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What determined CDS spreads of the UK financial institutions?

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Abstract

Credit default swap spreads are often understood as a leading indicator of development of creditworthiness, and therefore it can point out the potential situation in a company or economy. Since these spreads are such a useful indicator, market participants should pay attention to the factors which can have the impact on these spreads. The aim of this contribution is to analyze the influence of selected firm specific and market factors on credit default swap spreads of the UK financial institutions. To capture the changing role of the selected company specific and market factors, the panel data regression with fixed effects is employed in the pre-crisis, crisis and post crisis period. The participants in the financial market or policy makers can benefit from these findings and take them into consideration within their decision.

1. Introduction

The credit default swap (CDS) spreads are useful indicators which are often sought out by market participants for evaluation of company's creditworthiness. The aim of this contribution is to analyze the influence of selected firm specific and market factors on CDS spreads of the UK financial institutions. To capture the changing role of the selected company specific and market factors during time, the panel regression with fixed effects is employed in the pre-crisis, crisis and post crisis period. The contribution is organized as follows: Data are introduced in a section 2, the model is presented in a section 3, a section 4 is devoted to the results, and a last section concludes the contribution.

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2. Data

Data for research were obtained from Bloomberg database on monthly basis. CDS world monitor included 19 CDSs on senior debt of the UK financial entities. All available CDS contracts are of investment grade. The number of observations differs for each CDS depending on date when it was issued. Table 1 presents all included reference entities which debt was underlying for a CDS contract together with rating.

Table 1. Reference entities and CDS ratings

Name	Rating
3i Group PLC	BBB
Alliance & Leicester PLC	A
Aon PLC (USD)	A
Aviva PLC	A
Barclays Bank PLC	A
British Land Co PLC	BBB
Hammerson PLC	BBB
HBOS PLC	A
HSBC Bank PLC	AA
Legal & General Group PLC	A
Lloyds Bank PLC	A
Northern Rock Asset Management PLC	A
Old Mutual PLC	BBB
Prudential PLC	A
Royal Bank of Scotland PLC/The	A
RSA Insurance Group PLC	BBB
Santander UK PLC	A
Standard Chartered Bank	AA
Standard Chartered PLC	A

In our research, we included several explanatory variables of same frequency as CDS spreads. The company specific factors are based primarily on the paper by Merton (1974) – leverage, liquidity and equity volatility. Except company specific determinants, market factors are included in our research as well since they are considered to have significant influence – market volatility and return (on the UK and European level), risk-free rate and slope of term structure. The overview of determinants, indicators and expected relationship between an expected change in the determinant and a change in CDS spread is presented in Table 2.

Table 2. Selected determinants, indicators and expected/theoretical relationship

Determinant	Indicator	Expected relationship
Equity volatility	Historical 30-day volatility	+
Leverage	Equity returns	-
Liquidity	CDS Bid-Ask spread	+
Market return*	FTSE 100	-
Market volatility*	FTSE implied volatility index	+
Risk-free rate	LIBOR	+/-
Slope of term structure	10y-2y UK government bond	+/-

*In addition to market return and volatility, the European market return and volatility was added to the model.

Following Annaert et al. (2013), Avramov et al. (2007) or Christie (1982), we use stock return as a proxy for company leverage. If stock returns are positive (negative), leverage will decrease (increase), leading to lower (higher) credit spreads or vice versa. Asset volatility for each stock is obtained from Bloomberg database as historical 30-day volatility. Based on general knowledge, high asset volatility should reflect in higher credit spreads since it increases the probability of default. Inspired by Zhu (2006), Fabozzi et al. (2007), Tang and Yan (2010), Bedendo et al. (2011) or Coro et al. (2013), we consider bid-ask spread of individual CDS prices as a measure of liquidity. The positive relationship is expected between changes in liquidity and in the following changes in CDS spreads, since lower bid-ask spread shows on the higher liquidity that should result in the lower probability of default.

According to Annaert et al. (2013), it is likely that common variation is linked to the economic environment, capturing general market and economic conditions. Therefore FTSE 100 index is used as a measure of business climate and FTSE implied volatility index as a measure of market implied volatility. Higher market return should lead to lower CDS spreads because the lower probability of default is expected. Contrary, market volatility has the reverse impact because of the increasing uncertainty. In addition, we include the European market return and volatility to our model as well. Moreover we add 1year swap as a proxy of risk free interest rates in the UK. The term structure slope is considered as a determinant. It is calculated as a difference between the 10year and 2year UK government bonds.

All CDSs are of 5-year maturity in accordance with Mayordomo's et al. (2013) contribution since it shows that this maturity-provider combination reflects new information more rapidly than CDSs of other maturities.

To capture the changing role of selected factors in time, we decided to divide the whole sample period into three sub-periods according to trends in development of the Markit iTraxx Europe Senior Financials index – pre-crisis period (June 2004 – May 2007), financial crisis period (June 2007 – October 2009) and post-crisis period (November 2009 – December 2014).

Descriptive statistics results for used variables are not reported here, but they reject normality in all cases.

