

Box 4

CLOs: a financial stability perspective

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Collateralised loan obligations (CLOs) – structured finance vehicles which repackage the credit risk of assets – hold around a third of the outstanding leveraged loans in Europe and the US (see Chart A, panel 1). In parallel to the growth of leveraged loans, CLOs have almost doubled in size in the last five years (see **Chart A**, panel 2). Most of the CLO tranches outstanding have been issued since 2016, when the underlying credit quality had already deteriorated through increased leverage and lower investor protection.¹⁹ In addition, CLO exposures tend to be relatively more concentrated in lower-rated leveraged loans (see **Chart A**, panel 3). Amid recent developments in leveraged loan markets, this box focuses on financial stability risks deriving from CLOs.²⁰

¹⁹ For example, the share of European leveraged loan issuers rated B- and lower by S&P rose from 20% before the crisis to around 40% in 2015.

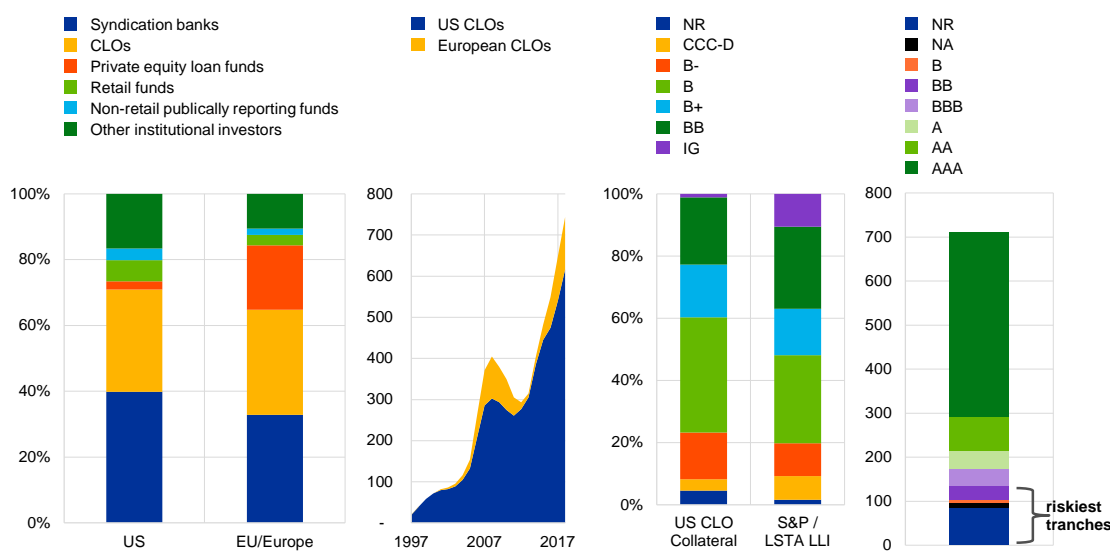
²⁰ For an analysis of the wider leveraged loan market, see the box entitled “Leveraged loans: a fast-growing high-yield market”, *Financial Stability Review*, ECB, May 2018, and the case study entitled “Recent developments in leveraged loan markets and the role of non-bank financial intermediaries”, *Global Monitoring Report on Non-Bank Financial Intermediation 2018*, Financial Stability Board, February 2019.

Chart A

Currently outstanding CLO amounts are sizeable, reference sub-investment-grade collateral and were issued when the underlying corporate credit quality had already weakened

CLO share of the leveraged loans outstanding (panel 1), CLO outstanding amounts (panel 2), breakdown by rating of the collateral in US CLOs and in global leveraged loan markets (panel 3), and breakdown by rating of global CLO outstanding amounts (panel 4)

(panel 1: end-2018; panel 2: 1997-2018; panels 3 and 4: March 2019; percentages and USD billions)



Sources: Bloomberg, Moody's, SIFMA, AFME, Morgan Stanley and ECB calculations.

Notes: Panel 1: ECB estimates. Holdings by syndication banks do not include undrawn facilities. Panel 3: the breakdown uses S&P ratings. Panel 4: composite ratings are computed as the lowest ratings across Moody's, S&P and Fitch.

