LONG-TERM CAPITAL MANAGEMENT REVISITED: ACCOMMODATIONS FOR INTERNATIONAL MARKETS

Jill L. Wetmore[1]
Saginaw Valley State University, USA.
E-mail: jwetmore@svsu.edu

ABSTRACT

The Long-Term Capital Management (LTCM) debacle of 1998 created serious problems for a number of major financial institutions worldwide. The fund was run by some of the most illustrious scholars in economics and finance. Before 1998, stellar returns kept the investors happy and not questioning the lack of transparency in accounting statements and inability to withdraw funds. The fund refunded capital to the shareholders in 1997. This among other actions involving misreading of risk left LTCM in a precarious position. By September 1998, losses were reported and a bailout occurred by the end of the month.

Thirteen of the fourteen banks participating in the bailout are included in this study. Since non U.S. banks are included for the first time, methodology is adjusted for changes in time, foreign exchange, and financial markets. The purpose is to determine the effects of non U.S. bank stock returns on the results and how non U.S banks fared in the bailout. Results are similar for U.S. financial institutions indication a global robustness of methodology.

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[1]Jill Wetmore is Professor of Finance at Saginaw Valley State University, 320 Curtiss Hall University Center, MI 48710, Telephone: 989-964-4064, Fax: 989-964-7497.

Jill L. Wetmore

In this study, stock prices of financial institutions participating in the bailout dropped by over 21% from the time of LTCM's announcement of losses through the bailout period. This represents an abnormal decline when compared with banks that did not participate in the bailout nor had no loan exposure in the case of lending to LTCM. As a comparison, prices of commercial bank stocks without exposure to LTCM and two market indices show increases of 10.97%, 5.47%, and 2.53% respectively.

Of the bailout participants, U.S. banks perform somewhat better than investment banks and non U.S. banks suggesting a small insurance effect. Non U.S. banks appear not to have benefited by the announcement of the FED takeover of the bailout on September 18.

Evidence of contagion is revealed by significant negative abnormal returns during the loss announcement and bailout period by banks with no investment or loans to LTCM showing a significant negative return. The announcement on September 2, 1998 is a surprise despite earlier hints of problems with the investments of LTCM. Results are similar to those of earlier studies despite the inclusion of non U.S. banks and alternative methodology.

Key words: commercial banking, Long-term Capital Management, event study, financial institutions, abnormal returns

JEL codes: G21, G14

I. INTRODUCTION

Long-Term Capital Management (LTCM) was designed to be the ultimate hedge fund. Some of the most illustrious scholars in finance and economics managed the fund. Investors in the fund were required to invest for an extended period of time and were not given a transparent view of the fund and its investments.

Initially, this was not a problem because, the large returns kept the customers satisfied After several years of stellar returns, LTCM refunded capital to the investors in 1997. In 1998, a number of LTCM's market bets turned out to be wrong and serious losses occurred. The weakened capital position of LTCM served to exacerbate the problem. News of these losses

generated abnormal losses in the prices of stocks of financial institutions perceived to have loan or investment exposure to LTCM. The LTCM loss announcement occurred on September 2, 1998 and by the end of September 1998 a bailout had occurred. This event is regarded as one of the most serious debacles of the 1990s and the subject of much controversy regarding the value of a bailout (Dowd [1999] and Leitner [2002]). [2]

In brief, losses occurred because LTCM management bet that interest rates between high yield corporate bonds and U.S. treasury securities would narrow following the currency crises in Asia in 1997. Instead, the spreads increased. This was compounded by the fact that LTCM reduced capital so it was not in a position to absorb major losses. Jorian [2000] examined the risk structure of LTCM and found that it had underestimated the probability of various events occurring and left itself undercapitalized. Moreover, as the spreads increased, LTCM was unable to unwind itself from the position due to the large number of illiquid financial instruments in its portfolio (Edwards [1999]). A bailout occurred and serious questions regarding the value of a bailout are raised.

This study examines stock return effects of thirteen of the fourteen banks participating in the bailout.   This is the largest number of participating banks included in a study. Abnormal returns of U.S. commercial banks participating in the bailout are compared with those of investment banking firms and non U.S. banks to determine if an insurance effect exists which protects the U.S. commercial banks. A sample of banks with no known exposure to LTCM is included as well for comparison and possible contagion effects.

The methodology is adjusted to accommodate the presence of stocks not traded in U.S. markets. Park [2004] posits when mixing domestic and foreign firms in an event study, the results may be overstated if a single country index is used and the data are not corrected for effects resulting from lack of synchronism in trading hours, exchange rate differences, noise from confounding events and differences in regulatory oversight.

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[2] For excellent discussions of the LTCM debacle, see Lowenstein [2000] , Stonham [1999 a, b] and Shirreff [2003].

Jill L. Wetmore

The paper is organized as follows. First the relevant literature is discussed. Data and methodology, empirical results and a conclusion follow.

II. LITERATURE SEARCH

Kho, Lee, and Stultz [2000] examine the effect of this event only on U. S. commercial bank stock returns. Non U.S. banks and investment banks are excluded from the study. To mitigate the effects of the lack of information about loan exposure to LTCM, they argue that banks participating in the bailout are heavily exposed to LTCM. The results suggest that during the period surrounding the initial announcement of losses, September 2, 1998 and the bailout period, the market distinguishes between exposed and unexposed banks.

Jorion [2000] found loss announcements on September 2 and 21. He examined LTCM's strategies using a Value at Risk framework. LTCM seriously underestimated its risk based on reliance on short-term history and risk concentrations.

Furfine [2001] examines nine banks participating in the bailout and finds the very large banks reduced their level of borrowing at the time of the debacle. Banks participating in the bailout, however, did not reduce their level of borrowing during the crisis. Market results suggest that creditor banks were not in danger of default.

Telfah, Hassan, and Kilic [2001] use an EARCH model to estimate the effects of the debacle on financial institutions. Banks are the most affected of all financial institutions.

Kabir and Hassan [2005] examine U. S. financial institutions including investment banking firms, commercial banks, savings and loans, and insurance companies. Non U.S. financial institutions are excluded. They distinguish between institutions participating in the bailout and those with loan exposure or "copy cat" positions. They find significant negative abnormal returns for investment and commercial banks with exposure to LTCM on the event dates. Investment banking firms suffer larger losses than those faced by other financial institutions. Evidence of contagion and a market perception of a "too-big-to-fail" effect are found.

III. DATA AND METHODOLOGY
A. Model

Using Seemingly Unrelated Regressions (Zellner [1962], Equation 1 is estimated over a 251 trading-day period (January 1, 1998-December 31, 1998).

$$R_{jt} = \alpha_{jt} + \beta_{jmt} R_{mt} + \beta_{jft} R_{ft} + D_{jt} \alpha_{jt} + D_{jt} \beta_{jmt} R_{mt} + D_{jt} \beta_{jft} R_{ft} + \Sigma \ \Gamma_{jt}D_{1jt} + \varepsilon_{jt} \qquad [1]$$

Where

j = firm j,

t = time t,

R = return,

D = Dummy variable = 0 between January 1 and August 21, 1998 and = 1 otherwise,

D_1 = Dummy variable of 1 during a specific event date and zero otherwise,

β_m = market beta coefficient,

β_f = foreign exchange risk coefficient,

Γ = abnormal return of bank on the individual event day examined.

The Γ's are examined separately for each day of the event period. The periods of July 20, September 1-4, and September 18-25, 1998 are examined.[3]

B. Data Collection

Daily stock price data are collected from the *Daily Stock Price Record* published by Standard and Poor in the case of U.S. traded stocks (Musumeci and Sinkey [1990]). Stock prices of companies trading on international exchanges are collected from *The Wall Street Journal*. For comparison, banks listed in the *American Banker's* top fifty banks and have no investment in LTCM are included.[4] Stock prices are corrected for dividends and stock splits. Returns are computed using the formula $(p_2 - p_1)/p_1$.

The Morgan Stanley World Index is used as the proxy for the stock market. The Federal Reserve Bank Foreign Exchange (G10) Index is used to proxy foreign exchange risk. Market and foreign exchange returns are

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[3] Not all of the days in this time range are studied in this paper. The focus is on the LTCM announcement of September 2, 1998 and the bailout period of September 18-25, 1998.

[4] Banks not trading for the entire year are excluded. These banks are: Nations Bank, Norwest Corp., CoreStates, Star Banc, First Chicago, and First Commerce.

computed using the same methodology as stock returns. Table 1 lists the financial institutions examined in this study.

Table 1: A List of Commercial Banks and Investment Banks Included in the Study of Stock Return Effects and Long-Term Capital Management, 1998

