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Commonality in hedge fund returns: Driving factors and implications

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ABSTRACT

We measure the commonality in hedge fund returns, identify its main driving factor and analyze its implications for financial stability. We find that hedge funds' commonality increased significantly from 2003 until 2006. We attribute this rise mainly to the increase in hedge funds' exposure to emerging market equities, which we identify as a common factor in hedge fund returns over this period. Our results show that funds with a high commonality were affected disproportionately by illiquidity and exhibited negative returns during the subsequent financial crisis, thereby providing little diversification benefits to the financial system and to investors.

1. Introduction

In recent years, hedge funds have become very important actors in global financial markets: their total assets under management are estimated at 1.8 trillion USD (International Monetary Fund, 2011), they account for about 80% of credit derivative trading (US Government Accountability Office, 2008) and have close relationships with other financial institutions such as prime brokers (Klaus and Rzepkowski, 2009; Aragon and Strahan, 2012). Given their major importance, instability in the hedge fund sector could pose a threat to the stability of the entire financial system. In this paper, we document a build-up of risks and "connectedness" in the hedge fund sector prior to the recent financial crisis. We analyze investment strategies of hedge funds, focusing on the issue of commonality, i.e., the extent to which hedge fund returns are driven by common factors. We show that commonality in hedge fund returns increased prior to the recent financial crisis and that hedge funds exposed to the common factor suffered from worse performance once the crisis set in.

Due to the fact that hedge funds are largely unregulated, there is little direct information about hedge funds' investment strategies and risk exposures. Fortunately, available data on hedge funds' returns represent a valuable source of information allowing inference on hedge funds' commonality. In this paper, we conduct an empirical analysis of hedge fund returns between January 1994 and June 2009 with a database of about 6400 hedge funds, aiming to (i) measure the degree of hedge funds' commonality, (ii) identify its potential driving factors, and (iii) characterize the risk exposure of funds with different degrees of commonality. We contribute to the literature by using a large sample of individual hedge funds to identify the driving factors of hedge funds' commonality and by investigating the risk profiles of the corresponding funds both before and during the recent financial crisis. Identifying the major driving factor of commonality allows us to assess whether hedge funds provided diversification benefits to the financial system, an aspect that has not received much attention in the literature to date.

We proceed in three steps. In the first step, we measure the commonality in hedge fund returns using Principal Component Analysis (PCA), in particular using the proportion of variation in the data set explained by the first principal component. We find three broad patterns prior to 2007: commonality increased between January 1996 and August 1998, declined thereafter, and

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rose again almost twofold between May 2002 and December 2006. Next, we measure the commonality in the returns of 12 risk factors that have been frequently used in the literature to model hedge funds' risk exposure (Fung and Hsieh, 2004; Bondarenko, 2007b; Sadka, 2010; Pojarliev and Levich, 2011). We ask whether the rise in commonality between 1996 and 1998, as well as between 2002 and 2006, can be related simply to increased commonality in the returns of 12 risk factors. For the latter period, the answer is negative: the commonality in the returns of 12 risk factors did not change or decreased. Moreover, market volatility also declined in this period. This makes the period between 2003 and 2006 a unique setting to identify the drivers of increased commonality, beyond changing commonality in risk factors or market volatility.

In the second step, we thus focus on the period between 2003 and 2006, aiming to pinpoint factors behind the rise in hedge funds' commonality. To this end, we first need to determine the identity of the common risk factor. We do so by classifying the hedge funds into deciles based on the correlation of their returns with the first principal component. We find that hedge funds with a high degree of commonality were particularly exposed to equity-oriented risk factors. By contrast, funds with a low commonality had only a small or no exposure to equity-oriented risk factors. In addition, the exposure to emerging market equities increased almost monotonically with an increasing level of commonality. We conclude that the common factor driving a substantial proportion of hedge fund returns over this period was emerging market equities. Second, we analyze how the exposure of hedge funds to this common risk factor evolved over time and find that it increased significantly over the period from 2004 until end-2006 for funds with a high commonality. At the individual fund level, we find that 20% of the hedge funds significantly increased their exposure to emerging market equities over this period, with 80% of those funds having no significant exposure prior to 2004. This result suggests that the increase in hedge funds' exposure to emerging market equities can be considered as the main driver of the rise in hedge funds' commonality.

