Why Do Hedge Funds Stop Reporting Their Performance?

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Abstract: It is well known that the voluntary reporting of hedge funds may cause biases in estimates of their investment returns. But wide disagreements exist in explaining why hedge funds stop reporting to the data-gathering services. Academic studies have suggested that poor or failing funds stop reporting while industry analysts suggest that better performing funds cease reporting because they no longer need to attract new capital. Using the TASS dataset, we find that hedge funds' returns are significantly worse at the end of their reporting live. We then use survival time analysis techniques to examine the funds' time to failure and changes in the hazard rate (i.e., the probability of failure) over time. We also estimate the effects of funds' performance, size, and other characteristics on the hazard rate. Consistent with the finding on funds' returns at the end of their reporting lives, we find that better performing and larger hedge funds have lower hazard rates.

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1. Introduction

The size of assets managed by hedge funds has grown dramatically, particularly in recent years. It is estimated that at the end of 2005, more than one trillion U.S. dollars were invested in hedge funds around the globe.[1] Despite their large global presence, hedge funds remain relatively free from many regulatory requirements of the Securities and Exchange Commission (SEC) or other regulatory bodies. This relative freedom includes exemption from obligatory performance reporting. The available hedge fund performance data from data-gathering services such as TASS are conditional on hedge funds' willingness to supply them. Therefore, it is interesting to examine the characteristics of funds that choose to report versus those that do not. However, an empirical analysis of this issue cannot be undertaken because of the obvious absence of data on funds that choose not to report. Instead, in this study, we examine the funds that reported their performance to the TASS database at some point in time and then chose to cease reporting. We explore the funds' likely reasons for ceasing to report and contrast the characteristics of these funds with those that continue to report their performance.

The current financial literature presents two competing explanations for why some hedge funds stop reporting their performance data. Researchers have argued that funds stop reporting when they perform poorly relative to other funds (see, for example, Malkiel and Saha, 2005). In essence, they have argued that funds stop reporting because they fail. However, cessation of performance reporting can also result from other reasons, including mergers and name change, which are unrelated to performance.

Other researchers have provided a competing explanation, arguing that well-performing funds do not have an incentive to continue reporting their performance because they do not need to attract additional capital. For example, Ackermann, McEnally and Ravenscraft (1999) contend: "Excluding disappearing funds has virtually no impact on our assessment on overall performance. This self-selection bias has two interesting implications for hedge funds research. First, some hedge funds may not actively seek new money, because there may be diminishing returns to their arbitrage

[1] According to Van Hedge Fund Advisors International.

strategies. Second, some of the best hedge fund managers may be opting out of the databases."[2]

Insight into which of these two competing hypotheses is true is provided, in part, by the degree of "survivorship bias" in average hedge fund performance estimates. Survivorship bias is evident when, for example, the annual average returns of all funds (both reporting and non-reporting) is lower than the average return of only the surviving funds. If it were true that the performance of funds that stop reporting is comparable to that of the funds that continue to report, then the average returns of the two groups would be very similar, and, as a result, there would be no evidence of survivorship bias. However, many studies on the hedge fund industry have found evidence of survivorship bias, although estimates of the bias vary considerably. Survivorship bias estimates range from 0.16% [Ackermann, McEnally and Ravenscraft, 1999] to 4.5% per year [Malkiel and Saha, 2005]. Other studies' estimate survivorship bias to be 2.24% [Liang, 2000], 3% [Brown, Goetzman and Ibbotson, 1999] or 3.48% [Fung and Hsieh, 1997]. The fact that all of these studies' survivorship bias estimates are positive suggests, albeit indirectly, that funds that cease to report are generally worse performers than those that continue to report.

In this study, we directly address the reasons for cessation of performance reporting by hedge funds. Using the TASS dataset of hedge funds, we first analyze the returns of funds that stop reporting. We find that these funds' returns significantly worsen at the end of their reporting lives, which suggests that the majority of funds stop reporting because they fail. We then use survival time analysis techniques to examine the funds' time to failure and changes in the hazard rate (i.e., the probability of failure) over time. We also estimate the effects of funds' performance, size and other characteristics on the hazard rate. Consistent with the finding on funds' returns at the end of their reporting lives, we find that better performing and larger hedge funds have lower hazard rates.

