Journal of Banking & Finance 58 (2015) 361–375

Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Trading strategies with implied forward credit default swap spreads

Arturo Leccadito [a], Radu S. Tunaru [b,*], Giovanni Urga [c,d]

[a] Department of Economics, Statistics and Finance, Università della Calabria, Ponte Bucci cubo 3 C, 87030 Rende (CS), Italy
[b] Kent Business School, University of Kent, Canterbury, Kent CT2 7PE, UK
[c] Cass Business School, 106 Bunhill Row, London EC1Y 8TZ, UK
[d] Hyman P. Minsky Department of Economic Studies, Università di Bergamo, Via dei Caniana, 2, 24127 Bergamo Italy

ARTICLE INFO

Article history:
Received 7 July 2014
Accepted 7 April 2015
Available online 3 June 2015

JEL classification:
G13
G19
C58

Keywords:
Statistical arbitrage
Forward credit spreads
Convexity adjustment
Forward rate unbiasedness hypothesis
Panel data

ABSTRACT

Credit default risk for an obligor can be hedged with either a credit default swap (CDS) or a constant maturity credit default swap (CMCDS). We find strong evidence of persistent differences in the hedging cost associated with the two comparable contracts. Between 2001 and 2006, it would have been more profitable to sell CDS and buy CMCDS while after the crisis between 2008 and 2013 the opposite strategy was profitable. Panel data tests indicate that for our sample period the implied forward CDS rates are unbiased estimates of future spot CDS rates. The changes in the company implied volatility is the main determinant of trading inefficiencies, followed by the changes in GDP and in the interest rates before the crisis, and the changes in sentiment index and in the VIX after the crisis.

1. Introduction

Credit default risk for an obligor can be hedged with either a credit default swap (CDS) or a constant maturity credit default swap (CMCDS). An investor may be indifferent to the instrument used since both provide the same terminal payoff. Is it possible that over a period of several years one type of hedging could be cheaper than the other? Credit default swaps have been instrumental in the increased trading in structured credit financial markets until the beginning of 2007 when the sub-prime crisis started to develop. The British Bankers Association reported an exponential evolution of the total notional amount traded on global credit derivatives reaching $20 trillion by the end of 2006, British Bankers' Association (2006). The single-name credit default swaps volume as a percentage of total credit derivatives volume was 33% in 2006, being by far the most important instrument in credit markets. In a recent report by the International Organization of the Securities Commissions (IOSC, 2012) it is revealed that at the end of 2011, the gross notional value of outstanding CDS contracts amounted to approximately $26 trillion, with a corresponding net notional value of approximately $2.7 trillion. Single name CDS accounts for almost 60% of the overall credit market in terms of gross notional.

Following the analogy with the constant maturity swap (CMS) contract, another traded credit derivative is the CMCDS. In such a contract, the buyer pays a premium (spread) in exchange for protection. While in a CDS the spread is fixed, in a CMCDS contract the spread is floating and calculated according to an indexing mechanism. In particular, the spread is set equal to the observed reference CDS spread at each reset date, multiplied by a factor known as the participation rate (PR). The CMCDS instrument allows economic agents to take views on the future shape of the CDS curve. Moreover, combining a CDS and a CMCDS with the same reference entity leads to the complete elimination of credit default risk for that obligor, allowing investors to isolate spread risk (i.e. the risk of changes in the premium not related to an actual credit event) and to hedge default risk. In addition, CMCDS are useful for protection sellers to hedge against spread widening risk.

One might presume that during the expansion of the market new operators were joining, trades were increasing due to both the increase in the notional as well as in the number of traders. We might thus think that the market was growing and that traders

* Corresponding author. Tel.: +44 (0)1227824608; fax: +44 (0)1227 764000.
E-mail address: r.tunaru@kent.ac.uk (R.S. Tunaru).

http://dx.doi.org/10.1016/j.jbankfin.2015.04.018
0378-4266/

could have different level of information and understanding of the market activity which in turn may lead to the occurrence of trading inefficiencies.[1] An important research issue then is the identification of the credit instrument to use for protection against default risk. If supply and demand conditions lead to an imbalanced market, it would be useful to know whether it is more cost effective to pay a floating premium spread rather than a fixed one. At any point in time, for a given company, buying protection with a fixed premium may lead to different costs than buying protection with a floating premium. Nevertheless, for the entire universe as a whole and for a long period of time, it should not make any difference what type of premium one is using. Otherwise, there would be a clear inefficiency in the credit market. This situation has already been investigated in interest rate markets. Brooks (2000) showed that for the interest rate swap market in the 1990s it was net profitable to pay floating and receive fixed. His study pointed out to a market anomaly regarding the interest rate swap market which emerged in the 80s and 90s.

