Analyzing Hedge Funds: A Social Network Perspective

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Abstract – 1000

When actors invest in making strong network ties (relationships) with other actors, such ties can potentially influence behavior and subsequent financial performance, but the strength and direction of these effects is debated. Using original qualitative and quantitative fine-grained data that documents the nature and extent of the relationships between Hedge Funds through their Prime Brokers, i.e. banks that provide leverage, issue credit lines and serve as bridges between Hedge Funds, this research project aims at uncovering the social topology that shapes this global alternative asset market. Contrasting much recent research that tends to stress the positive effects of network relationships, we believe that investing in network relationships in this industry has a "dark side", in terms of both performance and risk taking. The project will explore this idea through a mixed method approach, combining large sample statistics with micro-level fieldwork.

Abstract (Italiano) - 1000

Il presente lavoro è diretto ad investigare l’influenza delle relazioni che si instaurano tra Hedge Funds tramite i rispettivi Prime Brokers, i.e. banche che forniscono leverage, line di credito e consulenza, sugli Hedge Funds stessi. In contrasto rispetto a quanto accade in altri contesti, l’effetto positivo del network potrebbe nel caso specifico essere più che compensato dal “dark side”, soprattutto in relazione alle performance realizzate e all’assunzione di rischio degli attori. Il presente progetto intende esplorare questa idea, utilizzando diversi approcci che richiamino sia metodi quantitativi tradizionali che osservazioni sul campo.

Progetto di ricerca

Hedge funds (HF) are pooled investment vehicles privately organized, administered by professional investment-managers, and not widely available to the general public. Due to their private nature, HFs have less restrictions on the use of leverage, short-selling, and derivatives than more regulated vehicles such as mutual funds. This allows them to follow investment strategies that are significantly riskier from those of the non-leveraged, long-only regulated investment portfolio. HF were started in the late 1940s, but in their current form they emerged in the late 80s and have grown dramatically since then. Their proliferation in recent years has indelibly altered the risk/reward landscape of financial investments. Around 9,000 HFs have an estimated $1,500B asset under management. These lightly-regulated rather opaque investment partnerships have generally yielded high returns historically, but not without commensurate risks, and such risks are currently not widely appreciated or well understood. Many funds (such as York Capital and Argo Capital) have been founded quite recently, and gathered more than one billion dollars from investors. The size of their activities is so great that they have been accused of “moving markets”; and they are associated with unprecedented risk taking, herding behaviours and the channelling risks to unsuspecting institutions in other parts of the financial communities. Yet, little is known about the activities of this secretive industry and, how it operates. Of course, there is a substantial and rich research stream on hedge funds from the finance discipline. But while this tradition of research has focused extensively on the wealth, incentives and performance drivers of the operators it has almost completely disregarded the fact that the performance and behaviour of hedge funds are embedded in larger social structures that create opportunities but also constraints for action. Indeed, it is now widely accepted that several financial markets are organized by social networks rather than spot market transactions.
This project brings together ideas and analytic tools from finance, social network theory and organizational sociology, in order to advance a socio-structural perspective to the understanding of the hedge-fund industry. Building on original qualitative and quantitative fine-grained data on the relationships between hedge funds and prime brokers (banks that provide leverage, issue credit lines and serve as bridges between hedge funds and investors) and on the affiliation structure resulting from the interfirm mobility of hedge fund managers, we plan to investigate the role of this social topology in shaping hedge funds’ performance and risk dynamics. Based on this kind of analysis, we want to paint a deeper understanding of the possible drivers of hedge funds performance, and point to the importance of additional fundamentals beyond those previously documented in the academic literature. More generally, the project will shed light on the hedge fund industry’s social networks and their implications on performance and risk.

An increasing scholarly literature on hedge funds can be found in the financial journals. Most of this research has taken a fairly traditional view, looking at how hedge funds are individually structured (in the sense of the financial strategies they adopt), and providing insights as to why one should expect high and persistent hedge fund performance, whether incentive fees are reasonable and identifying several risk factors for investors such as poor risk management, liquidity risk, and strategy risk (see for instance: Mitchell & Pulvino, 2001; Fung, Hsieh, 2004; Boyson, 2003). On the other hands, some recent works have also been undertaken on how individual-level characteristics such as managerial experience and managers’ career moves can influence hedge fund behaviour and returns. Brown, Goetzmann and Park (2001), for instance, analyzed the effect of managerial skills on hedge funds survival rate. Similarly, Edwards and Caglayan (2007) found the persistence of hedge funds excess returns to be associated to the skills of their managers. Boyson et al looked at the role of managerial experience in shaping hedge funds’ performance. Li et al. (2007) used a large sample of hedge fund manager characteristics to provide a comprehensive take on the impact of various manager characteristics, such as education and career concern, on Hedge Funds’ performances. This emerging stream has brought fresh insights to the understanding of the hedge-fund industry showing the viability and power of a more individual-centred approach to the study of hedge funds; yet it has not accounted for the fact that these actors do not operate in a vacuum but are embedded in a structure of social exchanges that shapes significantly their choices.