Name of Financial Institution	Abbreviation	Relationship to LTCM Debacle
Amsouth Bancorporation	aso	none
Bank of America Corp.	bac	Loan Exposure
Barclays BK PLC	Baray [a]	Capital Exposure
BB&T Corp.	bbt	none
Bear Sterns	Bear [b]	Bailout
Bank of New York, Inc.	bk	none
Bank of Boston	bkb	Loan Exposure
Bankers Trust	bt	Bailout
Citicorp, Inc.	cci	Loan Exposure
Chase Manhattan Bank	cmb	Bailout
Comerica, Inc.	cma	none
Compass Bankshares	cpss	none
Credit Suisse-First Boston	creds [a]	Bailout
Crestar	crfc	none
Deutsch Bank	deuts [a]	Bailout
Dresdner Bank	dresd [a]	Loan Exposure
Regions Bank	fabc	none
M&T Bank Corp.	fes	none
Fifth Third Bancorp	fitb	none
Fleet Norstar Group	fng	Loan Exposure
First Security Corp.	fsco	none
Firstar Corp.	fsr	none
First Tennessee National Corp.	ften	none
First UN Corp.	ftu	none
Huntington	hban	none
J.P. Morgan & Co.	jpm	Bailout

Keycorp	key	none
Lehman Brothers	leh [b]	Bailout
Mellon Financial Corp.	mel	none
Merrill Lynch	merr [b]	Bailout
Marshall and Ilsley Corp.	mris	none
Morgan Stanley	msdw [b]	Bailout
Mercantile Bankcorp.	mtrc	none
National City Corp.	ncc	none
North Fork Banc	nfbc	none
Northern Trust Corp.	ntrs	none
Old Kent Financial Corp.	oken	none
Banc One Corp.	one	none
Pain Webber	Pain [b]	Capital Exposure
Bank Paribas	para [a]	Bailout
PNC Financial SVCS Group	pnc	none
Popular	bpop	none
Prudential Life	prud [b]	Capital Exposure
Republic New York Corp.	rnb	Loan Exposure
Societe Generale	socg [a]	Bailout
South Trust Corp.	sotr	none
State Street Corp.	stbk	none
Sun Trust Banks Inc.	sti	none
Sumito Bank	sumto [a]	Capital Exposure
TCF Financial Corp.	tbc	none
Travelers Group	trav [b]	Bailout
UBS	ubs	Bailout
Summit Bankcorp	ujb	none
Synovus Financial Corp	snv	none
Union Planters	upc	none
UnionBanCal	unbc	none
U.S. Bank Corp.	usbc	none
Wachovia Corp.	wb	none
Wells Fargo & Co.	wfc	none

[a] Non U.S. Bank
[b] Investment Banking Firm

As can be seen, thirteen institutions in this study participated in the bailout. The composition is three U.S. banks, five investment banking firms, and five non U.S. banks. Forty banks with no relationship to LTCM are used as a control group.   Ten banks or financial institutions have a loan or capital relationship with LTCM but did not participate in the bailout.

C. Methodology

Abnormal returns cannot be estimated using standard event study methodology (Brown and Warner [1980, 1985]). First, in the case of an event affecting a single industry, clustering is a potential problem.   This means that the returns are most likely cross-sectionally correlated and the residuals are not independently and identically distributed. See, for example, Collins and Dent [1984], Cornett and Tehranian [1990], Eyssell and Arshadi [1990], and Smirlock and Kaufold [1987].   Therefore the abnormal returns are estimated using Seemingly Unrelated Regressions (Zellner [1962]). See, for example, Cornett and Tehranian [1990] and Eyssell and Arshadi [1990].

Second, the event period contains conflicting events occurring near the event period that may affect the results. The Russian Ruble devaluation occurred just before and the Brazilian currency crisis occurred just after the notification of the LTCM losses. A narrow event window is used to mitigate the effects of this problem. Third, it is possible that structural changes in the market model coefficients occurred during this period thus rendering invalid the abnormal returns (Kane and Unal [1988]) so structured breaks are included in the equation.

Fourth, the use of non U.S. firms in the study suggests that several corrections be made in the market model to avoid overstating the results (Park [2004]). First, market returns for banks trading in Asia are lagged by one day to adjust for the lack of synchronism in trading. Second, the Morgan Stanley World and G-10 foreign exchange indices are used to correct for the differences in markets.

Finally, while the company made the announcement of serious losses on September 2, 1998, some investors may have predicted losses would occur and adjusted their investment in these institutions earlier than
September 2, 1998.[5]   For example, a large portion of the loss occurred because LTCM bet that the interest rates of bonds with subsequent year maturities would converge and instead, they diverged (Dowd [1999], Shirreff [2003], and Stonham [1999]). An investment analyst knowing of this position may have recommended an adjustment in the level of stocks of financial institutions invested in LTCM or holding "copy cat" positions at the time it became apparent that rates were going to diverge rather than converge.

A second issue that may have been predicted by analysts is the increase in risk of LTCM and its effect on affiliated firms caused by LTCMs opaque attitude toward its investors, return of capital, and reduction in margin requirements (Stonham [1999], Jorion [2000], and Shirreff [2003]). The resulting increase in risk would make and observant analyst nervous and ready to submit a sell (or at least hold) recommendations of the stocks of firms tied to LTCM prior to the September 2, 1998 announcement in light of possible expected bad news.

