



The fragile capital structure of hedge funds and the limits to arbitrage[☆]

Xuewen Liu^{a,*}, Antonio S. Mello^b

^a The Hong Kong University of Science and Technology, Hong Kong

^b University of Wisconsin-Madison, United States

ARTICLE INFO

Article history:

Received 5 October 2009

Received in revised form

12 August 2010

Accepted 12 January 2011

Available online 23 July 2011

JEL classification:

G14

G24

D82

Keywords:

Limits to arbitrage

Coordination risk

Fragile capital structure

Market liquidity

ABSTRACT

During a financial crisis, when investors are most in need of liquidity and accurate prices, hedge funds cut their arbitrage positions and hoard cash. The paper explains this phenomenon. We argue that the fragile nature of the capital structure of hedge funds, combined with low market liquidity, creates a risk of coordination in redemptions among hedge fund investors that severely limits hedge funds' arbitrage capabilities. We present a model of hedge funds' optimal asset allocation in the presence of coordination risk among investors. We show that hedge fund managers behave conservatively and even abstain from participating in the market once coordination risk is factored into their investment decisions. The model suggests a new source of limits to arbitrage.

© 2011 Elsevier B.V. All rights reserved.

“One fund-of-funds manager says he rushes to be the first out if he suspects that others may desert a hedge fund. ... If managers [of hedge funds] worry that clients will bail out, they may try to raise cash in anticipation.”

Economist, October 25, 2008, pp. 87–88.

1. Introduction

In the financial crisis of 2007–2009, hedge funds reduced their exposures to risky investments and increased their cash holdings very quickly. The *Economist* estimates that between July and August 2008 alone, the industry's cash holdings rose

from \$156 billion to a record \$184 billion, equivalent to 11% of assets under management.¹ The reallocation toward cash seemed to be in anticipation of unprecedented pressure for redemptions from investors. In fact, the hedge fund industry experienced record levels of redemptions during the third and fourth quarters of 2008. In the first half of 2009, investors continued to pull money out of hedge funds. Ironically, redemptions appear to have been self-reinforcing. A report titled *Hedge Funds 2009* by the International Financial Services London Research (IFSL) says:

Hedge funds faced unprecedented pressure for redemptions in the latter part of 2008, with investors withdrawing funds due to dissatisfaction with the performance or to cover for even greater losses or cash calls elsewhere. This in turn led to forced selling and closures of positions by hedge funds causing a cycle of further losses and redemptions. Some funds were not able to meet withdrawal requests so

[☆] We are very grateful to the referee for detailed comments and suggestions that significantly improved the paper. We thank Sudipto Bhattacharya, Enrico Biffis, Robert Kosowski, Tianxi Wang, seminar participants at the 2009 Imperial College hedge fund conference, and, in particular, Amil Dasgupta (the discussant) for helpful comments.

* Corresponding author.

E-mail address: Xuewenliu@ust.hk (X. Liu).

¹ “Hedge funds in trouble: the incredible shrinking funds,” *Economist*, October 25, 2008, pp. 87–88.

were forced to suspend redemptions, as selling illiquid assets would have damaged the investors that remained.

In this paper we ask why hedge funds, with a reputation for being aggressive investors seeking high returns, hold significant amounts of cash in their balance sheets. And, why do they quickly increase their cash holdings (hoard liquidity) when a crisis strikes? One would think that it is precisely during times of high uncertainty and high volatility that arbitrage opportunities are greater.² Why then do hedge funds become much less aggressive in exploiting price distortions and pass up profit opportunities?

In their quest for arbitrage gains, hedge funds also perform the important social role of enforcing market efficiency. From a social welfare point of view, it is not optimal that hedge funds allocate large fractions of their portfolios to riskless securities, instead of pursuing arbitrage opportunities in risky assets. Holding cash is synonymous with imposing limits on arbitrage. With insufficient arbitrage trading, financial markets can wander off erratically and risk falling into a vicious cycle that goes from lower price informativeness to less liquidity and back, a process of continued deterioration that can prolong a financial crisis. Thus, to analyze a modern financial crisis it is necessary to understand the reasons that hedge funds limit their arbitrage activities.