Addressing these shortcomings requires modelling the connections at the level of the firm as well as a more micro examination of the social networks of the individuals that work in the industry. We intend to analyze each of these aspects separately and discuss their implications for our understanding of the hedge fund industry emergence and performance.

The idea that financial markets should be conceptualized as networks of relationships is not new. It can be traced to seminal contributions by sociologists like Granovetter (1985) and White (1981) who explain that market relations are inherently ‘social’ in that a (financial) market is a structure of ongoing and relatively stable exchange ties among buyers and sellers of (financial) resources. These ties convey information as well as status and legitimation. Making connections to the hedge fund context, empirical research has demonstrated that bulge-bracket investment banks make use of strong ties with institutional investors when pricing and distributing corporate securities (Cornelli and Goldreich, 2001). In the corporate loan market, banks often prefer syndicating with loans with other banks over being the sole lender. In the primary equity and bond markets, banks tend to co-underwrite securities offerings with which they have long, standing relationships (Ljungqvist et al., 2005). Extending the above arguments to lending relationships Uzzi (1999) also suggests that the availability and costs of a firm’s capital varies with the degree to which its commercial transactions with a bank are embedded in social attachments. Social networks furnish governance and access to private information benefits that can channel resources and motivate attempts at integrative solutions to lending problems that are not available through market ties. Building on similar ideas, Hochberg et al (2007)

1 Such an analysis needs to go beyond traditional industrial economic analysis of concentration of assets (that is low in this industry) towards looking at how the industry emerged and the degree to which actors are connected (that is by this measure unusually high in this sector due to the presence of Prime Brokers).
have demonstrated that in the venture capital (VC) industry, better networked VC firms experience significantly better performance.

Recent ethnographic evidence suggests that social networks feature prominently among the firms and in the hedge fund industry as well (Beunza et al., 2006; MacKenzie, 2006). Hedge Funds are part of a rich network of inter-organisational connections, through which a thick flow of information circulates, including research reports, news, prices, information about what major categories of market actors are doing (and sometimes why they are doing it), and so on. Some of this flow is direct hedge-fund to hedge fund, but much of it originates from or passes through a more traditional category of actor: prime brokers that are very central to the functioning of the industry. Typically, a prime broker is an investment bank that provides leverage, issue credit lines and has trading capacity in major markets round the world. As credit institutions they are key lenders of cash and stock collateral to hedge funds. In addition they serve as bridges between hedge-funds and investors. In fact, according to Deutsche Bank’s 2004 Alternative Investment Survey, more than 40% of investors identify new hedge fund managers by prime brokers or word of mouth. Thus, hedge-funds are bound by their need for selected information and access to the capital market into web of relationships with other hedge-funds and their brokers.

At the same time, there is an established literature in finance that observes risk contagion effects of herding between market players. However, only limited research has addressed in detail the micro-mechanisms that are conducive to these effects. As a compendium to the first theme we therefore plan to investigate the potential for network affiliations to foster herding and mimicry in risk-taking behaviour across organizational boundaries. To this aim we are especially interested in analyzing the interfirm circulation of managers. Examining the interfirm movement of individuals has an established history in Management Research (Boeker, 1997; Almeida and Kogut, 1999; Rosenkopf and Almeida, 2003). For instance, Boeker (1997) illustrates how corporate level strategic choices, as reflected in product-market entry decisions, are influenced by executive migration and by the unique set of skills and mindsets that top managers bring in from their prior organizations. In a recent study, Corredoira and Rosenkopf (2006) demonstrate that employees often maintain preferential knowledge corridors with their former employers. Similarly, our analysis of where managers come from when they join the hedge fund nexus might shed light on why and how some firms (such as German Banks in late 2007) have suffered extensively as a result of buying products originating from within the nexus. We may be able to uncover hitherto unseen links between actors. Tracing ties between individuals on account of their past employment histories should allow us to better understand the extent to which hedge fund managers can increase their ability to tap and share information, perhaps selectively (Peterson and Rajan 1994, 2002; Uzzi 1999). As the recent Society General case showed, it was the past employment history of one of its employees that allowed extreme risk channelling to take place. Thus it is reasonable to think that network analysis at the level of the individual hedge fund managers, based on their past-employments, will shed new light on risk circulation and risk-taking behaviour.

