.1507	1.493	-0.329	0.456	-0.033	1.539	-1.414	
0.0097	-1.257	0.467	-1.066	-0.217	0.336	0.427	0.278	0.7705	-1.025	0.694	-1.315	-0.134	0.217	0.389	
0.0032	0.568	0.067	-0.131	0.420	0.643	0.092	0.725	1.1386	2.053	0.441	-0.718	1.144	1.841	0.372	
0.0031	0.179	0.100	0.050	0.151	0.330	-0.019	0.542	1.8926	1.108	1.129	0.463	0.702	1.615	-0.131	
-0.0008	0.077	0.165	-0.238	-0.532	0.066	-0.257	0.196	-0.1868	0.186	0.725	-0.870	-0.967	0.126	-0.692	
-0.0021	0.206	0.189	0.099	-0.076	-0.168	0.420	0.571	-0.7655	0.773	1.294	0.560	-0.215	-0.498	1.758	
0.0008	0.255	0.139	-0.020	-0.005	0.217	0.074	0.585	0.3797	1.184	1.175	-0.141	-0.017	0.798	0.383	
0.0034	0.252	0.040	0.040	0.047	0.264	0.013	0.518	2.0763	1.582	0.458	0.382	0.223	1.317	0.093	
0.0026	0.108	0.098	0.047	-0.109	0.181	0.003	0.487	1.7216	0.724	1.204	0.473	-0.553	0.962	0.021	
0.0025	0.211	0.084	0.067	-0.167	0.211	-0.020	0.460	1.3199	1.155	0.838	0.559	-0.690	0.918	-0.122	
0.0023	0.139	0.216	-0.163	0.291	0.345	0.046	0.817	1.4228	0.899	2.550	-1.592	1.417	1.769	0.335	

Exhibit 9: Factor Regression Results for Individual Funds (Continued)

Coefficients Sample III								T-Stats Sample III							
Alpha	SP500	Credit	Rates	VIX	Size	Gro vs Val	R2	Alpha	SP500	Credit	Rates	VIX	Size	Gro vs Val	
0.0083	-0.840	-0.667	-2.927	-1.243	1.523	-1.617	0.115	0.2645	-0.274	-0.397	-1.444	-0.306	0.394	-0.588	
0.0048	0.082	-0.074	-0.598	-0.249	0.511	-0.394	0.202	0.8970	0.157	-0.259	-1.735	-0.361	0.777	-0.843	
0.0174	1.017	-0.140	-0.686	-0.806	1.090	0.117	0.513	1.9506	1.171	-0.293	-1.194	-0.699	0.995	0.151	
0.0032	-0.196	0.054	0.192	0.138	0.385	0.275	0.464	1.3316	-0.847	0.422	1.252	0.451	1.318	1.323	
0.0172	1.026	0.022	-0.154	-0.323	0.995	-0.874	0.171	1.8303	1.117	0.045	-0.253	-0.265	0.859	-1.061	
0.0190	0.985	0.016	-0.373	-0.567	0.915	-0.949	0.191	2.0394	1.082	0.033	-0.619	-0.470	0.796	-1.163	
-0.0109	0.526	0.730	-0.481	1.230	1.614	0.141	0.640	-1.1841	0.587	1.485	-0.811	1.034	1.427	0.175	
-0.0005	0.290	-0.057	-0.175	-0.633	-0.184	0.949	0.407	-0.0627	0.402	-0.144	-0.366	-0.660	-0.201	1.464	
-0.0001	0.301	-0.203	-0.277	-0.490	-0.019	0.539	0.300	-0.0223	0.485	-0.599	-0.676	-0.597	-0.024	0.970	
0.0128	1.084	-0.278	-0.296	0.689	1.160	-0.048	0.647	2.9713	2.589	-1.211	-1.070	1.242	2.196	-0.128	
0.0110	1.389	-0.114	0.073	0.621	0.623	-0.212	0.359	1.7668	2.297	-0.344	0.183	0.775	0.817	-0.391	
0.0105	0.453	0.425	0.056	-0.813	0.328	0.127	0.645	2.2828	1.013	1.732	0.189	-1.370	0.582	0.317	