In the third step, we investigate the risk exposure of hedge funds in the different commonality deciles. Specifically, we examine whether funds with a high commonality have a comparable downside and illiquidity risk exposure to funds with a low commonality. While hedge fund failures are strongly related to their downside risk exposure (Liang and Park, 2010), their excessive leverage and illiquidity of their investments affect the risk of a market disruption (Khandani and Lo, 2007; Stein, 2009; Shleifer and Vishny, 2011). We find that both during the upmarket and the financial crisis period funds with a high commonality had a significantly higher downside risk, captured by negative skewness and semi-deviation, compared to funds with a low commonality. Moreover, the downside risk of funds with a high commonality increased significantly more often over the period from 2004 until end-2006. As we identified emerging market equities as the common risk factor, the higher downside risk of funds with a high commonality can be regarded as a direct consequence of their greater exposure to this risk factor. As for illiquidity risk exposure, we find that hedge funds with a high commonality had a higher degree of illiquidity (i.e., the fund specific illiquidity level), captured by the return autocorrelation, compared to funds with a low commonality. Since emerging markets generally exhibit a higher degree of illiquidity than developed markets, this finding can be attributed to the fact that funds with a high commonality had a greater exposure to this risk factor, thereby providing them with an illiquidity premium. While those funds benefited from the illiquidity premium as they increased their returns, the adverse effects of illiquidity materialized in stress periods when investors were forced to liquidate their positions. Indeed, we show that hedge funds with a high commonality were affected by illiquidity in the post-Lehman period significantly more often than funds with a low commonality.[1]

In sum, we provide evidence that through their investment behavior prior to 2007, hedge funds established pre-conditions for posing risks to the financial system, in particular via their exposure to common risk factors and their specific risk exposures. When such risks materialize, funds with a high risk exposure following similar strategies can trigger feedback loops involving asset prices and funding liquidity, as emphasized by Brunnermeier et al. (2009), and adverse shocks in the hedge fund sector can be further transmitted to other financial institutions, an aspect analyzed by Billio et al. (2012).

The rapid growth in the hedge fund industry over the last years and the availability of hedge fund data from commercial data providers such as Hedge Fund Research (HFR) and Lipper TASS, has led to a substantial number of theoretical and empirical papers on hedge funds. Our paper is related to two strands of the literature on hedge funds: (i) papers focusing on hedge funds' risk exposures in general and (ii) papers investigating commonality in risk exposures in particular.

In the first strand of the literature, Chan et al. (2005) develop several new risk measures for hedge funds and provide evidence that the level of systemic risk in the hedge fund industry has increased as a consequence of large capital inflows, higher competition for yield among investors and increased illiquidity. Our paper shows that commonality in hedge fund returns increased significantly prior to the recent financial crisis. Boyson et al. (2010) document the existence of contagion in hedge fund returns and show that large adverse shocks to asset and hedge fund funding liquidity make contagion more likely. Akay et al. (2013) show that both funding liquidity (proxied by the TED spread and the margin requirement on S&P 500 futures relative to the level of the index) and investor panic (measured by the VIX index) play a significant role in leading to hedge fund contagion. We provide evidence that due to exposure to common risk factors, hedge funds exhibited negative returns especially after the failure of Lehman Brothers. Sadka (2010), Teo (2011), and Schaub and Schmid (2013) focus on the liquidity risk of hedge funds and Aragon and Strahan (2012) find that the market liquidity of stocks held by Lehman Brothers hedge fund clients fell more after the Lehman failure than otherwise similar stocks. Patton (2009) analyzes the market neutrality of hedge funds and finds that even among those funds being classified as "market neutral", about 25% exhibit significant correlation with the market that investors seek to avoid. Our result that high commonality funds were strongly affected by illiquidity and negative returns confirms that a substantial proportion of hedge funds did not provide diversification benefits to investors at a time when they were needed most. Bali et al. (2012) investigate the extent to which aggregate risk measures explain the cross-sectional dispersion of hedge fund returns. They find that systematic risk has the greatest role in explaining the cross-section of future fund returns. Eling and Faust (2010) analyze the performance of hedge funds and mutual funds in emerging markets and document that hedge funds increased their equity exposure to emerging markets after 2003, which is consistent with our findings.

[1] At the same time, we do not find evidence that high commonality funds used share restrictions to manage their liquidity risk exposures, as less than 20% of high commonality funds had a lockup provision and their redemption notice periods were not significantly different from those of low commonality funds. For an in-depth analysis of the impact of share restrictions on hedge fund performance in both crisis and non-crisis periods, see Schaub and Schmid (2013).

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