Anticipating a loss before a formal announcement would create similar results to those of event studies on legislation changes where leakage of information routinely occurs as the probability of the bill passing or failing changes over time and the abnormal results change accordingly. By the time of the actual passage, there may be no significant abnormal change because there is no new information. If the results are not statistically significant, this may be the cause.

IV. EMPIRICAL RESULTS

The results are generally consistent with those of other authors Kho, Lee, and Stultz [2000] and Kabir and Hassan [2005]. Non U.S. bank stocks appear to have suffered greatly from this event. The

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[5] On July 17, 1998, it was announced that Salomon Smith Barney was liquidating its "copy cat" positions of LTCM (Shirreff [2003]).

similarities in the results with those of other authors suggest a robustness of the model and methodology.

Table 2 gives the results of changes in stock prices of equal weighted portfolios of stocks of various categories. The categories are as follows: 1) those with loan or investment exposure to LTCM but not participating in the bailout, 2) those participating in the bailout, 3) banks with no loan or investment exposure to LTCM, 4) U.S. commercial banks participating in the bailout, 5) investment banking firms and non U.S. banks participating in the bailout, 6) U.S. investment banking firms participating in the bailout, and 7) non U.S. banks participating in the bailout. For comparison, returns on the S&P500 and the World Index by Morgan Stanley returns are shown as well.

The group of financial institutions with loan or investment exposure to LTCM but not participating in the bailout shows a lower return than the group with no loan or investment exposure to LTCM but a better return -than the group participating in the bailout. These differences are significant at the 5% level. In the case of the subdivision of banks participating in the bailout, the only significant difference is between U.S. commercial banks and non U.S. banks.

Table 2: Changes in Stock Price of Financial Institutions during the Event of the LTCM 1998 Debacle Divided by the Level of Involvement in the Debacle [a]

Group/Dates	Group 1	Group 2	Group 3	Group 4	Group 6	Group 7	S&P500	Morgan Stanley World Index
9/1-9/25	-1.57%	-21.32%	10.97%	-14.62%	-19.59%	-26.76%	5.47%	2.53%

Z score of difference between Groups [b]

Group/Dates	3-1	3-2	1-2	4-7	4-6
9/1-9/25	5.09*	19.35*	8.96*	3.82*	1.13

[a] Group 1: Financial Institutions with Exposure to LTCM; Group 2: Financial Institutions Participating in the LTCM bailout; Group 3: A Sample of Banks with no exposure to LTCM,; Group 4: U.S. Commercial banks participating in the LTCM bailout; Group 5: Other Financial Institutions Participating in the LTCM bailout; Group 6: U.S. Investment banks participating in the bailout, Group 7: Non U.S. hanks participating in the bailout.
[b] Differences significant at the 5% level are noted with an asterisk

Stocks of bank holding companies with no loan or investment exposure to LTCM show an average increase of 10.97% over the period of September 1, 1998 to September 25, 1998. The S&P 500

increases 5.47%.   The Morgan Stanley World Index price change is 2.53%. Financial institutions with a loan or investment relationship with LTCM but not participating in the bailout show a return of -1.57%.   Financial institutions participating in the bailout show a price reduction of -21.32% over the same period of time. In the subdivision of the bailout group, U.S. commercial banks show a return of -14.62%, non U.S. banks -26.76%, and investment banking firms -19.59%. As stated earlier, the results between groups are significantly different at the 5% level except for the comparison of U.S. commercial banks participating in the bailout with investment banking firms. Non U.S. commercial banks performed significantly worse than U.S. banks.

Table 3 gives the results of the event study. The results are shown by group and by individual bank in Table 3a. Table 4 examines the differences in the results between the groups studied. [6]

The event study results for the period September 1-3 and September 18-25 are shown. While the letter was not sent until September 2, leakage may be in evidence so September 1 is included in the study. The dates of September 18-25 are shown to determine differing effects resulting from the adoption of the problem by the FED and the resulting bailout.

Since an announcement of problems with LTCM occurred on July 20, that date is evaluated as well. No group shows abnormal negative returns on July 20 indicating that the date is a nonevent which is consistent with Kabir and Hassan [2005].

Table 3: Abnormal Returns of U.S. and Non U.S. Participants in the LTCM Debacle and Bailout, 1998 [a] [b]

Group/	1	2	3	4	5	6	7
con	-0.00019	0.00064	-0.00090	-0.00011	0.00078	0.00080	0.00094
dcon	-0.00021	0.00033	0.00179	0.0021	-0.00084	0.0011	-0.0032
World	1.08*	1.18*	.95*	1.15*	1.12*	1.40*	.98*

[6] In this study, differences between the returns of the portfolios are regressed. Kabir and Hassan [2005] use a dummy variable methodology to identify the different groups of banks and insurance companies.