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[2] Ackermann, McEnally and Ravenscraft, 1999, p. 867. Similar arguments have been made by other authors; for example, Gregoriou (2002) writes: "Successful hedge funds with good records are frequently closed because managers have understood that size may have a negative impact on performance." p. 240. Similarly, in a recent paper, Baquero et al. (2005) write: "Thus, self-selection bias exists either because underperformers do not wish to make their performance known, because funds that performed well have less incentive to report to data vendors…". p. 495.

2.1 Prior Studies

Several published studies have examined the exit probability of hedge funds. Using the TASS database, Brown et al. (2001) estimate several alternative models of hedge fund failure and find that younger hedge funds die faster than more established funds. They also conclude that style-adjusted return risk has a significant impact on fund failure probability. Howell (2001) concludes that the probability of hedge funds failing is 7.4% in the first year after inception and that figure increases to 20.3% in the second year. While Baquero et al. (2005) focus on examining the persistence in hedge fund performance, they model the liquidation process of hedge funds using a probit model. Using TASS data for the 1994-2000 time period, they find that the impact of historical returns on hedge fund survival is positive and significant; funds with high returns are much less likely to liquidate than those with low returns.

The study most closely related to ours is a paper by Gregoriou (2002), which examines the pattern of survival times of hedge funds using various survival models, including Accelerated Failure Time Model and the Cox proportional hazard model. His study uses Zurich Capital Markets database for the period 1990 through 2001. He concludes: "[N]ew funds struggle during the first two to three years of operation, but then establish themselves so that the risk of failure (the hazard) decreases from then on. …The main conclusion reached is that investors should consider hedge funds as the ideal classification because of its highest survival time and because of its diversification effects for traditional investment portfolios."[pp. 245, 250]. Our conclusions are markedly different from his. We find that that failure rates for hedge funds are high and rates remain high, even for longstanding funds. We believe the difference in conclusions is primarily explained by two reasons. First, while the last year considered in Gregoriou's study is 2001, we examine TASS data through April 2004. Between January 1994 and December 2003, 1392 funds exited the TASS database. Of these, 541 funds or nearly 40% of all the exiting funds exited the database after 2001, in 2002 and 2003.[3] Thus, in our analysis, inclusion of these two years of data when a large number of exits occurred is very likely to lead to different conclusions. Secondly, in estimating an Accelerated Failure Time Model, Gregoriou adopts a Weibull distribution. The problem of using the

[3] See Table 7 in Malkiel and Saha (2005). They consider funds that reported returns contemporaneously.

Weibull distribution for modeling the change in failure rate over time (which, loosely speaking, is the hazard function) is that it does not have the flexibility to accommodate a U-shaped or an inverted U-shaped hazard function.[4] The Weibull hazard function is either monotonically increasing or monotonically decreasing. Our diagnostic analysis shows that the Weibull distribution is unambiguously rejected by data in favor of the log-logistic distribution, which yields an inverted U-shaped hazard function. This estimated shape of the hazard function in our study suggests that the failure rate increases during the first six years of a fund's existence, reaches a peak and then declines. As noted earlier, our findings show, even after being in existence for ten years the estimated hazard rate falls minimally from the peak. This finding suggests that the risk of failure for hedge funds remains relatively high even after being in existence for a fairly long time.

2.3 The TASS database

This study utilizes the TASS database to study the characteristics of hedge fund returns. The TASS service was purchased by Tremont Capital Management in March, 1999. At that time, an attempt was made to get those hedge funds that reported to Tremont and other database services to begin reporting to TASS. As a result, TASS has become one of the most comprehensive services covering a wide variety of funds. We believe it is broadly representative of the hedge fund universe. We obtained from TASS data not only on currently existing funds, but also on so-called "dead" or "defunct" funds, i.e., those funds that either are no longer in existence or that have stopped reporting to the TASS service but are still in existence. The TASS database does not contain specific information about why a fund chooses to cease reporting.