While most CLO tranches outstanding have a high credit rating, CLO collateral quality and structural protections have weakened recently. Around 60% of the CLO tranches outstanding are rated AAA, while the riskier tranches, which include both sub-investment-grade and unrated equity tranches, account for around 20%, or USD 140 billion (see **Chart A**, panel 4). CLO tranches outstanding are generally also better protected than before the crisis: AAA European CLO tranches now have collateral backing of around 40% compared with less than 30% pre-crisis. This partly reflects post-crisis action by credit rating agencies (CRAs), which responded to deficiencies in their rating methodologies by inter alia increasing subordination requirements.²¹ As such, tranches that pre-crisis would have received an AA, A, BBB or BB rating would now mostly be rated one notch lower (see **Chart B**, panel 1). But other structural protections introduced by market participants in post-crisis CLOs have deteriorated recently, mirroring the deterioration in the underlying leveraged loan market.²² The quality of the underlying collateral has also weakened for European and US CLOs in recent years (see **Chart B**, panel 2). Secondary market pricing – with spreads implying a lifetime probability of default (PD) ranging from 60% for BB tranches to 90% for the equity tranche (see **Chart B**, panel 3) – suggests that the market assigns higher expected losses than the low past CLO losses (see **Chart B**, panel 4).

²¹ The increased conservatism in CRAs' practices post-crisis is also reflected in their practice of not rating the equity tranches, as opposed to often rating the full capital structure in pre-crisis CLOs.

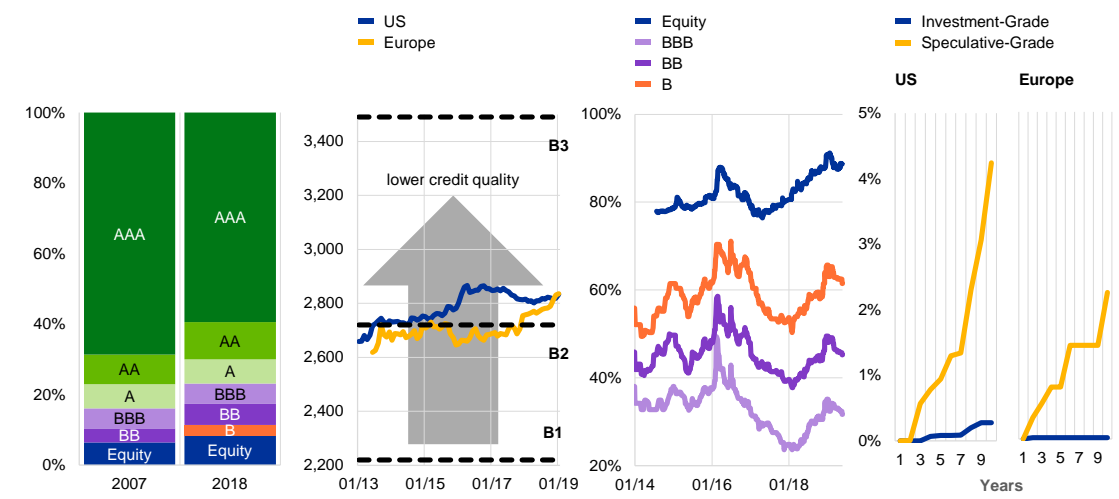
²² The weakening of CLO structures includes but is not limited to a growing share of transactions where CLO managers have increased trading flexibility or can make changes to key transaction terms with limited or without investors' consent. See also "Top 10 credit challenges CLOs face today", Moody's, 13 December 2018 for the US market and 1 April 2019 for the European market.

Chart B

While CLOs have performed well historically and post-crisis CLO structures offer more investor protection than pre-crisis ones, the credit risk of CLO tranches has increased recently

Comparison between European CLO structures post- and pre-crisis (panel 1), median rating of CLO collateral (panel 2), lifetime probabilities of default implied by the spreads of European CLO tranches (panel 3), and global CLO cumulative loss rates by geographical area, original rating and years outstanding (panel 4)

(panels 1, 3 and 4: percentages; panel 2: Moody's rating factor, on a scale of 1 for AAA to 10,000 for Ca and lower ratings)



Sources: JP Morgan, Moody's, Bloomberg and ECB calculations.

Notes: Panel 1: calculations are based on a sample of 30 European CLOs rated by Moody's, of which half were structured in 2007 and half in 2018-19. Panel 2: values shown are the median weighted-average rating factor for the collateral of CLOs rated by Moody's. The Moody's rating factors shown in the chart are 2220 for B1, 2720 for B2 and 3490 for B3 credit rating levels. Panel 3: implied lifetime probabilities are derived applying a CDS pricing model to secondary market spreads over EURIBOR/LIBOR rates. The recovery rate is assumed to be equal to 15% for high-yield and equity tranches, and 40% for BBB tranches. The discount curve is assumed to be flat at 0%. Implied probabilities of default are to some degree overestimated as the spreads used in the estimates include unknown liquidity and call premia. Panel 4: the loss rates shown are Moody's cumulative loss rates by original rating over the period from 1993 to 2017. Moody's loss rates refer to realised losses, where losses given default are weighted by the share of defaulted tranches.

Scenario analysis suggests that more junior CLO tranches are most vulnerable to credit losses, while holders of higher-rated tranches are highly exposed to downgrade risk. Analysis using data on current US CLO tranches and available data from selected CRAs suggests that if default rates were to rise from the current levels of around 11%, which represent the cumulative losses over the past five years, to levels closer to but below the peaks seen during the early 2000 and 2008 crises, only the unrated tranches would incur losses and no downgrades would likely occur (see **Chart C**, CRA base case, panels 1 and 2).²³ But loss given default (LGD) ratios are likely to be higher in this credit cycle than in the past, given weaker underlying credit quality and a higher proportion of covenant-lite loans. If cumulative default rates were to rise to 30% and recovery rates were to drop to 66% from historical levels around 80% (Scenario 1), the equity, B and BB tranches would lose all or nearly all of their value, while more senior tranches would be downgraded. Scenarios that assume higher default and lower recovery rates imply more severe downgrades for higher-rated tranches, illustrating the high sensitivity of tranche performance to recovery rates (see **Chart C**, panels 1 and 2).

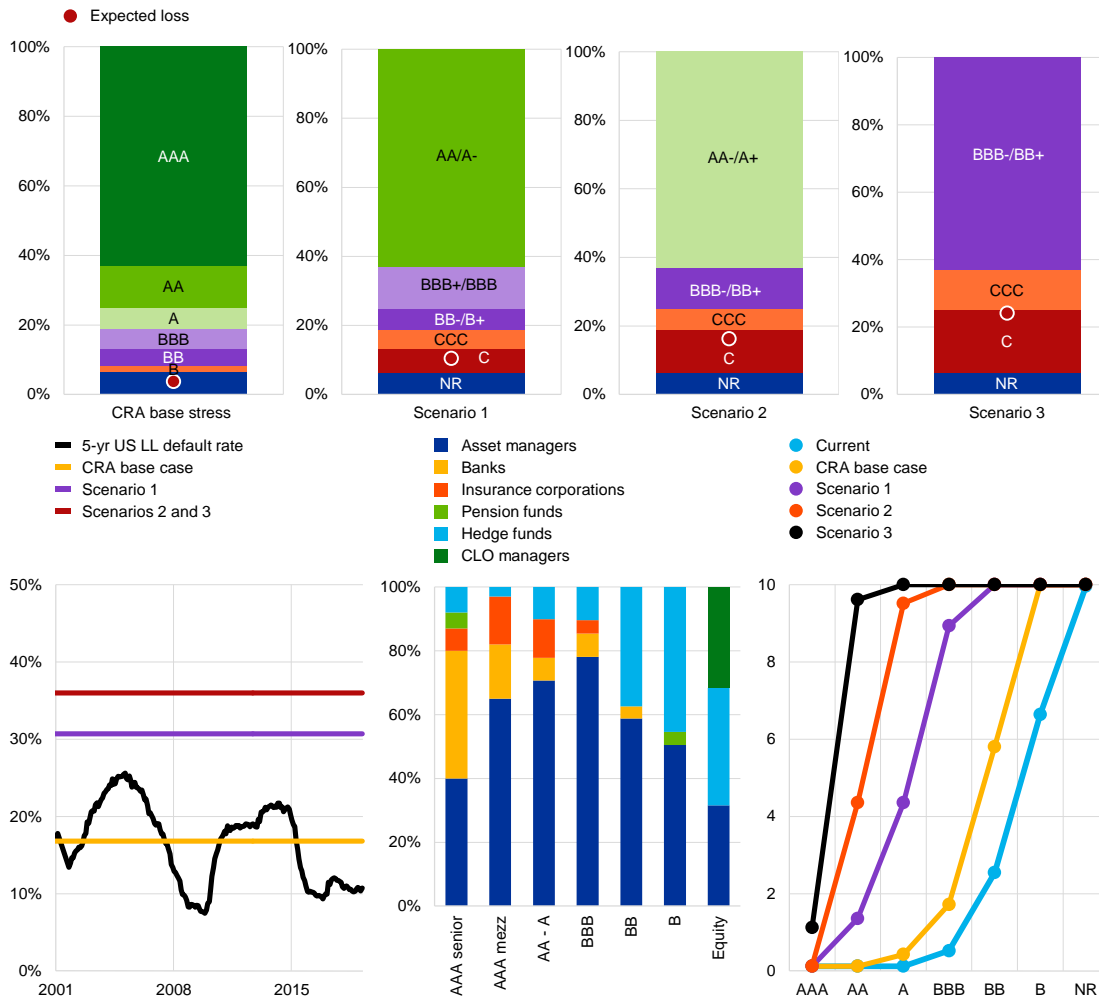
²³ The CLO CRA base stress and stress-test scenarios, as well as the hypothetical impact on ratings shown in Chart C, are based on "Leveraged Loan Stress Scenario: Implications for CLOs", Fitch, 21 May 2018. Other CRAs may have different stress-test assumptions incorporated in their ratings.