Index							
dWorld	0.025	0.19	-0.011	0.05500	0.27	-0.39	0.51**
G-10 Ex	0.39**	0.28	0.27	0.24	0.19	0.56	.0057
dG10-ex	-0.18	-.19	-.63**	0.32	-.33	-.61	-.064
Jul 20	-.0042	-.0021	.0026	-.0034	-.0022	-.017	.014
Sept 1	-.0083	-.023	.023*	0.0053	-.036*	-.017	-.047*
Sept 2	-.0032	0.0038	.011	-.013	.00015	-.0013	.019
Sept 3	-.026*	-.060*	-.0070	-.073*	-.056*	-.062*	-.051*
Sep 4	-.027*	-.036*	-.023	-.053*	-.033*	-.031	-.032
Sept 18	-.020**	-.045*	-.014	-.030	-.051*	-.023	-.077*
Sept 21	-.016	-.020	-.015	-.033	-.016	-.012	-.022
Sept 22	.051*	-.063*	.036	.090*	.050*	.046*	.063*
Sept 23	-.039*	-.058*	-.025*	-.066*	-.055*	-.055*	-.057*
Sept 24	-.0089	-.038*	-.0063	-.015	-.048*	-.026	-.063*
Sept 25	-.0049	-.024	.0052	-.019	-.028**	-.048*	-.0034
Entire Period	-.0095*	-.020*	-.0016	-.017*	-.023*	-.022*	-.021*

* is significant at the 5% level
** is significant at the 10% level.
[a] Group 1: Financial Institutions with Exposure to LTCM; Group 2: Financial Institutions Participating in the LTCM bailout; Group 3: A Sample of Banks with no exposure to LTCM,; Group 4: U.S. Commercial banks participating in the LTCM bailout; Group 5: Other Financial Institutions Participating in the LTCM bailout; Group 6: U.S. Investment banks participating in the bailout, Group 7: Non U.S. hanks participating in the bailout.
[b] The equation estimated is $R_{jt} = \alpha_{jt} + \beta_{jmt} R_{mt} + \beta_{jft} R_{ft} + D_{jt} \alpha_{jt} + D_{jt} \beta_{jmt} R_{mt} + D_{jt} \beta_{jft} R_{jft} + \Sigma \ \Gamma_{jt} D_{1jt} + \varepsilon_{jti}$ where $D_1 = 1$ after August 21, 1998 and 0 otherwise, D=1 if on a particular date and 0 otherwise, R_{mi} is the return on the Morgan Stanley World Index, R_{ft} is the sensitivity to the exchange rate (G1 Index), and R_i is the return on the stock.

Table 3a: Abnormal Returns of U.S. and Non U.S. Participants of the Long-Term Capital Management Debacle at the Time of the Debacle and Bailout, 1998 [a]

Name	du91	du92	du93	du94	du918	du921	du922	du923	du924	du925
aso	-.015*	.012*	-.012*	-.043*	-.024*	-.040*	.056*	-.011*	-0.0036	.013*
bac	-.024*	.012**	-0.014	-.076*	-.047*	.023**	.093*	-.071*	.040*	.015*
Baray	-0.017	-.048*	-.058*	-.061*	-.019*	-0.014	.028*	-0.048*	-.041*	-.040*

