

# The Secondary Market For Hedge Funds

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# What Do We Know About Hedge Funds?

- Returns can be explained by linear (S&P 500, SMB, HML, Yield Spreads) and nonlinear (out of the money puts on the S&P 500, lookback straddle options) factors. (Fung and Hsieh (2001, 2002, 2004), Agarwal and Naik (2004)).

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- Liquidity restrictions in hedge funds (withdrawal restrictions and minimum investment periods) are associated with high alphas. (Aragon (2006)).
- Hedge fund flows behave rationally, chasing high past alpha. Alpha-chasing generates declines in future alpha (capacity constraints). Fung, Hsieh, Naik, Ramadorai (2007).

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- These rules are nonexistent for offshore funds – outside jurisdiction.
- So Hedge Funds were (and are) privately offered to qualified (wealthy) investors, and lately, to institutional investors. But little public disclosure of ownership structure.
- This makes information about their ownership hard to find.

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  - Fees: do high management and incentive fees scare investors away?

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- **Anonymous bargaining is conducted by both parties engaging in unilateral negotiations with Hedgebay.**

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- Almost all completed transactions are conducted between pre-existing investors of the funds.
- Every completed transaction in the data thus far is initiated by sellers of funds.
- Transactions are primarily in funds that are closed to new investments, or in share classes that are not available for purchase.

- 935 transactions from 220 funds, August 1998 to July 2007. 66 'disaster' transactions, occurring during/after fund frauds (Bayou), or highly publicized liquidations (Amaranth, Absolute Capital). 869 non-disaster transactions in well-known names. Focus on these.
- Transactions are matched (by name and management company) to the consolidated TASS, HFR, CISDM and MSCI database, for administrative information, returns, and AUMs of funds around the time of transactions.
- Hedgebay acquired information directly from funds in several cases in which this information was not available from the consolidated database.
- Final set (when past 12 months' return data is required) includes 380 non-disaster transactions from 95 funds.
- When return data for 48 months surrounding a transaction is required, 239 transactions from 47 funds.

# Disaster Transactions

<b>Years</b>	<b>Transactions Number</b>	<b>Funds Number</b>	<b>AMT Mean \$MM</b>	<b>PREM Mean %</b>
<b>1998</b>	0	0	0	0
<b>1999</b>	0	0	0	0
<b>2000</b>	0	0	0	0
<b>2001</b>	0	0	0	0
<b>2002</b>	1	1	1.479	-50.000
<b>2003</b>	5	3	1.039	-65.000
<b>2004</b>	8	4	1.133	-67.072
<b>2005</b>	12	8	2.279	-49.485
<b>2006</b>	19	8	6.224	-31.075
<b>2007</b>	21	14	3.951	-56.167
<b>Overall</b>	66	23	3.702	-49.626

# Non-Disaster Transactions

<b>Years</b>	<b>Transactions Number</b>	<b>Funds Number</b>	<b>AMT Mean \$MM</b>	<b>PREM Mean %</b>	<b>TOTPAY Mean %</b>
<b>1998</b>	12	6	0.566	0.000	0.528
<b>1999</b>	51	14	0.591	0.000	0.408
<b>2000</b>	92	30	1.131	-0.060	0.382
<b>2001</b>	120	47	1.350	1.318	1.886
<b>2002</b>	86	29	1.260	1.937	2.603
<b>2003</b>	124	49	2.497	1.716	2.328
<b>2004</b>	109	48	3.298	1.353	1.989
<b>2005</b>	120	61	2.838	0.578	1.173
<b>2006</b>	104	54	3.747	-0.450	0.006
<b>2007</b>	51	31	3.846	0.086	0.478
<b>Overall</b>	869	202	2.309	0.813	1.362

# Comparison With Hedge Fund Universe

	<b>SAMPLE</b>	<b>UNIVERSE</b>	<b>[2.5%,97.5%]</b>
<b>NUMBER</b>	124	10666	
<b>MININV (\$MM)</b>	1.747	3.476	[1.414,5.498]
<b>LOCK (%)</b>	31.710	31.110	[30.239,31.986]
<b>REDEMP (Months)</b>	1.583	1.159	[1.146,1.182]
<b>REDFREQ (Months)</b>	2.756	2.408	[2.357,2.466]
<b>MGMTFEE (%)</b>	1.540	1.434	[1.422,1.448]
<b>INCFEE (%)</b>	19.839	16.993	[16.896,17.154]
<b>OFFSHORE (%)</b>	83.704	57.610	[56.676,58.542]