So far the finance literature has associated the limits to arbitrage with investor uncertainty about the fundamental value of the assets held by arbitrageurs. According to [Shleifer and Vishny \(1997\)](#), when investors do not understand or observe perfectly arbitrageurs' trading positions, they can react with their feet after observing poor performance. Understanding that poor performance can cause redemptions, hedge fund managers refrain from making investments that might lose money in the short term, even if a profit could be realized in the long run.³

In this paper, we offer an alternative explanation for the limits of arbitrage. We highlight investors' concerns about coordination risk (i.e., the uncertainty about what other investors might decide to do), instead of about fundamental risk. One key feature of the capital structure of hedge funds is the fragile nature of their equity. Equity capital in hedge funds can be redeemed at investors' discretion, a feature somewhat similar to demand deposit-debt in banks.⁴ The fragile equity capital in hedge funds introduces the risk of coordination among hedge fund investors. The coordination risk arises because investors suspect that

other investors might redeem, and to meet redemptions the hedge fund may be forced to liquidate positions at a loss. If investors suspect that, after liquidating positions to satisfy early redemptions, the hedge fund would be left with insufficient equity, a clear advantage exists to being a first mover. Then, even long-horizon investors could decide to withdraw, resulting in a vicious cycle of redemptions and asset sales that can trigger a disorderly collapse of the hedge fund. This risk of coordination must be taken into account by prudent hedge fund managers, who limit their arbitrage activities and hoard cash both to honor redemptions at little cost and to reassure concerned investors.

We use global game methods to model the asset allocation decision of a hedge fund that is subject to the risk of a run by its investors. We start by considering the benchmark case with no coordination problem. A random number of investors is assumed to redeem early for exogenous reasons. The random amount of the early redemptions requires the hedge fund to decide how much cash it needs to hold *ex ante*. The hedge fund's trade-off is between lower potential liquidation costs if it holds more cash, and a higher return if it invests more in risky assets. This trade-off gives an optimal level of cash holdings. In the presence of coordination risk, however, we show that hedge funds choose to hold more (i.e., excess) cash. Coordination risk affects the optimal level of cash in a fund in two ways. First, the fear of a possible run makes a greater number of investors redeem even if they do not face liquidity shocks. To satisfy redemptions at minimum cost, hedge funds optimally choose to hold more cash. Second, cash holdings have a direct impact on investors' decision to withdraw and, consequently, on the probability of a run. Naturally, the probability of a run is decreasing in the cash holdings.

In sum, the source of the limits to arbitrage in our paper is market illiquidity and the unstable nature of the equity capital in hedge funds. We emphasize the friction of investors' uncertainty about the actions of other investors in the fund, i.e., the liability side of the balance sheet, while in [Shleifer and Vishny \(1997\)](#) investors are uncertain about the asset side of the balance sheet, i.e., asset quality. Limits to arbitrage due to coordination risk are particularly likely in financial crises, when market liquidity is low and coordination problems are severe. We believe that a fuller explanation for the limits to arbitrage requires that the two motives triggering investors' redemptions be taken together.

It is interesting to contrast the behavior of hedge funds with that of banks before and during the financial crisis of 2007–2009. Before the crisis, on average, hedge funds operated with much lower leverage ratios than banks.⁵ During the crisis, hedge funds also reduced their exposures to illiquid assets more quickly and more drastically. [Fig. 1](#) shows that banks switched systematically to cash holdings only after the collapse of Lehman Brothers in September 2008, much later than hedge funds. We argue that the different investment and financing policies are due in part to differences in the nature of the capital structures of the

² [Mitchell and Pulvino \(forthcoming\)](#) and [Krishnamurthy \(2010\)](#) provide convincing evidence that, during the recent liquidity crisis, arbitrage opportunities were pronounced in debt markets.

³ [Gromb and Vayanos \(2002\)](#) build on the intuition of [Shleifer and Vishny \(1997\)](#) and show that margin constraints have a similar effect in limiting the ability of arbitrageurs to exploit price differences. [Abreu and Brunnermeier \(2002, 2003\)](#) use synchronization risk to explain market inefficiency.

⁴ It might seem that, because of the lock-up period clause, the equity in hedge funds is not fragile. In practice, however, hedge fund managers are reluctant to use lock-up periods and early-withdrawal penalties because these might signal a lack of confidence in their trading strategies. More problematic, hedge funds with lock-ups in place often grant side deals to 'special investors' (see [Brunnermeier, 2009](#); [Stein, 2005](#)). Indeed, evidence shows that few hedge funds, only those with the strongest records, can lock money in for long periods.

⁵ At the beginning of the crisis of 2007–2009, the hedge fund industry as a whole had a ratio of assets to equity of 1.8, compared with more than 20 for investment banks ([Economist](#), October 25, 2008, p. 87).

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات