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Conventions for Single-Name Credit Default Swaps

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Abstract

Over the last several years rapid changes in global contracts and local conventions for credit default swaps (CDS) contracts have been made with the implementation of CDS Big Bang and Small Bang protocols in order to increase transparency and efficiency of the market. In this note we present conventions and market standards for single-name CDS.

Contents

1 Introduction

As a complementary documentation to the recent paper "The Pricing and Risk Management of Credit Default Swaps, with a Focus on the ISDA Model" [Whi13] we summarise conventions and market standards for single-name CDS contracts.

The standardisation of credit derivatives has been led by the International Swaps and Derivatives Association, Inc. (ISDA) in order to gain market efficiency and reduce the potential for legal uncertainty. The first effort was made in 1998 publishing "Confirmation of OTC Credit Swap Transaction." In 1999 ISDA issued a set of standard definitions for credit derivatives followed by the three supplements in 2001. The standardised definition of the contracts was expanded and revised in the publication "2003 ISDA Credit Derivatives Definitions" [ISDa] which was later supplemented by the "July 2009 Supplement" [ISDb]. For the detailed definition of CDS contracts and their legal terms readers should refer to these publications.

Over the past several years, driven by global contract changes and local convention changes, credit derivative contracts have become more standardised. The recent changes in CDS contracts are summarised in a series of reports: [Mar09b] on global contract and North American convention changes (CDS Big Bang), [Mar09a] on global contract and European convention changes (CDS Small Bang), and [Mar09c] on subsequent convention changes for Australia, New Zealand, Emerging Markets and Japan. Our aim in this note is to focus on the convention side and present the details regarding single-name CDS.

2 General Conventions

Conventions that specify relevant dates and days for a single-name CDS contract are presented in this section. Note that some of the instruments required for CDS pricing in general use other conventions (see "Credit Curve and Discount Curve" in section 4).

Business Days

Single-name CDS contracts assume the following business day calendars:

- For non-JPY currencies all computations are based on a business day calendar of *weekdays only*, i.e., weekends (Saturday and Sunday) are the only non-business days.

- For JPY all computations are based on the *TYO holiday calendar* which is distributed on `https://cdsmodel.com`.

Business Day Convention

Business day convention is for adjusting dates when a specified date is not a business day. For single-name CDS the business day convention is *following*, i.e., the adjusted date is the first following day that is a business day.

Day Count Conventions

Day count convention to define an accrual factor between two dates is *ACT/360*, which is also called *Actual/360* or *A/360*. The accrual factor under this day count convention is

$$\frac{\text{Days}(d_1, d_2)}{360}, \tag{1}$$

where $\text{Days}(d_1, d_2)$ is the number of days between the dates d_1 and d_2.

IMM Dates

The maturity dates of CDS contacts are standardized to the *IMM dates*: March 20th, June 20th, September 20th and December 20th.

3 Contract Specifications

A single-name CDS contract is specified by trade date, maturity date and coupon. Market conventions for these are presented in this section.

Trade Date

Trade date is the current business day. Hereafter we denote the trade date by T. Thus $T + n$ represents n days after the trade date.

Maturity Date

Maturity Date is also called *end date* or *protection end date*. Scheduled maturities are rolled to the next IMM date and unadjusted by the business day convention. For example, a 5-year trade dealt on June 13th 2013 will terminate on June 20th 2018, whereas a 5-year trade after June 20th 2013 will terminate September 20th 2018.

Coupon

Standard single-name CDS trade with a fixed coupon and the range of the standardised coupons are market-specific. The full list is found in [Mar09c].

- In North America predominant conventions are 100 basis points and 500 basis points. Investment grade reference entities trade at 100 basis points quoted in a conventional spread (quoted spread) whereas high-yield reference entities trade at 500 basis points quoted in a point upfront.
- In Europe the standard fixed coupons are 25, 100, 500 and 1000 basis points. Investment grade names are quoted at 100 basis points and high-yield names are quoted at 500 basis points. 25 and 1000 basis points are used for tight or wide credits, respectively. Two additional coupons, 300 and 750 basis points, are also implemented.
- For Australia, New Zealand and Emerging Markets CDS trade with fixed coupons of 100 and 500 basis points. In addition to these, the coupon of 25 basis points is used in Japan.