Our preliminary analysis suggests that many of the hedge-fund managers move repeatedly across funds during their career, while some had had an earlier career with non-hedge-fund related financial institutions such as investment banks. To the best of our knowledge these patterns of prior professional affiliation and fund-to-fund transfer have not been addressed in previous studies on the hedge-fund industry and therefore lend themselves to fresh theoretical and empirical work. It is our contention that the analysis of hedge funds through the theoretical lenses provided by the Social Network Theory undertaken at three levels of analysis (the sector as a whole, the level of the hedge fund firm and its partner Prime Broker; as well as the level of the individual managers) has the potential to generate powerful insights at multiple levels.

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2 For more see the work of: Coleman, 1991; Wasserman and Faust, 1994; Granovetter 1974, Geertz 1978). In addition, research has shown that embedded ties promote private knowledge transfer because expectations of trust and reciprocity provide assurances that the transfer will be used to the mutual benefit of both parties (Uzzi 1999).
Below we specify more precisely the central research questions we want to address:

This micro, bottom-up approach to analyzing at the relational features of an industry is relatively novel for the finance field (see for instance Hochberg et al, Journal of Finance, 2007) but well established in organizational theory. We will look at the network structure of hedge-funds with other key actors, including other hedge funds and prime-brokers. In particular, the relationship between prime brokers and hedge funds represents a natural starting point, as it can be tracked on a large scale using secondary data sources, and because it is likely to shape hedge funds performance. These networks are channels through which information percolate. Measures of how well connected hedge funds are in this structure can therefore be used as proxies of their ability to tap information flows, contacts and resources dispersed in the field. From an empirical standpoint this requires computing indices of network connectivity such as network centrality, betweenness or closeness.

These network measures can then be associated to various measures of individual fund performance, and the variation in performance across the industry in a manner that is new to finance scholars. For example, we plan to relate our measures to traditional measures of fund performance such as the Sharpe-ratio and the skew and kurtosis. We also plan to investigate whether hedge-funds attached to prestigious alters are less likely to fail or if there is a relationship between the embeddedness of hedge funds in the social structure of the field and their vital rates. These somewhat traditional questions from a theory perspective will be supplemented by additional (and we suggest more novel) questions. For instance, we also plan to see if network measures are related to resource munificence in the sense of the size of the funds under management (if and when we can get the data). And we plan to relate network measures to more singular measures of risk, such as debt write-offs by Sub Prime Brokers (currently totalling nearly $100 billions).

Although direct copying of trading strategies is difficult because of the secrecy of hedge fund trades, sharing of information appears to occur between groups of hedge funds through prime-brokers and also at the individual level, via interfirm mobility of managers. Anecdotal evidence, for instance, suggests that prime brokers do sometimes inform some of their hedge fund clients about selective trades made by others (Danielsson et al, 2005). Likewise, in a recent report from the Financial Times it was observed that the movement of individual managers from investment banks into positions as hedge fund managers could create a potential similarity in trading strategies between former colleagues and also their employers (“A Health Warning on Hedge Funds”, Financial Times, 2004).

Consistent with these ideas, we see two approaches through which a social network perspective can improve our understanding of risk-taking behaviour and the potential for herding in hedge funds’ strategies. First, at the firm level, we know from seminal work in the social network tradition, that organizational actors are more prone to mimicry when they are connected (Galaskiewicz and Wasserman, 1989). Empirically, there are various approaches that can be used to gauge this effect. The analysis of the clustering of the hedge-funds/brokers network, for instance, can highlight zones in the industry where herding behaviours are more likely. Measure of network cohesion could also be computed to identify groups of hedge-funds at risk of herding. Second, at the individual level, we can look at how individual managers are related to each other through prior common job affiliation. This kind of network affiliation analysis will provide greater granularity to our analysis of self-similarity drivers allowing us to better monitor risks generated by herding and cognitive homogeneity.

To ground this kind of analysis, we also intend to undertake a small scale fieldwork on the internal processes of hedge funds observing how they manage their information flows. This work is intended to borrow from and complement the work of organizational sociologists such as Beunza et al. (2006) and MacKenzie (2003) on the social structure of hedge funds behaviour. We believe that such fine grained work will give important clues and corroborative evidence on how the micro-to-macro linkages operate. We anticipate a small number
of “immersion studies” focusing on the dynamics of interplays in a specially (not random) selected set of firms: Long Only; Highly Quantitative: Event Driven.