Exhibit 10: Correlation and Factor Structure of Samples

Correlation Matrix Sample I															
	S1x1	S1x2	S1x3	S1x4	S1x5	S1x6	S1x7	S1x8	S1x9	S1x10	S1x11	S1x12	S1x13	S1x14	S1x15
S1x1	1.000	0.312	0.432	0.545	0.322	0.381	0.140	0.630	0.412	0.408	0.348	-0.192	0.585	0.624	0.391
S1x2	0.312	1.000	-0.303	-0.007	0.013	-0.036	0.089	0.112	0.412	0.405	-0.018	-0.108	0.308	0.323	0.046
S1x3	0.432	-0.303	1.000	0.521	0.138	0.194	0.034	0.373	0.183	0.171	0.228	-0.097	0.180	0.282	0.052
S1x4	0.545	-0.007	0.521	1.000	-0.040	-0.010	-0.053	0.396	0.214	0.229	0.745	-0.223	0.499	0.370	0.082
S1x5	0.322	0.013	0.138	-0.040	1.000	0.784	0.838	0.342	-0.074	-0.057	-0.061	-0.054	0.126	0.141	0.135
S1x6	0.381	-0.036	0.194	-0.010	0.784	1.000	0.331	0.608	-0.119	-0.117	0.062	-0.230	0.295	0.399	0.230
S1x7	0.140	0.089	0.034	-0.053	0.838	0.331	1.000	0.019	-0.042	-0.020	-0.140	0.118	-0.033	-0.118	-0.030
S1x8	0.630	0.112	0.373	0.396	0.342	0.608	0.019	1.000	-0.042	-0.041	0.443	-0.175	0.553	0.687	0.333
S1x9	0.412	0.412	0.183	0.214	-0.074	-0.119	-0.042	-0.042	1.000	0.998	0.005	-0.159	0.166	0.135	-0.237
S1x10	0.408	0.405	0.171	0.229	-0.057	-0.117	-0.020	-0.041	0.998	1.000	0.020	-0.165	0.166	0.125	-0.241
S1x11	0.348	-0.018	0.228	0.745	-0.061	0.062	-0.140	0.443	0.005	0.020	1.000	-0.433	0.459	0.393	0.059
S1x12	-0.192	-0.108	-0.097	-0.223	-0.054	-0.230	0.118	-0.175	-0.159	-0.165	-0.433	1.000	-0.109	-0.214	-0.257
S1x13	0.585	0.308	0.180	0.499	0.126	0.295	-0.033	0.553	0.166	0.166	0.459	-0.109	1.000	0.663	0.200
S1x14	0.624	0.323	0.282	0.370	0.141	0.399	-0.118	0.687	0.135	0.125	0.393	-0.214	0.663	1.000	0.367
S1x15	0.391	0.046	0.052	0.082	0.135	0.230	-0.030	0.333	-0.237	-0.241	0.059	-0.257	0.200	0.367	1.000

Explained Variance (Eigenvalues)															
Value	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12	PC 13	PC 14	PC 15
Eigenvalue	4.570	2.665	2.115	1.481	1.060	0.967	0.759	0.391	0.341	0.242	0.169	0.140	0.098	0.003	0.001
% of Var.	30.465	17.764	14.097	9.871	7.067	6.446	5.058	2.606	2.276	1.612	1.124	0.936	0.653	0.021	0.004
Cum. %	30.465	48.230	62.326	72.198	79.265	85.711	90.768	93.374	95.651	97.263	98.387	99.323	99.976	99.996	100.000

Exhibit 10: Correlation and Factor Structure of Samples (Continued)