3. Model

Panel regressions for all sub-periods are employed in order to find out whether the changes of selected variables have influence on CDS spread changes. The monthly changes are used in the model. The model is specified as follows:

$$\Delta CDS_{it} = \alpha_i + \beta_1 \Delta CDS_{i(t-1)} + \beta_2 \Delta LIQ_{it} + \beta_3 \Delta LEV_{it} + \beta_4 \Delta EVOL + \beta_5 \Delta MVOL_{jt} + \beta_6 \Delta MRET_{jt} +$$
$$\beta_7 \Delta STS_{jt} + \beta_8 \Delta RF_{jt} + \beta_9 \Delta EURET_{jt} + \beta_{10} \Delta EUVOL_{jt} + u_{it} \tag{1}$$

where i identifies reference entity specific explanatory variables, j identifies common market explanatory variables, t is time period, ΔCDS is a change in CDS spread, $\Delta CDS_{i(t-1)}$ is a lagged CDS spread change, $\Delta EVOL$ is a change in equity historical volatility, ΔLIQ is a change in bid-ask spread, ΔLEV is a change in leverage (equity return), $\Delta MVOL$ is a change in market implied volatility, $\Delta MRET$ is a change in market index return, ΔSTS is a change in slope of term structure, ΔRF is a change in risk-free rate, $\Delta EURET$ represents a change in the European stock market return, $\Delta EUVOL$ is a change in the European volatility index and u is error term.

4. Results

Panel regressions were run in the period before, during and after the financial crisis. Firstly, the regression was employed in the pre-crisis period. The results are summarized in Table 3. During the pre-crisis period, company specific factors were statistically significant. The changes in liquidity, leverage and in equity volatility led to the changes in CDS spreads. The changes in leverage had much bigger impact compared to the changes in other factors. The signs of coefficients were in all cases in accordance with the theoretical expectations. The changes in slope of term structure were the only one from market factors that have the influence on the changes in CDS spreads.

The adjusted coefficient of determination was 26.73 %. Durbin-Watson statistic was 2.05 that shows that the residues are not correlated.

Table 3. Panel regression results – the pre-crisis period

Variable	Coefficient	Probability
Constant	-1.8937	0.0734
CDS(-1)	0.0169	0.6706
LIQ	**0.1087**	**0.0001**
LEV	**-0.9395**	**0.0000**
EVOL	**0.1455**	**0.0000**
MRET	0.3886	0.6206
MVOL	0.0558	0.0739
STS	**0.0107**	**0.0029**
RF	0.3942	0.3351
EURET	0.1947	0.7642
EUVOL	-0.1010	0.0999
Adj. R^2	0.2673	
Prob(F-stat)	0.0000	
DW statistics	2.0532	

The results for the crisis period are demonstrated in Table 4. During the crisis period the changes in market factors (on the European level) became much more significant than in the pre-crisis period. The most significant were changes in the European stock market return, followed by changes in risk-free rate and the changes in the European volatility index. The signs of coefficients of these factors were in accordance with our expectations. The changes in leverage and changes in market return were statistically significant, however, these changes had the opposite impact on the changes in CDS spreads than we had expected.

The adjusted coefficient of determination increased compared to the previous period to the value 32.51 %. Durbin-Watson statistic was 2.03 which is required.

Table 4. Panel regression results – the crisis period

Variable	Coefficient	Probability
Constant	9.4795	0.0001
CDS(-1)	0.0042	0.9245
LIQ	**0.1007**	**0.0000**
LEV	*0.2876*	*0.0683*
EVOL	**0.1833**	**0.0008**
MRET	*2.3297*	*0.0100*
MVOL	0.0784	0.3334
STS	0.0066	0.1979
RF	**0.4791**	**0.0057**
EURET	**-3.3105**	**0.0000**
EUVOL	**0.4488**	**0.0005**
Adj. R^2	0.3251	
Prob(F-stat)	0.0000	
DW statistics	2.0344	

The following table summarizes the results obtained from employed panel regressions in the post-crisis period. The explained variation of the model increased compared to the variation that was explained in the crisis period, it

was 40.87 %. Durbin-Watson statistic was 2.03 which is required. Analysing the influence of the company specific factors, the changes in liquidity lost its significance. The changes in leverage and in equity volatility were statistically significant and in accordance with the expectations. The changes in the market factors were not such significant like they were in the crisis period, but still their significance should not be underestimated.

Table 5. Panel regression results – the post-crisis period

Variable	Coefficient	Probability
Constant	1.0635	0.0051
CDS(-1)	-0.0410	0.1028
LIQ	-1.84E-05	0.9923
LEV	**-0.3499**	**0.0000**
EVOL	**0.0656**	**0.0000**
MRET	-0.1380	0.5442
MVOL	0.0142	0.3374
STS	**0.1208**	**0.0040**
RF	**0.3379**	**0.0001**
EURET	**-1.2282**	**0.0000**
EUVOL	**0.0639**	**0.0355**
Adj. R^2	0.4087	
Prob(F-stat)	0.0000	
DW statistics	2.1095	

5. Conclusion

The aim of the contribution was to analyze the influence of the selected company specific and the market factors on CDS spreads of the UK financial institutions. The panel data regressions were employed in the pre-crisis, crisis and post-crisis period to capture the changing role of the selected company specific and market factors during time. The results show that the majority of selected determinants has the explanatory power and the expected relationship between change in the determinant and change in CDS spread is in accordance with the theoretical expectations. We also found that the results differ in individual periods and that the explanatory power of selected determinants is dependent on the prevailing market circumstances. These findings can be used by market participants as well as authorities within their decision-making process.

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