

# **Shadow Banking: Credit Related Hedge Funds and the Factors that Generate Abnormal Returns**

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*Shadow banking has come into the scope of many central banks as they try to prevent another financial crisis. The risk factors of shadow banking should include many macroeconomic factors. This paper examines the risk and return characteristics of two types of credit based hedge funds (shadow banks) over the time period 2003-2011. Distressed Lending and Credit Arbitrage funds are studied in an attempt to compare and contrast risk characteristics and gain insight into the factors that affect returns for these types of hedge funds.*

## **Strategies and Market Types**

Credit markets are large and complex. A great deal of firm specific factors, as well as, macroeconomic factors and portfolio risk must be considered by the providers of capital. Typically, commercial banks have standard types of contracts and borrowers that do not meet these standards must search for other capital providers. This study examines two unique types of capital providers to determine the factors related to asset returns in these industries. Hedge fund returns in these two categories are empirically analyzed to derive correlations and differences, in order to understand some of the factors that enhance asset returns related to credit markets.

The financial crisis of 2008 left many large banks unable to de-lever and as a result, these banks could not maintain business as usual. Large banks began lending at a lower rate after the financial crisis. Shadow banking entities grew and thrived during this time period. Shadow banks filled the lending void that large banks left in the economy. For investors in these shadow banks, many of the shadow banks are absolute return investment vehicles which can provide better risk adjusted returns than investing in a large bank or using index investing, even in extreme distressed environments. The volatility of each of the two types of hedge funds discussed in this paper was lower than the S&P 500 index. Inclusion of these types of funds, into a portfolio during this time period, did allow investors the opportunity to lower risk even during a financial crisis.

The performance of Distressed Lending was remarkable during this time period. The largest financial crisis in, at least, 25 years (perhaps 75 years) was a credit event that tested many money managers during this period. The results for Credit Arbitrage were similar to Distressed Lending, in that the empirical factors were consistent with the debt-like structure and liquidity of these funds. Equities did not achieve positive returns over this period. Distressed Lenders had the highest returns and the highest risk adjusted returns, as well.

Distressed lending has gained more popular press since the 2008 financial crisis. Many governments are acting as distressed lenders in the US and Europe. Examples of this include the US Government bailout of 19 financial institutions, including AIG and 18 large banks. In addition, the automobile industry

was given a bailout. In Europe, Portugal, France, Spain and Greece have set up bailouts for banks, as other parties in Europe have bailed out the government in Greece and did set up some similar arrangements for Spain and Ireland after the crisis. Commercial banks do not typically lend to distressed companies. The risk management practices and central bank regulations limit bank lending in these areas. As a result, there is a void in lending and hedge funds in the distressed lending space provide capital in these situations. Some of these lenders do not label themselves as hedge funds, however, their structure is usually very similar (including a performance fee of 20% charged to investors). The structure of the distressed lending contract usually entails a legal agreement that entitles the lender to some type of coupon paying debt (with relatively high interest rates to account for the high level of credit risk in the underlying firm), that is frequently convertible into common stock. The debt contract can be considered an option that allows the firm to stay alive. It is a bridge to existing equity, as well. This investment could be considered more like a private equity valuation. The lender will become the equity holder if bankruptcy occurs. This investment is called high yield debt, otherwise known as junk bonds. While some firms do not lend based on convertible features and analyze credit with a fixed payment, the convertible feature is important to the success of many types of lenders. Some lenders choose to lend to higher rated "junk" bond firms and not use convertible features. The upside to these distressed lenders is limited. If the distressed lender does obtain convertible bonds or convertible preferred shares with high interest payments, then the upside potential is much greater and the lender may be able to handle a portfolio with a higher default rate.