Regardless of when the CDS trade is executed, a coupon is paid by the protection buyer on the first coupon date after the trade date, which is usually an adjusted IMM date.[1]

4 Assumptions

In this section we list the assumptions which are made under single-name CDS contracts. These should be captured by any CDS pricing model.

Cash Settlement

Cash settlement amount is the upfront payment which the protection buyer makes to the protection seller when entering into the swap. The *cash settlement date* is set to be three business days after the trade date for a standard contract.

Protection Leg

Protection leg is the contingent payment which the protection seller makes to the protection buyer if a credit event occurs.

- *Protection effective date* or *step-in date* is when protection starts and set to be $T+1$. The date is distinguished from *legal protection effective date*, $T-60$ for credit events and $T-90$ days for successions events, which is not adjusted by the business day convention.
- *Protection maturity date* is the same as maturity date. Thus the number of days of protection is
$$(\text{Protection maturity date}) - (\text{Protection effective date}) + 1\,. \tag{2}$$
- *Protection payoff* can be expressed as
$$(\text{Notional}) \times (\,100\% - (\text{Recovery rate})\,)\ , \tag{3}$$
where the convention for the recovery rate is described later. There are two ways to make the payment of the protection leg, *physical settlement* and *cash settlement*. Their definition is given in [ISDa].

Premium Leg

Premium leg is a series of payments which the protection buyer makes to the protection seller. These payments terminate at the maturity of contract or following a credit event.

- Payment frequency: coupon is paid on a quarterly basis.
- Regardless of when the CDS trade is executed the first coupon payment date is earliest IMM date after $T+1$ adjusted by the business day convention.[2]

[1] Previously the timing of the first coupon payment depends on when the trade occurs. If the trade date is before 30 days prior to the first IMM date, the premium is paid on the first accrual date for the number of days of effective protection during that period. This is called a "short stub" period. If the trade date is within 30 days before the first coupon date, no premium payment is made on the first accrual date, i.e., there is a "long stub period."

[2] Prior to Big Bang the first accrual depends on when the trade occurs. See footnote 1 for detail on long stub period and short stub period.

- Accrued payment is made in the event of a default.
- *Accrual begin date*, also called *start date*, is the latest adjusted IMM date prior to T+1, or if T+1 itself is an adjusted IMM date then it is T+1.[3]
- *Accrual dates* are IMM dates adjusted by the business day convention. Note that the last accrual date, i.e., maturity date, remains unadjusted.
- *Accrual periods* or *payment intervals* are the interval between from previous accrual date inclusive to the next accrual date exclusive. For the last accrual period the accrual end date, i.e., maturity date, is included.
- Payment amount at each accrual date is

$$\text{(Notional)} \times \text{(Year fraction of accrual period)} \times \text{(Coupon)} \ , \tag{4}$$

  where the year fraction is computed by (1).

Recovery Rate

When a CDS contract is priced, the standard recovery rate is assumed to be 40% for senior and 20% for subordinated, whereas 25% is used in for both the cases in Emerging Markets. For an actual default a defaulted instrument is delivered to the protection seller in order to receive the face value of the defaulted debt, or an auction is conducted to establish a market price of the defaulted instrument.

Credit Curve and Discount Curve

- Both of survival probability and discount factor are assumed to be 1 at T
- A yield curve is constructed from money market rates and swap rates. We should note that a yield curve adopts day count convention, business day convention and holiday calender which are specific to respective currencies. Several examples of the day count convention (DCC) are shown in Table 1.