Name	du91	du92	du93	du94	du918	du921	du922	du923	du924	du925
Bear	0.013	.037*	-.064*	-.049*	-0.0091	.070*	-.062*	-.062*	-0.0045	-0.019
bbt	.020*	-.013*	-0.00011	-.045*	.0090*	-.046*	.075*	-.031*	.016*	.019*
bk	-.025*	0.00510	-.022*	-.039*	0.0045	-.021*	.037*	-.060*	.012*	.013*
bkb	.022**	0.0024	-.042*	-.062*	-.036*	-.048*	.11*	-.076*	-.026*	-0.0095
bt	-0.027	-0.0020	-.094*	-0.0045	-0.017	-0.019	.094*	-.071*	-.023*	-.036*
cci	-.056*	0.0054	-.078*	-.093*	-0.019	-.064*	.12*	-.042*	-0.0039	-0.027
cma	.029*	.012*	-0.012*	-.025*	-.029*	-.025*	.032*	-.020*	.-.021*	-0.0076
cpss	-0.0087	-0.0021	.029**	-0.017	-.037*	0.00087	-0.0065	-0.017	0.014	0.020
cmb	0.011	-.013*	-.083*	-.11*	-.031*	-.066*	.10*	-.069*	-.035*	-.023*
creds	-.079*	.026*	-.073*	-.069*	-.11*	-.044*	.11*	-.040*	-.053*	-0.0083
crfc	0.0041	-.029*	-.011**	.034*	-.012*	.038*	-.036*	0.0049	.021*	.0024*
deuts	.027**	-0.0051	.030*	-.024*	-.064*	.019**	.060*	-.085*	-.031*	.028*
dresd	-.017*	-.015*	-.044*	-.027*	-.028*	-.019**	.057*	-.073*	-.057*	.036*
fabc	-.030*	-.0083**	0.0099	-.013*	.017*	-.035*	.041*	-.041*	.020*	0.0070
fes	.054*	.028*	-0.00087	-.014**	-.020*	-.042*	.020*	0.0054	-.0094*	.024*
fitb	-.030*	-.058*	0.00030	-.0069**	0.0063	-0.00340	.030*	-0.0037	-0.0034	-.044*
fng	.048*	.0097*	-0.00091	-.040*	-0.00042	-032*	.059*	-.037*	-.013*	-0.0045
fsco	.15*	-.014*	-0.0064	-.0086*	-.026*	-.023*	.027*	-.030*	-.044*	.0097**
fsr	.060*	.058*	.013*	-0.0071	0.0049	-.033*	0.0010	-0.00024	-0.0047	.011*
ften	.027*	.056*	-.015*	-.023*	-.039*	-.025*	.053*	-.021*	-.014*	.0072**
ftu	0.0099	0.0045	-0.00068	-0.078*	-0.0070	-0.0034	.059*	-.038*	-.0093*	-.013*
hban	.061*	-0.018	-0.0046	-0.0035	.023**	.022**	-0.016	-0.0049	0.026	-0.007
jpm	.025*	-.029*	-.053*	-.041*	-.043*	-0.0093	.068*	-.062*	.012*	-0.0010
key	.080*	-.013*	-.028*	-.029*	-.022*	-.025*	.052*	.010*	-.027*	-.047*
leh	-.038**	.046*	-.078*	-.038*	-0.0093	0.0092	.062*	-.099*	-.023*	-.10*
mel	.015*	-0.0063	-.023*	-.047*	-.019*	0.0073	.035*	-.040*	-.0090*	-0.0059
merr	-0.013	-0.0023	-.035*	-.066*	-.043*	-.055*	.098*	-.063*	-.036*	-.029*
mris	0.019	.023*	-.042*	-.0096*	-.018*	.031*	0.0052	-.026*	-.020*	.015*
msdw	-0.0053	-.10*	-.068*	.070*	-.022*	.048*	-.10*	.018*	-.074*	-.094*
mtrc	-.040*	-.026*	.023*	-.042*	-.024*	-.024*	.029*	-.033*	-.013*	.034*
ncc	0.00084	.028*	-0.0081	-.013*	-0.0018	-0.011	.053*	-.047*	-.018*	.013*
nfbc	-0.0081	0.039*	-0.012	0.0062	-0.027	-0.0091	-0.0210	0.0083	-.034**	0.013
ntrs	.062*	-.066*	-0.0010	-.040*	-.025*	-.021*	.054*	-.034*	-.018*	0.0058
oken	-0.0078	.034*	-.030*	-0.0011	-.031*	-0.0069	.010*	-.050*	-.0096*	-0.00081
one	.047*	-.020*	.019*	-.054*	.011**	-.035*	.052*	-.044*	-.031*	0.0018
Pain	-0.013	-.060*	-.043*	.099*	-0.012	.045*	-.061*	.033*	.028*	-.072*
para	-.049*	.030*	-.033*	-.019*	-.064*	-.053*	.019*	-.049*	-.088*	-.016*