The first category of credit related hedge funds is called credit arbitrage. We have eliminated fixed income arbitrage because many fixed income funds are investing in macroeconomic or yield curve types of risks rather than credit related risk. Credit arbitrage funds analyze firms and attempt to predict changes in the credit ratings of firms or sectors. Changes in relative interest rates may occur due to industry, macroeconomic or firm specific factors. Most firms use firm specific analysis first and then other information. Bottom up credit and balance sheet information is important. Typically, credit arbitrage funds trade with more frequency and may hold mostly investment grade bonds. The hedge fund may buy and short many types of bonds. Some possible investments may be investment grade and others may be high yield, or junk bonds. A strategy of going long high grade investment grade bonds (rated AAA or AA) and going short high yield non-investment grade bonds would be implemented if the hedge fund manager believed default risk would increase in the economy. This would occur if the probability of a recession increased. The returns on investment grade bonds would outperform the returns on high yield bonds. Therefore, the credit quality of investments in a credit arbitrage fund is usually higher than the quality of investments in a distressed lending fund. In addition, the time horizon of holding credit arbitrage funds is typically (months) much shorter than a distressed lending fund which may hold securities for years.

The second category is the distressed lending hedge fund or entity. Distressed lending is for firms that are not investment grade. In many cases, the firm may not be current on their debt. The distressed lender may purchase outstanding bonds for a substantial discount from par value.

The differences in credit quality and time horizon for these types of shadow banks are very different. The macroeconomic risk entailed in both of these types of funds (shadow banks) is expected to be different because of the quality and time horizon differences.

## **HYPOTHESES SECTION**

The risk profiles of these types of hedge funds are credit related and vary according to liquidity risk. Therefore, credit conditions and changes should affect returns to these hedge funds. The liquidity provisions should, also, matter. Distressed lending is not a liquid investment. Distressed Lending may be restricted or find it very difficult to sell for months or years. The credit risk is substantial and the funds are long credit risk all the time. Credit arbitrage funds, however, usually have much more liquidity and can move in and out of positions in minutes or days. Credit arbitrage funds can actually be short credit risk and have higher liquidity, frequently.

**Hypothesis 1:** Distressed Lending funds are more interest rate sensitive than Credit Arbitrage hedge funds. Given the longer term nature of the lending and the less liquid environment of a distressed loan, turnover in the distressed lending market tends to be longer term. Longer term loans have higher duration and more interest rate sensitivity.

**Hypothesis 2:** Distressed Lending funds will be the most correlated with 10 year Treasury Bonds. The source of lending for Distressed Lending funds is longer term and less liquid than credit arbitrage funds.

**Hypothesis 3:** Credit Arbitrage funds will be the most highly correlated with 3 month Treasury Bills. The source of funding is more related to Credit Arbitrage funds than the longer terms needed for Distressed Lending.

**Hypothesis 4:** Distressed Lending funds will be the most highly correlated with the unemployment rate. The risk of the Distressed Lending portfolio will be more affected by a recession and an increase in default rates in the economy.

**Hypothesis 5:** Distressed lending will be more highly correlated with equity markets since the lending has a lower credit quality and is closer to equity in the default process.

**Hypothesis 6:** The Credit Arbitrage funds will be the most negatively affected by changes in the Federal Funds Rate, FFR. This type of fund relies more on the short term lending market.

**Hypothesis 8:** Distressed Lending will be affected more by increases in inflation, as measured with the consumer price index, CPI. Inflation tends to be correlated with long term interest rates in the economy.

**Hypothesis 9:** Distressed lending will be more correlated with changes in international trade balances. International stock markets are more integrated, therefore shortages of capital and currency runs should be more correlated with distressed lending. Distressed credit is more affected by changes in international trade balance surpluses and deficits.

**Hypothesis 10:** The returns on the S&P 500 index should be higher than distressed lending and distressed lending returns should be higher than credit arbitrage. The ranking should be the S&P 500, Distressed Lending and then Credit Arbitrage. This is consistent with historical stock and bond market returns.

**Hypothesis 11:** Distressed Lending funds should be more highly correlated with Copper prices than Credit Arbitrage funds. Distressed Lending returns are higher credit risk returns that depend on default risk and the probability of a recession. Therefore, their correlations with commodities that are cyclical in nature should be higher.

**Hypothesis 12:** The price of Gold is related to a financial crisis and could reflect the probability of inflation, recession or the breakdown of a major world currency. Gold is related to liquidity events. During a liquidity event, capital moves to safer more liquid assets, such as US Treasury Bills. This is called a flight to quality. Distressed Lending should be affected the most, since it is a fixed income investment.