2.4 Exit pattern

The exiting funds are identified in our dataset by those that stopped reporting performance data to TASS before March 31, 2004. Funds that continued to report on or after this date are classified as "alive." The time span of our comparative performance analysis is limited to the period from January 1996 to April 2004. In earlier years,

[4] Curiously, while Gregoriou (2002) write: "The results indicate that an inverse U-shaped hazard function may be harmonious, since hedge funds go through the learning process." [p. 251], they use a Weibull distribution that is incapable of accommodating an inverted U-shaped hazard function.

particularly 1994 and 1995, the proportion of "backfilled" data in the TASS database is high. Backfilling occurs when a fund opts to report its returns of prior years at a later date. Studies have shown that this practice introduces a bias because backfilling occurs selectively; funds choose to backfill the earlier years' returns only when they are favorable.[5]

Table 1 compares the performance of exiting funds in the final three, six and nine months before they exit the TASS database with their prior performance (that is, after January 1996 and before the final three, six and nine months of existence). We use two measures of performance: (a) the fund's average monthly return (calculated as the geometric mean of all the fund's returns) and (b) the fund's Sharpe ratio. Table 1 indicates a markedly worse performance in the period immediately before the funds stop reporting. For example, in the final six months, the exiting funds' average monthly return is -0.56%, compared to an average monthly return of 0.65% during their reporting lives (excluding the final six months). In the last three months, the average returns falls to -0.61%, compared to an average monthly return of 0.49% during their reporting lives prior to the last three months. Table 1 also shows that the average fund Sharpe ratios closely follow the pattern displayed by the average monthly returns. The average Sharpe ratios during the final months are consistently lower than the averages for the preceding period.

Insert Table 1 here

The unambiguous pattern of declining performance during funds' final months prior to cessation of reporting suggests that, on average, it is poor performance, and very likely failure, that explains hedge funds' cessation of reporting to the TASS database. The hypothesis that successful funds stop reporting because they do not want to attract additional capital does not seem to be supported by the data.

3.1 Hedge Fund's Time to Failure

We now proceed to examine the time to exit for funds that cease reporting to the TASS database. To study the exit of funds, we use survival time analysis techniques

[5] See, for example, Malkiel and Saha, 2005.

widely used by researchers who have examined duration data. Applications of duration analysis include the length of unemployment [Lancaster, 1979] or welfare spells [Blank, 1989]; job duration [Gronberg, 1994]; the length of time firms remain in Chapter 11 protection [Bandopadhaya, 1994]; and the duration of marketing time of residential housing [Haurin, 1988]. Excellent reviews and numerous other examples are provided by Kiefer [1988] and Lancaster [1990].

In survival analysis models, the variable of interest is the length of the spell, which in our case is the length of time from a hedge fund's inception until it fails or stops reporting. Central to our duration analysis is the survival function:

$$S(t) = \Pr(T \geq t),$$

which gives the probability that the random variable, *T*, denoting duration, will equal or exceed the particular value of *t*. Even though the survival time is the underlying process that is modeled, it makes more sense to think about the spells in terms of "hazard rates." The hazard rate is the rate at which spells are completed, given that they lasted until that moment. The hazard function is defined as:

$$\lambda(t) = -\frac{\dot{S}}{S} = -\frac{dS(t)/dt}{S(t)}.$$

In this study, the hazard function is the rate at which funds stop reporting at time *t*, given that they have continued to report until *t*. The hazard function describes how the rate of failure changes over time, the failure event being a fund's cessation of reporting. A monotonically increasing hazard function, for example, implies that the likelihood of failure increases with time. However, in many applications, hazard functions can be non-monotonic and can, for example, be U-shaped or inverted U-shaped.

A priori one would expect the hazard function for hedge funds' survival time to be inverted U-shaped. This shape would imply that a fund is unlikely to fail immediately after inception; if failure occurs, it is more likely to occur in the first few years of operation. Once a fund has survived the formative years and has established a favorable track record, however, its likelihood of failure is expected to decline over time.

Insert Fig.1 here

For each fund that exited the TASS database, we compute the length of time between its inception and the month it stopped reporting. Of course, for a fund that has continued to report, the duration time is simply the time between the fund's inception and April 2004, the last month of data in the database. Figure 1 shows the distribution of survival times for the funds in our sample. As it can be seen from Figure 1, after the first three or four years of funds' lives, the number of failing funds in each additional year decreases.

As noted in the review of prior literature, the conclusions regarding the rate of funds' exit are sensitive to the choice of functional form for the hazard function. For example, the exponential distribution imposes a flat-line hazard function (implying that the hazard rate does not change over time); the hazard function of the Weibull distribution is either monotonically increasing or monotonically decreasing. By contrast, the log-normal or the log-logistic distribution can accommodate an inverted U-shaped hazard function. The choice of the distribution that fits the data best can be made using Akaike's information criterion (AIC), which is based on the highest log-likelihood value. The log-likelihood values for the four alternative specifications are:

Exponential:	-4004.7
Weibull:	-3932.7
Log-normal:	-3898.3
Log-logistic:	-3897.2

Thus, according to this criterion the log-logistic distribution fits the data the best, closely followed by the log-normal specification, both of which allow for an inverted U-shaped hazard function—the shape one would expect *a priori*. The exponential and the Weibull distributions (the latter was adopted by Gregoriou (2002)), are clearly rejected by our data.

Insert Fig.2 here

Figure 2 shows the estimated hazard function computed using the log-logistic distribution.[6] According to the log-logistic estimates, the hazard rate increases rapidly

[6] The log-logistic distribution imposes the inverted U-shape for the hazard function. In addition to the fact that that the log-logistic distribution provides the "best fit", the inverted U-shape for the hazard function is confirmed by undertaking a Kaplan-Meier non-parametric analysis—which is free from the assumption of any specific distribution—of the survival time data for hedge funds.

during the first five years of a fund's existence. Approximately five and a half years after inception, it reaches its maximum of 1% per month, which corresponds to roughly 12% per year. However, it should be noted from Figure 2 that the decline in the hazard rate after it reaches its maximum (at month 66) is extremely gradual; even after being in existence for ten years, the estimated hazard rate falls minimally from the peak of 12% per year to 11% per year. Indeed, the estimated likelihood of failure of a ten-year old hedge fund is not significantly different from the likelihood of failure of a five and a half-year old fund. These findings suggest that the risk of failure for hedge funds remains relatively high, even after being in existence for a fairly long time. Interestingly, this finding on hedge funds stands in sharp contrast to the estimated hazard rates for mutual funds in a study by Lunde, Timmermann and Blake [1999] using a dataset of UK funds. Their study finds that the estimated hazard rate for a typical mutual fund drops sharply after it has survived for approximately ten years.

One reason why the risk of failure remains considerably higher for hedge funds is the existence of so-called "high water marks." Suppose a hedge fund has enjoyed a strong long-run performance but then suffers a sharp loss in net asset value in a single year. Not only will the fund manager fail to earn an incentive fee (usually about 20 per cent of any profits) during that poor year, but also the manager will be less likely to earn an incentive in the following years. This is so because the incentive will only be earned if the net asset value exceeds the previous high net asset value. Thus, the manager may prefer to close the fund and open a new fund that is not burdened by a "high water mark" that will limit his incentive compensation. This will be especially true if assets under management are relatively small.

3.2 Factors That Affect Time Until Failure

In this section, we investigate the factors that affect hedge funds' hazard rates. In particular, we examine how hedge funds' exit probability is related to fund characteristics such as size, performance, and investment style.

Table 2 shows the means and standard deviations of the variables that reflect the fund characteristics of interest. The duration variable represents the number of days between a hedge fund's inception and its cessation of reporting, or until April 2004 if the fund has continued to report.

Insert Table 2 here

In Table 2, the Sharpe ratio for a fund is computed by dividing the difference between the geometric mean of the fund's monthly returns and the geometric mean of risk-free returns (i.e., 3-month Treasury bill returns) by the fund's volatility of returns. Volatility is the variance in a fund's monthly returns over the entire reporting life of the fund between January 1996 and April 2004. The 'assets under management' variable is the fund's average reported assets in billions of US dollars over its entire reporting life. To compute the 'performance relative to funds in the same primary category' variable, we first calculate the difference between a fund's average return (geometric mean) and average returns of all hedge funds in the same primary category; we then divide this difference by the standard deviation of the returns of all funds in that same primary category. The variable 'performance relative to all hedge funds' is computed in a similar fashion, except now the benchmark is the average return of all hedge funds in the TASS database. Finally, we created several indicator variables that reflect the fund's investment style. These indicator variables were constructed by segregating the hedge funds into the four groups: Equity Hedge Funds (1,706 funds), International Hedge Funds (495 funds), Fund of Funds (914 funds) and all Other Funds (1,374 funds).[7]

3.3 Results

We examine the relationship between funds' characteristics and hazard rates using both semi-parametric and parametric models. In Table 3, the first column shows the coefficient estimates using a Cox semi-parametric hazard model; the second column contains the results of the parametric estimation using a log-logistic survival model.[8]

[7] These four groups were created on the basis of the "primary category" variable in the TASS database.