The constant maturity credit default swaps work exactly like constant maturity interest rate swaps by resetting the premium every period in line with a reference rate. Upon default, the CDS and CMCDS contracts will offer buyers the same payoff protection. The main difference between the two default swaps is that one requires a fixed rate premium while the other requires a floating rate premium. The calculation of the floating rate premium is more elaborated than the derivation of a fixed rate premium for CDS. In addition, the floating rate premium is sensitive to the shape of the credit curve, whether upward trending or inverted or exhibiting humps due to liquidity pressure at some tenor maturities. Hence, in this paper we conjecture that market participants may favor overall one contract style over another when in fact they should be indifferent if the aim is to trade default protection on corporate single names. While this statement may be more credible for trading data before the subprime crisis, mainly due to the expansion of the CDS market, it is interesting to see if the same conclusion is still valid after the subprime crisis. In a nutshell, we explore the questions whether there are inefficiencies on single name credit markets, whether these inefficiencies existed only prior to the subprime crisis, whether the forward credit default swap rates calculations were biased and what are the possible determinants of the statistical arbitrage opportunities.

In order to investigate possible trading inefficiencies present on credit markets covering single name corporates, we calculate the forward CDS curves for a large database of obligors for which market CDS premia is available. To the best of our knowledge, this is the first study that takes into consideration the forward credit curves for the entire universe of corporate single names CDS traded in USD. We believe that the credit curves contain more useful information than just the individual rates along the term structure. In particular the shape of the credit curve determines the forward credit default rates and it contains useful information for investment strategies. Consider for example two companies that have identical five year CDS spreads. Suppose that one has a flat credit curve and the other has an upward trending credit curve. Even if an investor buys or sells simultaneously both names, the value of the two contracts will very likely evolve differently over the term of the contract. Therefore a pair trading strategy combining a CDS with a CMCDS (one long and one short) for the single-name companies may produce significant profit opportunities. This is because upon default, the pair of CDS and CMCDS contracts will give a net zero payment but before default the net payments may be more one sided across all companies throughout a long period. In this paper, we show that these opportunities existed before the crisis and also after the crisis, but the direction of the trade has changed after the crisis. For identifying the statistical arbitrage opportunities we perform an exhaustive analysis for a large database of corporate companies during two different periods, before the crisis between 2001 and 2006 and after the crisis between 2008 and 2013.

The analysis requires bootstrapping the survival probability curve from the market CDS spreads. To this end, we implement both nonparametric (e.g. piecewise constant hazard rates) and parametric (Nelson–Siegel interpolation and a method driven by an Ornstein–Uhlenbeck (OU) process for the hazard rates) methods and mostly used by investment banks in a real trading environment. By employing these models we hope to minimize any conclusion bias caused by model risk.

On a large universe of obligors, one expects *ex ante* that there is no difference which contract is used to hedge default risk. Nevertheless, we identify, *ex post*, the credit market inefficiencies that existed between 2001 and 2006, and between 2008 and 2013, in terms of the number of obligors, size of profits that could have been made and the timing of the opportunities. The inefficiencies detected are significantly different from zero, before and after the subprime crisis.

A possible explanation of the inefficiencies related to the forward CDS curves identified in this paper could be a bias related to forward curve calculations. To this purpose, we implement recent panel data testing procedures to test for the forward unbiasedness hypothesis and we show that the forward credit default swaps are unbiased estimators of future CDS rates. Subsequently, we identify several important determinants of the differential between CDS and CMCDS spreads. Our results show that statistical arbitrage opportunities that existed before the crisis were mainly driven by changes in firm-specific volatility, GDP, 10-year treasury rate and to a lesser extent investor sentiment index. After the crisis, the important determinants of trading inefficiencies were changes in firm-specific volatility, in the volatility index VIX, in the investor sentiment index and in the equity index.

The remainder of this paper is organized as follows. Section 2 briefly describes the linkages with previous works in credit risk and investments area. In Section 3 we review the pricing methodology of CDS and CMCDS contracts including the convexity adjustment for the latter contract as it was performed by investment banks. The dataset used for calibration and examples illustrating some numerical issues are shown in Section 4. The results of the statistical arbitrage analysis based on a type of buy and hold trading (static) strategy and also on a dynamic day by day investment are reported in Section 5. In Section 6 we test the forward unbiasedness hypothesis while in Section 7 we analyse the determinants of the significant differences between CDS and CMCDS premia. Section 8 concludes.

2. Connection with credit risk literature

One stream of the literature on CDS has focused on issues like the validity of the theoretical equivalence of CDS prices and credit bond spreads and the determinants of credit default swap changes.[2] Duffie (1999) and Hull and White (2000) point out that the credit default swap spread for a corporate should be very close to the spread of a par yield bond issued by the reference entity over the par yield risk-free rate to avoid arbitrage between the cash and the synthetic markets. The validity of the theoretical equivalence of CDS spreads and bond yield spreads is tested in Blanco et al. (2005). Using a dataset of 33 U.S. and European investment-grade

[1] We thank an anonymous referee for suggesting this interpretation.

[2] The relevant literature on the determinants of credit default swap changes includes Ericsson et al. (2009), Zhang et al. (2009), Cao et al. (2010), and Tang and Yan (2010).