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- Variables:  
*SP500, ILLIQI, VIXDIFF, CFPREM, SENTIMENT, HFRET, HFFLOW*  
and *d(CREDITSPREAD)*
- Simple univariate regressions to detect relationships:

$$AVGTOTPAY_t = a + bMKTCOVARIATE_t + u_t, \quad (1)$$

$$AVGTOTPAY_t = \frac{1}{N_t} \sum_{i=1}^{N_t} TOTPAY_{i,t}$$

# Aggregate Relationships

	<u>AVGTOTPAY(t)</u>							
Intercept	<u>0.938</u>	<u>1.067</u>	<u>0.785</u>	<u>2.238</u>	<u>1.167</u>	<u>0.941</u>	<u>0.901</u>	<u>0.930</u>
SP500(t)	-0.065							
ILLIQI(t)		-0.063						
VIXDIFF(t)			0.145					
<b>CEFPREM(t)</b>				<u>0.590</u>				
<b>SENT(t)</b>					<u>-0.477</u>			
HFRET(t)						-0.021		
HFFLOW(t)							0.028	
d(CREDITSREAD(t))								-0.166
AVGTOTPAY AR(1)	0.593	0.586	0.617	0.586	0.586	0.593	0.593	0.593
Regressor AR(1)	0.040	-0.214	0.103	0.906	0.860	0.180	0.153	0.361
Adjusted R-squared	-0.006	-0.008	0.011	0.340	0.219	-0.009	-0.009	0.018
N	104	89	101	89	89	104	104	104

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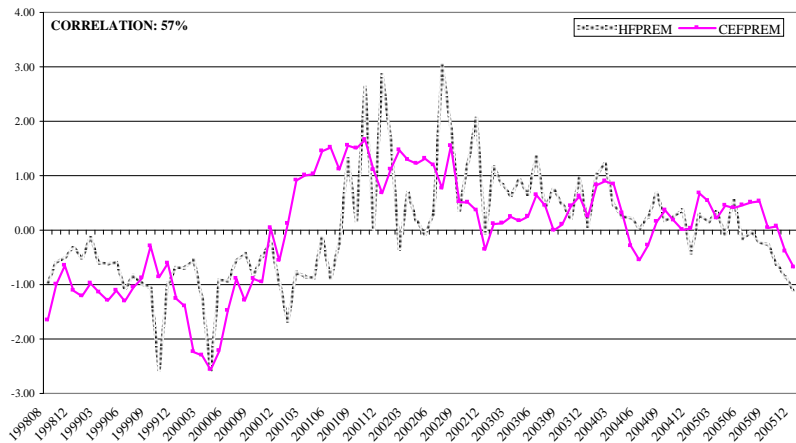
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- Berk and Stanton (2007), and Cherkes, Sagi and Stanton (2007) model *CEFPREM* as driven up by expectations of future performance (B&S), up by expectations of the illiquidity of underlying securities (CSS), and down by the level of fees (both).

# Common Determinants?



# What Determines the Hedge Fund Premium?

- Regress  $PREM$ ,  $COMM$ ,  $TOTPAY$  on explanatory variables related to liquidity and past performance.

$$PREM_{it} = \alpha_s + \beta_1 LOCK_i + \beta_2 REDEMP_i + \beta_3 MININV_i \\ + \beta_4 REDFREQ_i + \beta_5 AMT_{i,t} + \beta_6 GLMTHETA0_{i,t-1} + u_{i,t} \quad (2)$$

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- Strategy-specific fixed effects in estimation, and standard errors in panel corrected for heteroskedasticity and contemporaneous cross-correlation.

# Liquidity and the Premium

	<b>PREM</b>	<b>TOTPAY</b>
<b>LOCK</b>	0.067	0.136
<b>REDEMP</b>	<u>-0.496</u>	<u>-0.559</u>
<b>MININV</b>	0.002	0.001
<b>REDFREQ</b>	-0.146	-0.168
<b>AMT</b>	0.011	0.008
<b>GLMTHETA0</b>	0.016	0.018
<b>Adjusted R-squared</b>	0.072	0.079

# Past Performance and the Premium

	<b>PREM</b>	<b>TOTPAY</b>
<b>PERF(-12)</b>	<b><u>0.336</u></b>	<b><u>0.362</u></b>
<b>RM(-12)</b>	<b><u>-0.107</u></b>	<b><u>-0.120</u></b>
<b>STDPERF(-12)</b>	<b><u>-0.193</u></b>	<b><u>-0.218</u></b>
<b>MGMTFEE</b>	<b><u>-1.128</u></b>	<b><u>-1.220</u></b>
<b>INCFEE</b>	-0.014	-0.008
<b>AMT</b>	0.013	0.009
<b>Adjusted R-squared</b>	0.199	0.186

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- First stage probit:  $z_i$  – ‘selection’ variable which is 1 if transaction occurs on Hedgebay, 0 otherwise.  $w_i$  – vector of determinants of selection. (Unconditional) exclusion restriction: *OFFSHORE*.