Chart C

More severe macroeconomic shocks would lead to tranche downgrades, mark-to-market losses and sharp increases in the capital requirements for more senior CLO tranches held by banks

Hypothetical impact on rating due to stress scenarios on US CLO tranches (panel 1), historical five-year cumulative US leveraged loan default rates compared with CRA base case and stress scenarios (panel 2), buyers of European CLO tranches in the primary market by investor type and rating (panel 3) and bank capital charges under SEC-IRBA by tranche and CRA stress scenario for a €10 million CLO tranche (panel 4)

(panels 1,2 and 3: percentages; panel 4: € millions)



Sources: Fitch, Moody's, Credit Suisse and ECB calculations.

Notes: Panel 1: the expected loss rates under the CRA base stress are based on a portfolio PD of 16.8% and an LGD of 22%. Tranches below the expected loss suffer 100% losses. Scenario 1 assumes a PD of 30.7% and an LGD of 34%, Scenario 2 a PD of 36% and an LGD of 55% and Scenario 3 a PD of 36% and an LGD of 67%. For more details, see the report "Leveraged Loan Stress Scenario: Implications for CLOs", Fitch, 21 May 2018. NR stands for not rated. Panel 2: the historical US leveraged loan default rates shown are cumulative default rates over the previous five years. Panel 4: the values shown are the hypothetical bank capital requirements for a €10 million tranche of a given rating held by a bank, assuming capital requirements of 8% of risk-weighted assets. Bank capital charges are computed assuming banks can use SEC-IRBA according to the Basel III securitisation framework.

Banks appear to be exposed mostly to senior tranches, suggesting that they are more vulnerable to downgrade, capital requirements, and mark-to-market risks than to direct credit losses. Banks typically purchase AAA senior and upper mezzanine tranches, while insurance companies buy upper mezzanine tranches, and hedge funds purchase the riskiest tranches, including equity (see **Chart B**, panel 3, for the European CLO buyers). While AAA and high-rated upper mezzanine tranches are unlikely to incur losses even in severe stress, they are subject to significant downgrade risks. Moreover, banks holding these tranches and applying SEC-IRBA (internal ratings-based approach) for the computation of capital charges would be exposed to sharp

increases in capital charges, when compared to the current capital charges, should the more severe stress scenarios materialise (see **Chart C**, panel 4).

The lack of clarity about who holds the risk of many CLO tranches raises a number of financial stability concerns that require further investigation and close monitoring. The ultimate risk holders of CLO tranches remain unknown as asset managers and hedge funds, which purchase the majority of the CLO tranches in the primary market, invest mainly on behalf of third parties. This raises questions about whether the ultimate investors have the capacity to bear potential severe losses, or how losses might be transmitted across the financial system. Moreover, the CLO amounts outstanding are sizeable and risks to CLO performance in the current credit cycle are also high, as the higher tranche collateralisation in post-crisis CLO structures has been offset to an unknown degree by weaker underlying collateral. In addition, the high commonality of CLO holdings means that tranches of similar seniority across different CLOs will suffer similar losses; as such, CLOs propagate losses more widely across the financial system. Finally, the non-linearity of credit risk introduced by the tranching process implies that, in the case of severe stress in more senior tranches, the downgrades and the associated increase in bank capital requirements will accelerate in a non-linear fashion. The issues of risk ownership of leveraged loans and CLOs, behaviour under stress and contagion channels require further analysis.