[8] The Cox semi-parametric estimation technique allows the fund characteristics to have a multiplicative effect on the hazard function in the following fashion: $\lambda(t) = \lambda_0(t)\exp(X'\beta)$, where $\boldsymbol{X}$ is the vector of fund characteristics, β is the vector of parameters and $\lambda_0(t)$ is the baseline hazard function. The log-logistic survival function has the following form: $S(t) = \left\{1 + (\lambda t)^{1/\gamma}\right\}^{-1}$ and is implemented by parameterizing $\lambda_j = \exp(-\mathbf{X}_j\beta)$ and treating the scale parameter γ as an ancillary parameter to be estimated from data.

The coefficient estimates from the two models must be interpreted with caution. Because the "explained" variable in the Cox model is the hazard rate while in the log-logistic model it is the time to failure, the estimated coefficients are expected to have opposite signs. For example, a negative estimated coefficient for a particular variable in the Cox model signifies that the variable reduces the hazard rate (i.e., the conditional probability of failure). By contrast, a positive estimated coefficient for the same variable in the log-logistic model signifies that the time to failure is increased by the variable, consistent with the Cox model result.

Table 3 shows that the signs on all the estimated coefficients (except for the variable 'performance relative to all funds') are consistent across the Cox and log-logistic models, as one might expect.[9] The Cox model estimates show that the Sharpe ratio is a statistically significant predictor of the likelihood of a fund's failure at the ninety nine percent confidence level, suggesting that a higher Sharpe ratio leads to a lower likelihood of fund failure. The positive coefficient in the log-logistic specification (also significant at the ninety nine percent confidence level) indicates that a higher Sharpe ratio leads to an increase in a fund's survival time. This is an especially powerful result, supporting our earlier finding that poor performance, and not success, explains funds' cessation of reporting.

The estimated coefficient on the 'volatility' variable has the expected sign and is significant at the 95 percent confidence level in the Cox model suggesting that funds with higher volatility of returns have a higher likelihood of failure.

The estimated coefficient on the 'assets under management' variable implies that a fund's size is a strong predictor of a hedge fund's likelihood of survival; the bigger a fund, the less likely is its failure. The estimated coefficient of the 'assets' variable is statistically significant at the 99 percent confidence level in both the Cox and log-logistic

[9]In estimating the Cox and log-logistic specifications we account for "left truncation" as well as "right censoring." These problems typically arise in duration data. "Left truncation" in our dataset arises for funds that came into existence before 1996, the beginning of our data period. "Right censoring" arises for funds which were still alive as of April 2004, the last month in our data period. For those funds, the duration is censored because we do not know how long those funds will continue to exist beyond April 2004; thus, the observed length of their lifetime constitutes a lower bound of their survival time.

specifications. These results are inconsistent with the hypothesis that funds stop reporting because they have become "too big."

The Cox model results in Table 3 show that a fund performing better than its peers in the same primary category has a lower hazard rate. However, the estimated coefficient of the variable measuring performance relative to all hedge funds is insignificant in the Cox model, but statistically significant and with the expected sign in the log-logistic specification.

Of all the fund category indicator variables, only one—the Fund of Funds category—is statistically significant in both the Cox and log-logistic specifications. The results imply that hedge funds classified as Fund of Funds have a lower hazard rate relative to the benchmark Equity Hedge Funds category. This finding seems to suggest that fund of funds, which hold portfolios of other hedge funds, are more successful in diversifying their risks, lowering their likelihood of failure.

4. Conclusion

In this paper, we investigate two competing hypotheses regarding the reasons for cessation of reporting by hedge funds to data-gathering services such as TASS. Some authors argue that poor performance, and indeed failure, is the main reason for the cessation of reporting, while others have suggested that funds stop reporting because they do not need to attract new capital; that is, success, and not failure, explains the cessation of reporting.