Correlation Matrix Sample II																	
	S1x1	S1x2	S1x3	S1x4	S1x5	S1x6	S1x7	S1x8	S1x9	S1x10	S1x11	S1x12	S1x13	S1x14	S1x15	S1x16	S1x17
S2x1	1.000	0.706	-0.145	0.508	0.560	0.849	0.275	0.051	0.842	0.682	0.431	0.665	0.799	0.777	0.598	0.627	0.675
S2x2	0.706	1.000	0.097	0.296	0.340	0.740	0.415	0.146	0.701	0.708	0.348	0.633	0.708	0.755	0.610	0.669	0.517
S2x3	-0.145	0.097	1.000	-0.477	-0.450	-0.142	0.232	-0.330	-0.356	-0.061	0.111	-0.370	-0.202	-0.064	0.040	0.116	-0.583
S2x4	0.508	0.296	-0.477	1.000	0.951	0.578	0.081	0.209	0.754	0.623	0.171	0.427	0.618	0.550	0.454	0.413	0.765
S2x5	0.560	0.340	-0.450	0.951	1.000	0.606	0.081	0.150	0.760	0.683	0.212	0.448	0.659	0.594	0.523	0.489	0.779
S2x6	0.849	0.740	-0.142	0.578	0.606	1.000	0.420	0.108	0.875	0.799	0.553	0.706	0.882	0.885	0.754	0.779	0.728
S2x7	0.275	0.415	0.232	0.081	0.081	0.420	1.000	-0.276	0.271	0.480	0.438	0.340	0.415	0.373	0.452	0.488	0.163
S2x8	0.051	0.146	-0.330	0.209	0.150	0.108	-0.276	1.000	0.269	0.204	-0.107	0.203	0.156	0.151	0.111	0.075	0.490
S2x9	0.842	0.701	-0.356	0.754	0.760	0.875	0.271	0.269	1.000	0.873	0.386	0.759	0.913	0.884	0.719	0.709	0.893
S2x10	0.682	0.708	-0.061	0.623	0.683	0.799	0.480	0.204	0.873	1.000	0.490	0.678	0.906	0.907	0.876	0.867	0.752
S2x11	0.431	0.348	0.111	0.171	0.212	0.553	0.438	-0.107	0.386	0.490	1.000	0.473	0.684	0.559	0.756	0.760	0.293
S2x12	0.665	0.633	-0.370	0.427	0.448	0.706	0.340	0.203	0.759	0.678	0.473	1.000	0.842	0.730	0.684	0.654	0.728
S2x13	0.799	0.708	-0.202	0.618	0.659	0.882	0.415	0.156	0.913	0.906	0.684	0.842	1.000	0.925	0.906	0.895	0.811
S2x14	0.777	0.755	-0.064	0.550	0.594	0.885	0.373	0.151	0.884	0.907	0.559	0.730	0.925	1.000	0.868	0.872	0.708
S2x15	0.598	0.610	0.040	0.454	0.523	0.754	0.452	0.111	0.719	0.876	0.756	0.684	0.906	0.868	1.000	0.991	0.634
S2x16	0.627	0.669	0.116	0.413	0.489	0.779	0.488	0.075	0.709	0.867	0.760	0.654	0.895	0.872	0.991	1.000	0.599
S2x17	0.675	0.517	-0.583	0.765	0.779	0.728	0.163	0.490	0.893	0.752	0.293	0.728	0.811	0.708	0.634	0.599	1.000

Explained Variance (Eigenvalues)																	
Value	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12	PC 13	PC 14	PC 15	PC 16	PC 17
Eigenvalue	10.236	2.515	1.037	0.844	0.752	0.612	0.313	0.192	0.155	0.122	0.092	0.051	0.044	0.026	0.007	0.002	0.001
% of Var.	60.213	14.793	6.102	4.963	4.422	3.601	1.840	1.131	0.913	0.720	0.541	0.298	0.256	0.153	0.041	0.010	0.003
Cum. %	60.213	75.006	81.108	86.071	90.493	94.094	95.933	97.065	97.978	98.698	99.239	99.537	99.793	99.946	99.987	99.997	100.000