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- Compute inverse Mills ratio  $\lambda(w_i' \gamma) = \frac{\phi(w_i' \gamma)}{\Phi(w_i' \gamma)}$ , incorporate it into *PREM* regression as a selection bias correction:

$$PREM_{i,t} = x_{i,t}' \beta + \delta \lambda(w_i' \gamma) + v_{i,t}. \quad (5)$$

# Probit Marginal Effects

	<u>dF/dX</u>
MININV	0.000
MGMTFEE	0.101
INCFEE	<u>0.029</u>
REDFREQ	<u>0.043</u>
REDEMP	<u>0.286</u>
LOCK	-0.027
<b>STRATEGIES</b>	
Security Selection	<u>1.260</u>
Global Macro	<u>1.511</u>
Relative Value	-0.283
Directional Traders	-0.144
Funds of Funds	-0.392
Multi-Process	<u>1.130</u>
Emerging Markets	0.311
Fixed Income	0.804
<b>EXCLUSION RESTRICTION</b>	
Offshore	<u>0.988</u>
N(Funds)	10,790
Observed Probability	1.149
Pseudo R-Squared	0.114
Chi2(15)	116.270
P-value(Chi2)	0.000

# Selection Bias Corrected Results

	PREM	TOTPAY
TALPHA(-12)	<u>0.015</u>	<u>0.017</u>
STDPERF(-12)	-0.067	-0.078
MGMTFEE	<u>-1.008</u>	<u>-1.103</u>
INCFEE	-0.008	-0.001
LOCK	-0.102	-0.005
REDEMP	-0.180	-0.235
REDFREQ	-0.167	-0.197
AMT	0.011	0.008
GLMTHETA0	0.017	0.019
IMILLS	0.401	0.320
Adjusted R-squared	0.213	0.207

# Does the Hedge Fund Premium Anticipate Future Performance?

- Unconditional specification:

$$\overline{FUTPERF}_{i,t+1,t+24} = \alpha_s + \beta_1 \overline{PASTPERF}_{i,t-1,t-24} + \beta_2 \overline{TOTPAY}_{i,t} + \beta_3 \overline{AMT}_{i,t} + \beta_4 \overline{GLMTHETA0}_{i,t-1} + \beta_5 \overline{IMILLS}_i + e_{i,t} \quad (6)$$

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- Conditional on level of *TOTPAY*:

$$\overline{FUTPERF}_{i,t+1,t+24} = \alpha + \beta_1 \overline{PASTPERF}_{i,t-1,t-24} + \beta_2 \overline{HITOTPAY}_{i,t} + \beta_3 \overline{LOTOTPAY}_{i,t} + \beta_4 \overline{AMT}_{i,t} + \beta_5 \overline{GLMTHETA0}_{i,t-1} + \beta_6 \overline{IMILLS}_i + e_{i,t} \quad (7)$$

$$\overline{HITOTPAY}_{i,t} = \overline{TOTPAY}_{i,t} * I_{\{\overline{TOTPAY}_{i,t} > \text{median}(\overline{TOTPAY}_{i,t})\}},$$

$$\overline{LOTOTPAY}_{i,t} = \overline{TOTPAY}_{i,t} * I_{\{\overline{TOTPAY}_{i,t} \leq \text{median}(\overline{TOTPAY}_{i,t})\}}$$

# Future Performance and the Premium: Unconditional

	PERF(+24)	ALPHA(+24)			TALPHA(+24)		
	Raw Returns	Market Model	Fama-French	Fung-Hsieh	Market Model	Fama-French	Fung-Hsieh
<b>TOTPAY</b>	-0.009	<u>-0.052</u>	<u>-0.058</u>	<u>-0.082</u>	-0.136	-0.129	<u>-0.186</u>
AMT	-0.001	-0.001	-0.003	-0.004	<u>-0.011</u>	<u>-0.011</u>	-0.007
PERFMEAS(-24)	<u>-0.135</u>	<u>-0.099</u>	-0.080	-0.122	<b>0.474</b>	<b>0.485</b>	<b>0.337</b>
IMILLS	0.046	<u>-0.241</u>	<u>-1.071</u>	-0.259	-1.828	<u>-3.028</u>	-2.005
GLMTHETA0	0.003	0.011	0.028	-0.018	0.239	<u>0.298</u>	0.058
Adjusted R-squared	-0.019	0.012	0.146	-0.001	0.352	0.457	0.245

# Future Performance and the Premium: Conditional

	PERF(+24)	ALPHA(+24)			TALPHA(+24)		
	Raw Returns	Market Model	Fama-French	Raw Returns	Market Model	Fama-French	Raw Returns
HITOTPAY	-0.015	<u>-0.067</u>	<u>-0.072</u>	<u>-0.102</u>	-0.174	-0.151	<u>-0.228</u>
LOTOTPAY	0.067	<u>0.117</u>	<u>0.092</u>	<u>0.136</u>	<u>0.257</u>	0.086	0.215
AMT	-0.001	-0.002	<u>-0.004</u>	<u>-0.005</u>	<u>-0.015</u>	<u>-0.013</u>	<u>-0.011</u>
PERFMEAS(-24)	<u>-0.151</u>	<u>-0.126</u>	-0.113	-0.160	<u>0.453</u>	<u>0.474</u>	<u>0.312</u>
IMILLS	0.080	<u>-0.180</u>	<u>-1.028</u>	-0.158	-1.781	<u>-2.995</u>	-1.955
GLMTHETA0	-0.002	0.002	0.019	-0.029	0.217	<u>0.286</u>	0.041
Adjusted R-squared	-0.012	0.078	0.179	0.039	0.362	0.457	0.255

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- Now working on the 'book' of all indications of interest on Hedgebay (>1,000 funds, >7 years). A rich set of possible questions to be answered using those data.