Name	du91	du92	du93	du94	du918	du921	du922	du923	du924	du925
pnc	0.0059	.0085**	-0.0099	-.050*	-.012*	-.015*	.062*	-.021*	-.020*	-.031*
bpop	.065*	0.026	-0.035	-0.0059	-0.016	-.038**	-0.032	-0.0067	-0.0086	-0.015
prud	-.028*	.012*	-.011*	-.017*	-.014*	-0.011	.060*	-.018*	-.039*	.032*
rnb	-.019*	-.0081*	-.043*	-.039*	-.025*	-.019*	.059*	-.049*	-.014*	0.0046
socg	-.060*	-0.0074	-.043*	-.024*	-.070*	-0.0054	.060*	-.025*	-.090*	0.0086
sotr	-0.0027	.042*	-.036*	-.034*	-.028*	.034*	.022*	-.027*	.044*	-0.0060
stbk	-.021**	-.018*	0.0052	-.026*	-.028*	.018*	.093*	.0091*	.017*	-.025*
sti	-.020*	0.00055	-0.0083	-.040*	-.016*	-.025*	.071*	-.038*	-.018*	.028*
sumto	0.0062	.047*	.071*	.031*	-0.0023	-.036*	-.023*	.014**	-.026*	-.017*
snv	-0.0015	-0.0046	-0.0042	-0.013	0.036	-0.018	0.024	-0.012	0.022	0.014
tbc	.024*	.025*	-.013*	-.033*	-.017*	-.039*	.031*	-.034*	-0.00021	.016*
trav	-.060*	.012*	-.060*	-.080*	-.030*	-.052*	.11*	-.066*	0.0052	0.0027
upc	.030*	.041*	0.0036	-0.0096	-0.0017	-0.0061	0.0045	-0.024	.040*	0.018
unbc	-.040**	.060*	-.039**	-0.031	-0.016	.056*	-0.019	-0.0041	.087*	.046*
ubs	-.045*	.062*	-.070*	-.019*	-.080*	-0.017	.061*	-.098*	-.060*	-.022*
ujb	0.010	.012*	-0.0044	-.024*	-.026*	-0.0006	.065*	-.035*	-.031*	.032*
usbc	.043*	.029*	0.012	-.034*	-0.013	-.061*	.062*	-.020*	-.056*	-.039*
wb	.030*	.018*	-.010**	-.019*	-.012*	-.031*	.033*	-.024*	.0070*	.012*
wfc	.051*	0.00055	-.018*	-.032*	.015*	0.012	.042*	-014*	-.0074**	.019*

* is significant at the 5% level
** is significant at the 10% level.

[a] The equation estimated is $R_{jt} = \alpha_{jt} + \beta_{jmt} R_{mt} + \beta_{jft} R_{ft} + D_{jt} \alpha_{jt} + D_{jt} \beta_{jmt} R_{mt} + D_{jt} \beta_{jft} R_{ft} + \Sigma \ \Gamma_{jt} D_{1jt} + \varepsilon_{jt\,1}$ where $D_1 =1$ after August 21, 1998 and 0 otherwise, D=1 if on a particular date and 0 otherwise, R_{mi} is the return on the Morgan Stanley World Index, R_{ft} is the change in non U.S. exchange rates (G1 Index) and R_i is the return on the stock.

Table 4: Differences in Abnormal Returns of Regression Groups of Participants in the Long-Term Capital Management Debacle, 1998 [a] [b]

Group/Date	3 - 1	3 - 2	1 - 2	4 - 5	4-6	4-7	6-7
con	-.00071	-.0015	-.00083	-.00089	-.00091	-.0010	-.00014
dcon	.0015	.0021	-.00054	-.0030	.0011	.0053	.0037
World Index	-.013*	-.24**	-.011	.028	-.25	.17	.42
dWorld Index	.-.036	-.20	-.17	-.22	.-.093	-.45	-.58
G10ex	-.13	-.0091	.12	.052	-.32	.24	.56
dG10 ex	-.35	-.34	.011	.65	.93**	.38	-.47
Sept 1	.031*	.047*	.015	.041*	.022	.052**	.032
Sept 2	.015	.0076	-.0071	-.013	-.012	-.032	-.019

Sept 3	.019*	.053*	.035*	-.018	-.011	-.024	.010
Sept 4	.0038	.013	.0095	-.020	-.022	-.021	.0023
Sept 18	.0063	.031*	.025*	-.021	-.0072	.047**	.054*
Sept 21	.00034	.0051	.0048	-.016	-.021	-.011	.00022
Sept 22	-.015*	-.0026**	-.011	.040*	.044*	.027	-.017
Sept 23	.014	.033*	.020*	-.011	-.011	-.0089	.0018
Sept 24	.0027	.032*	.029*	.033**	.011	.048**	.038
Sept 25	.0010	.029*	.019	.010	.030**	-.014	-.043
All	.0078*	.020*	.013*	.0077	.0034	.0080	.0046

 * is significant at the 5% level
 ** is significant at the 10% level
[a] Group 1: Financial Institutions with Exposure to LTCM; Group 2: Financial Institutions Participating in the LTCM bailout; Group 3: A Sample of Banks with no exposure to LTCM; Group 4: U.S. Commercial banks participating in the LTCM bailout; Group 5: Other Financial Institutions Participating in the LTCM bailout; Group 6: U.S. Investment banks participating in the bailout, Group 7: Non U.S. hanks participating in the bailout.
[b] The equation estimated is $R_{jta} - R_{jtb} = \alpha_{jt} + \beta_{jmt} R_{mt} + \beta_{jft} R_{ft} + D_{jt} \alpha_{jt} + D_{jt} \beta_{jmt} R_{mt} + D_{jt} \beta_{jft} R_{ft} + \Sigma\ \Gamma_{jt} D_{1jt} + \varepsilon_{jt\ I}$ where $D_1 = 1$ after August 21, 1998 and 0 otherwise, $D = 1$ if on a particular date and 0 otherwise, R_{mi} is the return on the Morgan Stanley World Index, R_{ft} is the change in non U.S. exchange rates (G1 Index), and $R_{jta} - R_{jtb\ I}$ is the difference in returns of two groups.