Correlation Matrix Sample III												
	S1x1	S1x2	S1x3	S1x4	S1x5	S1x6	S1x7	S1x8	S1x9	S1x10	S1x11	S1x12
S3x1	1.000	-0.093	-0.089	-0.046	-0.065	-0.015	0.024	-0.008	0.014	-0.070	-0.209	0.030
S3x2	-0.093	1.000	0.349	0.003	0.285	0.322	0.249	0.225	0.190	0.198	0.245	0.333
S3x3	-0.089	0.349	1.000	0.288	0.391	0.399	0.529	0.466	0.394	0.712	0.588	0.490
S3x4	-0.046	0.003	0.288	1.000	0.266	0.241	0.181	0.487	0.357	0.265	0.263	0.292
S3x5	-0.065	0.285	0.391	0.266	1.000	0.990	0.348	0.657	0.532	0.166	0.477	0.547
S3x6	-0.015	0.322	0.399	0.241	0.990	1.000	0.354	0.675	0.560	0.172	0.520	0.547
S3x7	0.024	0.249	0.529	0.181	0.348	0.354	1.000	0.525	0.419	0.659	0.470	0.686
S3x8	-0.008	0.225	0.466	0.487	0.657	0.675	0.525	1.000	0.893	0.361	0.536	0.570
S3x9	0.014	0.190	0.394	0.357	0.532	0.560	0.419	0.893	1.000	0.243	0.438	0.441
S3x10	-0.070	0.198	0.712	0.265	0.166	0.172	0.659	0.361	0.243	1.000	0.546	0.287
S3x11	-0.209	0.245	0.588	0.263	0.477	0.520	0.470	0.536	0.438	0.546	1.000	0.379
S3x12	0.030	0.333	0.490	0.292	0.547	0.547	0.686	0.570	0.441	0.287	0.379	1.000

Explained Variance (Eigenvalues)												
Value	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12
Eigenvalue	5.360	1.536	1.141	1.076	0.725	0.662	0.626	0.366	0.329	0.108	0.066	0.005
% of Var.	44.665	12.800	9.510	8.969	6.040	5.517	5.215	3.051	2.738	0.901	0.552	0.041
Cum. %	44.665	57.465	66.976	75.944	81.985	87.502	92.716	95.768	98.505	99.406	99.959	100.000

Conclusions

Hedge fund incubation and operational platforms are an increasingly important organizational form in the hedge fund industry, allowing newer managers to take advantage of the benefits of affiliation with larger institutions. This is the first article that examines performance and related characteristics of seeded funds as well as funds on operational platforms. We defined hedge fund incubation platforms as firms that provide one or more of the following services: seed capital, legal, administrative, operational, and marketing (beyond mere prime broker capital introduction). We provided an analytical discussion of the economics associated with affiliation and bundled sourcing of operational services. We examined the performance of various funds that are provided one or more of the aforementioned services by major institutions. Our results generally indicated that portfolios of managers in Samples organized and aggregated with respect to the nature of institutional affiliation outperform hedge fund benchmarks, particularly on risk and factor-exposure adjusted bases. Further, on a blended basis—combining funds from across Samples—we found that the institutionally affiliated funds outperform investable and non-investable indices at the portfolio level, as well as at the fund level. In part because of the sizes of Samples, our results do not allow us to establish conclusive differences in performance between funds in different samples that made use of such services in different combinations.

Appendix

Select Fund Failures and Risks

Fund Name	Risk(s)	Year Failed
Amaranth, LLC	1, 8	2006
MotherRock, LP	1, 7, 8	2006
International Management Associates	5, 6, 8	2005
Bayou Funds	5, 6, 8	2005
KL Group	2, 5, 6, 8	2005
V-tek Capital	4, 5, 8	2004
Marque-Millennium Group	2, 4, 5, 8	2003
Lancer Management Group LLC	4, 5, 8	2003
Rhino Advisers Inc.	1, 8	2003
Beacon Hill Asset Management, LLC	6, 8	2002
Manhattan Capital Management, Inc.	1, 3, 5, 10	2000

Table drawn directly from Davidson and Meziani (2007).

Concentration of Strategy=1, Inexperienced or Untested Staff=2, Unclear Overall Business Viability=3,
Service Provider Track Record=4, Haphazard Risk Management=5, No Written Valuation Procedures=6
Inappropriate Leverage=7, Governance Practices=8, Technology Infrastructure=9
Unclear Business Continuity Plan=10



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