	USD	EUR	GBP	JPY
Money Market DCC	ACT/360	ACT/360	ACT/365F	ACT/360
Floating DCC	ACT/360	ACT/360	ACT/365F	ACT/360
Fixed DCC	30/360	30/360	ACT/365F	ACT/365F
Business Day Convention	MF	MF	MF	MF
Holiday Calender	WO	WO	WO	TYO

Table 1: The yield curve conventions for USD, EUR, GBP and JPY

Here WO represents weekdays only and MF represents *modified following*, i.e., the adjusted date is the first following day that is a business day unless that day falls in the next month, in which case that date is the first preceding day that is a business day. While the day

[3] Prior to Big Bang accrual start date was $T + 1$ adjusted by the business day convention.

count convention ACT/365F is obtained by replacing 360 in (1) by 365, 30/360 is defined by

$$\frac{360\,(Y_2 - Y_1) + 30\,(M_2 - M_1) + (D_2 - D_1)}{360}\,, \tag{5}$$

and divided into two groups depending on the adjustment for the cases D_1, $D_2 = 31$ (see [ISDa]).

The full list of the yield curve convention including its spot date adjustment is given in e.g., [Qua12].

References

[ISDa] 2003 ISDA Credit Derivatives Definitions.

[ISDb] 2009 ISDA Credit Derivatives Determinations Committees, Auction Settlement and Restructuring Supplement to the 2003 ISDA Credit Derivatives Definitions.

[Mar09a] Markit. The CDS Small Bang: Understanding the Global Contract & European Convention Changes. Technical report, Markit, July 20, 2009.

[Mar09b] Markit. The CDS Big Bang: Understanding the Changes to the Global CDS Contract and North American Conventions. Technical report, Markit, March 13, 2009.

[Mar09c] Markit. Forthcoming CDS Convention Changes: Australia, New Zealand, Emerging Markets, and Japan. Technical report, Markit, September 9, 2009.

[Qua12] Quantitative Research. *Interest Rate Instruments and Market Conventions Guide*. OpenGamma, 1.0 edition, April 2012. http://www.opengamma.com/sites/default/files/interest-rate-instruments-and-market-conventions-guide.pdf.

[Whi13] Richard White. The pricing and risk management of credit default swaps, with a focus on the isda model. Technical report, OpenGamma, 2013. http://developers.opengamma.com/quantitative-research/Pricing-and-Risk-Management-of-Credit-Default-Swaps-OpenGamma.pdf.

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1. Marc Henrard. Adjoint Algorithmic Differentiation: Calibration and implicit function theorem. November 2011.
2. Richard White. Local Volatility. January 2012.
3. Marc Henrard. My future is not convex. May 2012.
4. Richard White. Equity Variance Swap with Dividends. May 2012.
5. Marc Henrard. Deliverable Interest Rate Swap Futures: Pricing in Gaussian HJM Model. September 2012.
6. Marc Henrard. Multi-Curves: Variations on a Theme. October 2012.
7. Richard White. Option pricing with Fourier Methods. April 2012.
8. Richard White. Equity Variance Swap Greeks. August 2012.
9. Richard White. Mixed Log-Normal Volatility Model. August 2012.
10. Richard White. Numerical Solutions to PDEs with Financial Applications. February 2013.
11. Marc Henrard. Multi-curves Framework with Stochastic Spread: A Coherent Approach to STIR Futures and Their Options. March 2013.
12. Marc Henrard. Algorithmic Differentiation in Finance: Root Finding and Least Square Calibration. January 2013.
13. Marc Henrard. Multi-curve Framework with Collateral. May 2013.
14. Yukinori Iwashita. Mixed Bivariate Log-Normal Model for Forex Cross. January 2013.
15. Yukinori Iwashita. Piecewise Polynomial Interpolations. May 2013
16. Richard White. The Pricing and Risk Management of Credit Default Swaps, with a Focus on the ISDA Model. September 2013
17. Yukinori Iwashita. Conventions for Single-Name Credit Default Swaps. December 2013

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