The empirical evidence in this study refutes the latter hypothesis. First, we show that in the months leading up to the cessation of reporting, funds tend to perform significantly worse than in the preceding time period. Second, using hazard function analysis, we find that the likelihood of funds' cessation of reporting reaches a peak around five and a half years and then gradually declines over time. This finding is consistent with the intuition that the first few formative years are critical for a fund's survival; funds that fail are likely to do so in the first few years. Finally, we find that better performing funds (with higher Sharpe ratios), larger funds, and funds that outperform their peers have a lower likelihood of ceasing to report performance. All three findings suggest the same conclusion: most funds stop reporting not because they are “too successful,” but rather because they fail. Interestingly, we also find that hedge funds in the fund of funds category typically have a lower likelihood of failure. As pointed out in Malkiel and Saha (2005), however, such funds tend to provide lower returns than the average hedge fund universe.

The results shown in this paper have important implications for investors. The fact that hedge funds cease reporting because of unfavorable results implies that failure rates for hedge funds are extremely high. While some hedge funds have provided generous returns, we have shown that investors face a high risk of buying a poorly performing fund or, even worse, a failing one. Moreover, since failure rates remain high, even for longstanding funds, this risk cannot be mitigated by restricting one’s purchases to funds with a long record of past success.

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Table 1. Performance of Funds that Have Stopped Reporting: 1996 – 2004

A.	**Last Three Months**	**(1)**	**(2)**
		Entire Period[1]	**Last 3 Months**
	Returns	0.49%	-0.61%
	Sharpe Ratio[2]	0.102	-1.859
B.	**Last Six Months**		
		Entire Period	**Last 6 Months**
	Returns	0.65%	-0.56%
	Sharpe Ratio	0.146	-1.293
C.	**Last Nine Months**		
		Entire Period	**Last 9 Months**
	Returns	0.85%	-0.45%
	Sharpe Ratio	0.153	-1.551

Notes:

(1) Excluding the last three, six or nine months.

(2) Sharpe ratios are computed using the 3-month treasury bill converted to monthly returns as the risk-free rate. It is the geometric mean of relevant monthly hedge fund returns minus the relevant geometric mean of risk-free returns divided by the relevant hedge return volatility.

(3) Intra-fund returns are calculated using geometric returns. Comparison across funds is calculated using an arithmetic mean.

Table 2. Summary Statistics

	Mean	Std. Dev.
Duration	1,866.5	1,404.4
Sharpe Ratio	0.224	0.744
Volatility	0.042	0.040
Assets under management in ($billions)	75.8	225.6
Performance relative to funds in the same primary category	0.003	0.260
Performance relative to all funds in the database	0.004	0.261
Indicator variable for Equity Hedge Funds	0.382	0.486
Indicator variable for International Hedge Funds	0.110	0.313
Indicator variable for Fund of Funds	0.201	0.401
Indicator variable for Other Funds	0.307	0.461

Notes:

(1) Sample Size = 4328

Table 3. Estimated Coefficients of Hazard and Survival Analysis Models

	Cox Model	Log-Logistic Model
Sharpe Ratio	-0.513	0.847
	[11.09]**	[9.68]**
Volatility	1.047	-0.573
	[2.00]*	[1.15]
Assets under management	-0.003	0.002
	[9.93]**	[8.13]**
Performance relative to funds in the same primary category	-0.860	0.083
	[3.51]**	[0.39]
Performance relative to all funds in the database	0.228	0.576
	[1.02]	[2.69]**
Indicator variable for International Hedge Funds	0.105	-0.022
	[1.46]	[0.36]
Indicator variable for Fund of Funds	-0.203	0.195
	[2.96]**	[3.59]**
Indicator variable for Other Funds	0.007	-0.011
	[0.14]	[0.25]
Constant		7.463
		[175.29]**

Notes:

(1) Absolute value of z statistics in brackets

(2) * significant at 5%; ** significant at 1%

(3) Equity Hedge Funds is the benchmark category

Fig. 1 Hedge Funds Survival Times

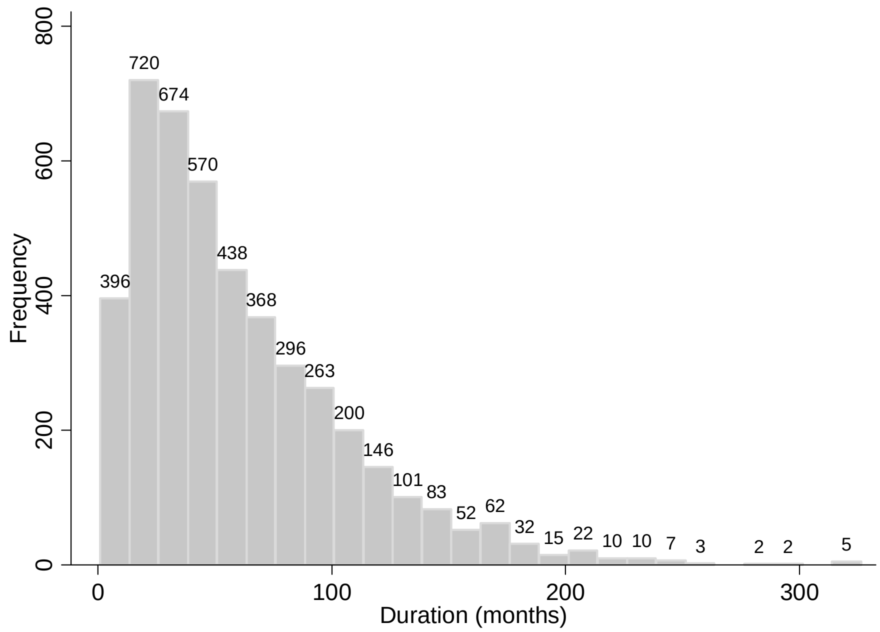
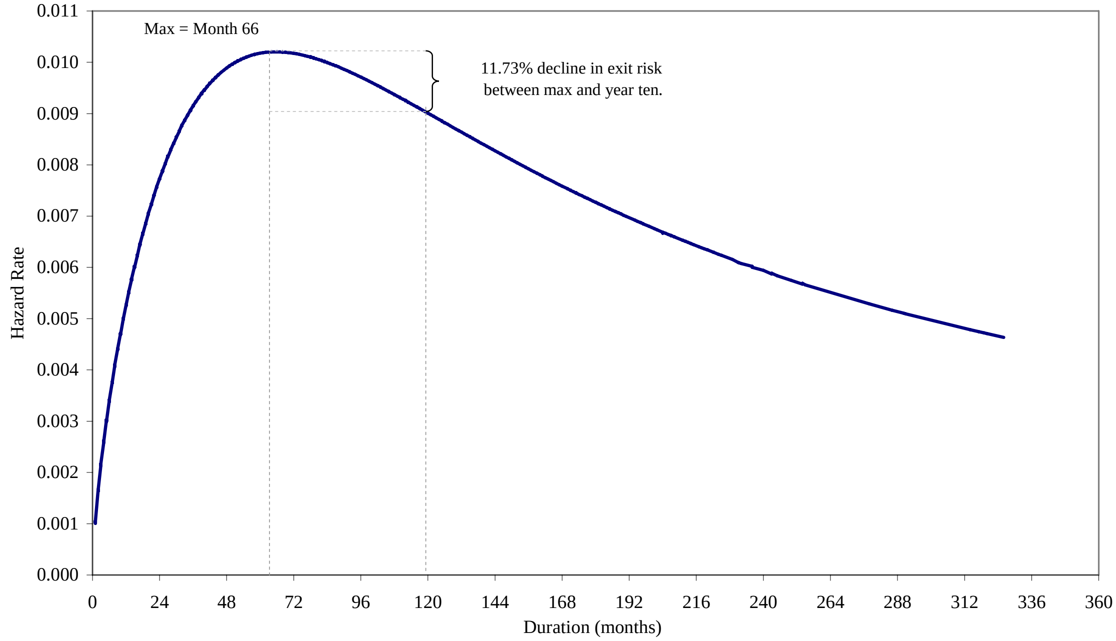


Fig. 2 Log-Logistic Unconditional Hazard Function



The graph shows at which rate a hedge fund dies given that it has lasted the number of months shown on the horizontal axis