**Hypothesis 13:** USD/Euro and USD/Yen exchange rates should be correlated more highly with the sourcing of each strategy. The strategies using the carry trade more frequently or using international sources of capital should be more exchange rate sensitive. Credit Arbitrage funds would be more likely to be the most correlated with exchange rates, since they would typically have shorter time horizons than Distressed Lending.

## **EMPIRICAL RESULTS**

Monthly returns over the time period 2003-2011 are analyzed using data from the Hedge Fund Research Database. This includes over 8000 hedge funds. Each category listed has over 100 funds providing data each month. The data for the S&P 500 is from the CRSP database. The data for the Federal Funds Rate, FFR, Unemployment, U, inflation, CPI, International trade balance, Trade, and housing is from Bloomberg and the index of leading economic indicators. The MSCI (world stock index), CS (credit spread), Gold price, Copper price, USD/EUR and USD/YEN (US dollar exchange rates with the Euro and the Yen) and the 3 month T-Bill and the 10 year Treasury rate is from Bloomberg. Multiple sources were

used for unemployment, inflation, international trade data and the index of leading economic indicators using the US Government statistics.

**TABLE 1  
CORRELATION TABLE 2003-2011**

	<b>S &amp; P 500</b>	<b>MSCI</b>	<b>CS</b>	<b>10 year</b>	<b>FFR</b>	<b>U</b>	<b>Housing</b>
<b>Credit Arbitrage</b>	.63	.68	-.12.	-.02	-.09	.24	-.06
<b>Distressed Lending</b>	.53	.46	-.03.	.53	.73	-.78	.74

These empirical results find that the correlation of both of these strategies with the S & P is positive and statistically significant. The difference between the correlation of credit arbitrage funds and distressed lending is statistically significant. Credit arbitrage funds are more correlated with the stock market than distressed lending funds, this is a surprise finding. This suggests that the link between the stock and bond market is more correlated than the non-investment grade bond market and the stock market. In addition, both of these strategies are positively related to the world stock index, MSCI. Again, credit arbitrage funds are more correlated to commodities than distressed lending funds. This suggests the investment grade bond market is more highly correlated with commodity markets than the distressed non-investment grade bond market. The difference is statistically significant.

The corporate credit spread, CS, is negatively correlated with the credit arbitrage fund and distressed lending returns. Credit arbitrage funds are negatively correlated with an increase in default rates in the economy. Distressed lending returns are slightly negatively related to an increase in default rates in the economy. The corporate credit spread is the ratio of the YTM of 10 year corporate AA rated bonds divided by the YTM of 10 year US Treasury Bonds.

**TABLE 2  
CORRELATIONS EXPANDED TO INTERNATIONAL CURRENCIES AND  
COMMODITIES (2003-2011)**

	<b>USD/EUR</b>	<b>USD/YEN</b>	<b>Gold</b>	<b>Copper</b>	<b>Trade</b>	<b>TBill</b>	<b>CPI</b>
<b>Distressed Lending</b>	.27	.20	-.19	-.09	.01	.25	-.29
<b>Credit Arbitrage</b>	.16	.05	-.09	-.02	.00	.20	-.10

Neither the distressed funds nor the credit arbitrage hedge fund categories are significantly correlated to international trade balances of goods and services. Distressed Lending may be based on LIBOR or a longer term interest rate, however, the T-Bill correlation is quite significant. In addition, distressed lending is more related to the price of copper indicating more sensitivity to the business cycle and production in the economy. In addition, Distressed Lending is much more highly correlated to the CPI, inflation in the United States. The difference in correlations of both of these types of funds with respect to the CPI is statistically significant. This indicates a difference in the return processes of each type of shadow bank regarding inflation. This result is consistent with the Fisher equation regarding inflation and empirical results that stock returns (which PIPES are more similar) and bond returns (which Distressed Lending is more similar) vary according to inflation exposure.

The correlation of metals to the returns of Distressed Lending is significant, as is the exposure of credit arbitrage funds. The larger sensitivity of these two funds to Gold is an indication that Gold prices are related to interest rates and world debt markets.

