

## Box 11

## PRICE OF DEFAULT RISK AS A MEASURE OF AVERSION TO CREDIT RISK

Since the financial turmoil erupted, the CDS spreads of LCBGs have widened significantly, suggesting that banks' default risk has increased. This may be explained by investors' increased aversion regarding credit risk, which followed the repricing in this risk category in the aftermath of the sub-prime problems. This box decomposes the CDS spreads of LCBGs into an expected-loss component and a default risk premium. The latter reflects the compensation required by investors for accepting exposure to default risk, and can also be used as an indicator of aversion to credit risk.<sup>1</sup>

<sup>1</sup> The decomposition of CDS spreads is based on intensity-based pricing models. In particular, this box draws on the method presented in J.D. Amato, "Risk aversion and risk premia in the CDS market", *BIS Quarterly Review*, Bank for International Settlements, December 2005.

According to intensity-based CDS pricing models, the CDS premium (*CDS*) can be decomposed into an expected-loss component (*EL*) and a default risk premium (*DR*). The latter is composed of a jump-to-default risk premium (*JtD*), which is the compensation for the sudden default of the entity before the market has had time to factor in its increased default risk into current spreads, and a systematic risk premium (*S*), which is the compensation for the volatility of the risk factors affecting default probability:

$$CDS = EL + DR = EL JtD + S, \quad (1)$$

Thus, the default risk premium can be measured as the difference between the CDS spread and the expected-loss component. The decomposition can also be written in multiplicative form:

$$CDS = EL * RA, \quad (2)$$

where the risk adjustment ratio (*RA*) is the compensation for a unit of expected loss and is usually reflected as the price of default risk (*PDR*):

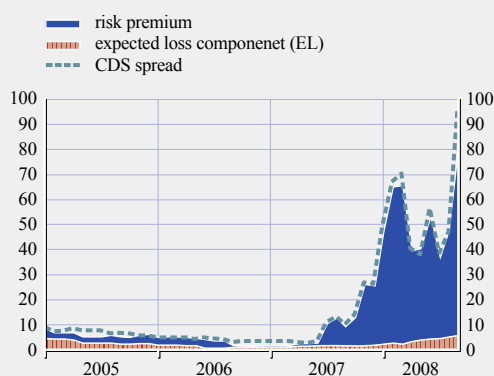
$$RA = 1 + PDR \quad (3)$$

Using equation (2), both the price of default risk and the risk adjustment ratio may be approximated by the quotient of *CDS* to *EL*. This ratio is a measure of investors' aversion to default risk.

Using this method, the one-year CDS spreads of individual euro area LCBGs were decomposed into expected-loss and default risk premium components. Moody's one-year expected default frequencies of individual LCBGs were used as a proxy for *EL*, assuming a loss-given-default of 0.55. Furthermore, the variance of the risk premium was decomposed using a Cholesky-variance decomposition within a VAR framework to explain the rise in the default risk premium since August 2007.

**Chart A Decomposition of the CDS spreads of euro area large and complex banking groups**

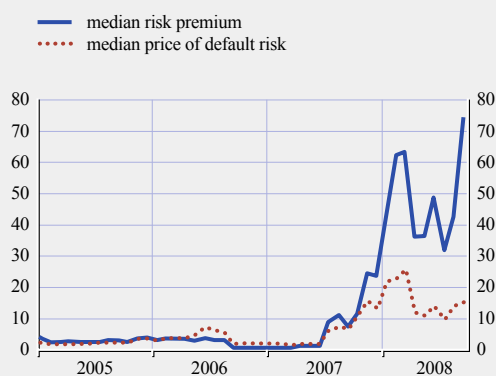
(basis points)



Sources: Bloomberg, Moody's and ECB calculations.  
Note: Since expected-loss components and risk premiums were calculated for each LCBG individually, sum of their averages does not equal the average CDS spread.

**Chart B Default risk premium and price of default risk for euro area large and complex banking groups**

(basis points)



Sources: Bloomberg, Moody's and ECB calculations.

The significant widening of euro area LCBGs' CDS spreads observed since August 2007 was driven mainly by the default risk premium (see Chart A). Whereas the largest proportion of CDS spreads corresponded to the compensation for expected loss between 2005 and mid-2007, since the eruption of the turmoil, the expected-loss component has increased only moderately in comparison with the default risk premium. This is because the former is a more fundamentals-based and is, therefore, a less volatile measure of default risk.

A simple VAR model-based decomposition of the variance of the risk premium revealed that as much as 40% of the variance may be explained by systemic risk (as measured by the systemic risk indicator – see Chart 4.27), and another 20% by liquidity (as measured by the market liquidity risk indicator – see Chart 3.1 in Section 3.1). This suggests that investors' high aversion regarding LCBGs' credit risk was driven mainly by fears related to jump-to-default risk – due to the possibility of a systemic spillover – and, to a lesser extent, by vanishing liquidity in the broader financial markets.

Since April 2008, aversion to credit risk, as measured by the price of default risk, has declined. Although it still remained at a relatively high level in September 2008, it has not reached the levels seen after the near default of Bear Stearns (see Chart B). This was due to the increase in the expected-loss component, which has been rising steadily since the end of 2007, suggesting that CDS spreads are increasingly being driven by rising probabilities of default of individual LCBGs. This could reflect a perception by market participants that the shock-absorption capacities of individual LCBGs may have diminished. However, it should be kept in mind that, more recently, CDS prices themselves may have incorporated additional risk premium components, which could complicate their interpretation in times of intense financial market stress.