**Piano di attività**

The project requires a significant data collection effort. Both primary and secondary sources will have to be tapped and combined. About 90% of HFs are located in London and New York. We plan to conduct extensive fieldwork in the main financial centres (London and NY) to enhance our understanding of how the industry is structured and operates. Our approach will be to interview key hedge-fund players and their network parties to identify how they characterize their relationship with others key parties in the industry, and how they describe the role of their affiliation network in shaping group dynamics and strategic decisions. The initial interviews conducted suggest that we are correct in our framework that sees hedge funds as being embedded in a rich texture of individual and organizational level ties that shape behaviour and performance (Miller, 2008). Sources of data on the ties that exist between firms and between firms and prime brokers are on well-established databases on the hedge fund industry, including the TASS and HFR databases, arguably the most comprehensive sources on the industry. The aforementioned databases contain information on respectively about 5,000 and 7,500 HF and their managers. One interesting feature of the TASS database is that it is divided into two parts: “Live” and “Graveyard” funds. HFs in the “Live” database are active and once a fund is considered no longer active, it is transferred to the “graveyard” section. This kind of data structure is extremely useful as it allows us to estimate survivorship models based on liquidation events. Available data includes monthly net-of fee returns, expenses, fees, size, terms, age and style of the funds as well as information on prime brokers. Those databases also provide biographical sketches of the key managers involved in each fund, including information, such as age, educational, and prior work experience. Individual current and past affiliations can be gathered from additional sources. In particular, due to regulatory rules of the FSA, audited details of the prior work experience of UK associated hedge fund managers can be obtained from regulatory sources available online. We have already the TASS database. We need to integrate it with the HFR database.

We will map the linkages between two related populations, i.e. hedge funds and prime brokers. The network connecting these two related populations can be modeled as a bipartite undirected network with hedge funds companies and prime brokers as the two actors. In this network, a tie between a hedge fund and a prime broker exists if the latter is listed in the database as providing services to the former. We adopt a somewhat similar approach to mapping the linkages at the individual level data on managers’ prior job affiliation. An affiliation network is a network of vertices connected by common group memberships such as projects, teams or organizations. Likewise, we could construct networks of managers in which a link between any two managers reflects prior experience in the same company (the underlying assumption here would be that these managers are more likely to exchange information due to the common experience. It seems also plausible to assume that such managers are more prone to similarity in financial strategies due to their common professional background).

The rich financial literature on hedge funds suggests various metrics to gauge hedge funds performance. We will use the aforementioned sources to construct our databases on financial performance. In principle, we should be able to compute three types of outcome measures. **Survival:** As already pointed out our sources provide information on hedge funds liquidation events as well as other forms of exit. These kinds of data can be modelled using event history techniques; **Performance:** The traditional approach to model hedge funds performance is to use simple annualized “excess of risk-free rate-of-return” measures. These require multi-factor modelling as suggested by Fama and French (1993, 1995, 1996). Other more sophisticated measures can be utilised as well that control for exposure to indices in the spirit of a Sharpe Style of analysis (see for instance Sharpe: 1992; 1994) as is suggested by Fung and Hsieh (2001). **Risk:** We plan to develop a database...
on risk in the industry by tracking “debt” write offs and “announcements of losses” related to sub-prime loans and other matters. Such data are likely to be gathered from public websites and regulatory agencies. In addition, we will examine Skew and Kurtosis. Additional metrics can be found by tracking error deviation measured relative to a fund-of-funds (FOF) index. Once the adjacency matrices have been created we can compute various measures to gauge the salient properties of network and the structural position of each actor. We plan to divide our network analytic strategy into two parts. The first part will consist of visual representations and descriptive statistics of the networks in order to highlight critical trends and patterns in the data. The relational structure of the hedge funds industry will be visualized, inspected and quantified based on software packages such as UCINET VI (Borgatti et al., 2002) and Pajek (de Nooy et al., 2004). Both types of matrices (hedge fund-brokers; managers-managers) can be scrutinized following this approach. The analysis will be aimed at graphically tracing the flow of information among the actors and distil key measures about fundamental properties of the industry social structure such as its cohesiveness, connectivity, density, centralization, openness, etc. Network visualizations can be very helpful to gain an appreciative understanding of the industry’s topology and highlight the degree of embeddedness of each hedge fund in it. Moreover, as the causal sense may remain hided, in a second part, we plan to use the network measures computed in part 1 as covariates within a longitudinal framework of multivariate estimation. This allow us to address such questions as “Are variations in hedge funds network position conducive to performance differentials? Are cohesive structures more likely to lead to herding effects? Do tight-knit clusters of hedge fund tend to exhibit higher than normal similarity in their outcomes? Is failure systematically associated to particular network configurations? Depending on the specific nature of the dependent variables different approaches can be followed to tackle these questions. We could for instance model hedge fund exit as a function of the time varying network structure of the industry using event history estimation techniques. Otherwise, we could focus on firm level measures of network location and estimate their effect on risk-return using longitudinal estimation techniques such us fixed-effect or random-intercept models, depending on the longitudinal depth and cross-sectional breadth of the data.

Timeline of the research proposal

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**Pubblicazioni (6 ultimo quinquennio)**


ANVUR A è riferito alla classificazione A di ANVUR per il SSD di appartenenza di chi sta presentando domanda.