According to Table 3 results, banks with no loan or investment exposure to LTCM show no significant negative abnormal returns over the period studied except for September 23. The reason why banks with no exposure should suddenly show a negative abnormal return on September 23 would generate from a market perception that some of these banks may face danger as a result of the event by possibly holding "copy cat" positions or they may be required to participate in the bailout. Contagion is a distinct possibility as well as suggested by Kabir and Hassan [2005].

The results of Table 4 suggest that banks with no exposure to LTCM out perform financial institutions with exposure to LTCM or participating in the bailout by showing significantly higher abnormal returns on September 1 and 3 as well as for the entire period studied.

Reviewing the individual results for September 23 in Table 3a shows that thirty of the forty banks show a significant negative abnormal return on September 23 and only seventeen show a significant negative abnormal return on September 3. It would appear that by the time of the bailout that the market had time to assess which of these banks may have held "copy cat" positions to LTCM or were invested in securities similar to LTCM that would be

difficult to unwind (Edward [1999] and Kabir and Hassan [2005]). If both LTCM and these banks decided to unwind their positions simultaneously, a serious negative reaction would result.

The results in Table 3 show significant negative abnormal returns for financial institutions with loan or investment exposure to LTCM but not participating in the bailout on September 3, 4, 18 and 23. Banks with exposure to LTCM significantly out performed the bailout group on September 3, 18, 23, and 24 as well as the entire period studied. These results indicate that the market identifies banks with exposure to LTCM and treats them as weakened as a result of the debacle but less so than banks participating in the bailout.

The group participating in the bailout show significant negative abnormal returns for September 3, 4, 18, and 22-24. The additional days of significant negative abnormal returns indicate that the market differentiates this group as being in greater risk and having greater exposure to LTCM by implication of participating in the bailout.

The results for U.S. banks participating in the bailout show significant negative abnormal returns on September 3, 4, 18, and 23. The market differentiates these institutions and perceives them to be in danger. Separating the U.S. commercial banks from the other financial institutions reveals that on September 1, 22, and 24, the U.S. commercial banks participating in the bailout significantly out performed the other financial institutions participating in the bailout. When the U.S. investment banks were separated from the other financial institutions participating in the bailout, the U.S. commercial banks out performed the U.S. investment banks on September 22 and 25. The U.S. commercial banks participating in the bailout show a less negative abnormal return than non U.S. banks on September 1 and 24 although the level of significance drops to the ten percent level from the five percent level. It appears that there may be an insurance effect in the case of the U.S. commercial banks that protects them during the bailout period.

The other financial institutions participating in the bailout show significant negative abnormal returns on September 1, 3, 4, 18, and 23-25. The market perceived these firms to be in greater danger

than the U.S. commercial banks. Moreover, it appears that there may be some leakage of the event for this group.

Dividing the other financial institutions participating in the bailout into U.S. investment banks and non U.S. banks reveals the following information. The U.S. investment banking firms show a significant negative return for September 3 and September 23 and 25. The non U.S. banks have significant negative abnormal returns on September 1, 3, 18, 23, and 24. There appears to be some leakage in the case of the non U.S. banks to explain the September 1 abnormal negative return. Since the non U.S. banks show more days with significant negative abnormal returns, it is possible that the market differentiates this group and determines it to be in greater danger.

According to Table 4 results, U.S. investment banking firms outperform non U.S. banks only on September 18. The day of the FED announcement appears to help the U.S. investment banking firms more than the non U.S. banks. The market perceives that non U.S. banks would not benefit as much from the FED takeover of the problem.

V. CONCLUSION

Banks with no exposure to LTCM out perform banks participating in the bailout and financial institutions with loan or capital exposure to LTCM. Similarly, banks with loan or capital exposure out perform financial institutions participating in the bailout but to a lesser extent. During the bailout period, a number of the unexposed banks show a negative abnormal return indicating a contagion effect. U.S. banks participating in the bailout show a minimal insurance effect by out performing U.S. investment banks and non U.S. banks also participating in the bailout.

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