The currency exposure risk or correlation may be related to the source of capital and to the concept of the carry trade. A hedge fund will borrow from a low interest rate economy and reinvest in a higher return asset or economy. The risk in this trade includes exchange rate risk. If the hedge fund (shadow bank) borrows at low interest rates from a bank in Japan and reinvest in credit arbitrage in the US, then an increase in the value of the Yen could cause a large decrease in returns on this carry trade. The positive correlation of the Yen exchange rate with both types of hedge funds, implies that the source of funds is a risk for shadow banks. However, the risk to credit arbitrage funds is relatively lower than the risk to distressed lenders. The difference between both types of funds and their correlations with the USD/EURO is statistically significant.

Distressed Lending correlations indicate that sourcing of these securities is more sensitive to changes in the value of the dollar versus the yen. If the US dollar increases in value relative to the yen, the returns on Distressed Lending funds increase more than the returns to credit arbitrage. Therefore, relative interest rates and currency values clearly affect the risks to shadow banking.

**TABLE 3**  
**RISK AND RETURN PROFILES 2003-2011(AUGUST)**

	<b>Mean Return</b>	<b>Std Dev.</b>	<b>Sharpe</b>	<b>Skewness</b>	<b>Kurtosis</b>
<b>Distressed Lending</b>	8.23%	.0298	1.75	-.42	-.12
<b>Credit Arbitrage</b>	1.64%.	.0112	1.01	-.29	.30
<b>S &amp; P</b>	-2.88	.0351	-1.36		

While the return results for both sets of funds seem unimpressive, the returns on the S&P were negative and the Sharpe ratios of the S&P 500 was negative. The highest level of returns over different time periods in this decade for the S & P 500 was approximately 7% for a decade, this would give a Sharpe ratio close to zero or negative in every time period. A higher positive ratio is preferred by investors. Different Sharpe ratios are listed for Distressed Lending and credit arbitrage are listed if the source of capital used is the Yen risk free rate of return. This is consistent with business practices in these industries and other empirical results. Credit arbitrage risk free rates are in the US or Japanese T-Bill market and Distressed Lending is in the US T-Bond market (this understates the actual Sharpe ratio for distressed lending firms). The equation for the Sharpe ratio is,

$$S = (R_p - R_f) / SD, \tag{1}$$

Where, SD is the standard deviation of the hedge fund portfolio.  $R_p$  is the return on the hedge fund and  $R_f$  is the risk free rate (US Treasury Bill return). This is a risk return ratio, a higher ratio indicates a better investment. The Sortino ratio is given below:

$$\text{Sortino} = (R_p - R_{\text{Min}}) / DD \tag{2}$$

Where,  $R_p$  is the return on the hedge fund and  $R_{\text{Min}}$  is the minimum threshold level. DD is the downside deviation below the threshold level. If the threshold level is set at zero (capital protection is crucial and prioritized), then

A Sortino ratio defines a minimum acceptable return and ranks hedge fund returns. The Sortino ratio, when the minimum acceptable return is the risk free rate, would indicate that Distressed Lending and credit arbitrage funds would be preferred to PIPES. However, a unique characteristic of PIPES is the positive skewness. Positive skewness is frequently a sign of successful risk management or security characteristics that investors prefer. The S&P 500 has a negative skew of returns that is less than credit arbitrage funds. However, a disadvantage of PIPES is the large negative Kurtosis. This indicates a higher

probability of large negative returns than would be indicated if the distribution of returns were normally distributed. Sharpe and Sortino ratios at zero or the risk free rate would rank performance based on return and risk in the following order: Distressed Lending, credit arbitrage, PIPES and then the S & P 500 index.

## RESULTS OF HYPOTHESES TESTING

**H1:** 3 month Treasury bills are more correlated to Credit arbitrage than distressed lending. This hypothesis is rejected in Table 2. Both are interest rate sensitive, however, distressed lending returns are more sensitive than credit arbitrage returns.

**H2:** Distressed Lending is the most correlated with the 10 year Treasury bond. This is accepted in Table 1. The .53 correlation is statistically significant from the other two hedge funds.

**H3:** Credit Arbitrage funds are the most highly correlated with the 3 month Treasury bill. In Table 2, this hypothesis is rejected, since Distressed Lending and Credit Arbitrage correlation differences are not significant. Both are statistically significantly different from zero, however, the difference between them is not statistically significant. Given the long term nature of Distressed Lending this is a surprise finding.

**H4:** Distressed Lending is the most correlated with the unemployment rate. This hypothesis is accepted in Table 1. The sensitivity of Distressed Lending to the unemployment rate is .73 and it is significantly different from credit arbitrage hedge funds. Credit Arbitrage fund returns are negatively correlated to the unemployment rate.

**H5:** Distressed lending funds are not the most highly correlated to the S&P 500 and the MSCI world stock market index. This hypothesis is rejected in Table 1. This is a surprising result. This indicates that distressed lending markets are less correlated to equity markets than short term lending markets.

**H6:** The Credit Arbitrage funds will be the most negatively affected by the Federal Funds Rate, FFR. This hypothesis is accepted in Table 1. The strong positive result for Distressed Lending may come from the risk on trade, opposite the flight to quality trade.

**H8:** Distressed lending will be more sensitive to inflation than credit arbitrage funds. This is accepted in Table 2 (correlation is -.29), and the differences in the correlations is statistically significant.

**H9:** Distressed lending is the most highly correlated with international trade balance changes. This is accepted in Table 2 (correlation is -.25) and the differences in correlations are statistically significant.

**H10:** The ranking of returns should be S&P 500, distressed lending and credit arbitrage. This is rejected in Table 3, with the ranking distressed lending, credit arbitrage and then the S&P 500. The difference between the returns on distressed lending and the other two investments is statistically significant. In addition, Table 4 using equations 1 and 2, indicates that the Sharpe and Sortino Ratios rank the funds from highest to lowest in the following order: distressed lending, credit arbitrage and the lowest is the S&P 500.

**H11:** Distressed lending should be more highly correlated to Copper prices, since they should be more affected by cyclical economic factors. In Table 2, this is accepted for Distressed Lending funds, the correlation is -.09 (versus -.02 for credit arbitrage).

**H12:** The price of Gold is related to liquidity events and a flight to quality, therefore, Distressed Lending should have the highest correlation with Gold. This hypothesis is accepted in Table 2 (correlation is -.19), again the difference is statistically significant.

**H13:** USD/Euro and USD/Yen should have the highest correlations with the strategy that uses these sources for funding. The carry trade should indicate the strategy using these sources. In Table 2, the strategy with the highest correlation is distressed lending. This is a surprise, since distressed lending is less liquid and increases the risk of the carry trade. The basic economics can be justified or rationalized, however, debt covenants would have to give the distressed lenders time during a flight to quality event to repay the debt. Otherwise, the carry trade may not be a sustainable business model. Capital has to be tied up with some grace period during liquidity events, otherwise the distressed lender would not be able to meet a margin call or debt recall. The factor driving the relatively high correlation with exchange rates with Distressed Lending fund returns is a paradox. This is a puzzle for distressed lending funds and

should be examined in further research. This could be a major risk factor for regulators to examine in shadow banking.

## SUMMARY

The returns for shadow banking outperformed the returns on the S&P 500 index during this time period. The performance of distressed lending returns was remarkable during this time period. The largest financial crisis in, at least, 25 years (perhaps 75 years) was a credit event that tested many money managers during this period. The factors affecting the performance of Distressed Lending were supported in almost all of the hypotheses. A major risk factor, that seems a paradox, is the high sensitivity of distressed lending returns to the Yen. The results for Credit Arbitrage were similar to Distressed Lending, in that the empirical factors were consistent with the debt-like structure and liquidity of these funds. Distressed Lenders achieved positive returns that were almost equity like. This could be regarded as proof of skill and the generation of Alpha (abnormal returns). Equities did not achieve positive returns over this period. Distressed Lenders had the highest returns and the highest risk adjusted returns, as well. Next highest, were Credit Arbitrage funds, they had better risk adjusted returns than the S&P 500 index over this period.

Absolute return investment vehicles, such as hedge funds that provide lending in environments when large banks cannot provide adequate lending, can provide better risk adjusted returns than index investing, even in extreme environments. The volatility of both of these types of hedge funds was lower than the S&P 500 index. The returns of each of these strategies were higher than the stock index, as well. Inclusion of these types of funds into a portfolio will allow investors to lower risk even during a financial crisis. The types of risks that regulators should concern themselves with in terms of analyzing shadow banks should include currency risk and commodity risks. Event or liquidity crisis events that are shocks to interest rates at either the short or long end of the yield curve should, also, be considered a risk factor.

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