Internet Appendix For "Are CLO Collateral and Tranche Ratings Disconnected?"

A. Linking Trustee Report and Bloomberg Data

Collateral pool holdings in our trustee report data lack a unique loan identifier and S&P industry classifications. We develop an algorithm to match loans reported in the trustee data to Bloomberg data, which has both additional fields.

Bloomberg holdings data typically includes a loan identifier (FIGI). We begin by identifying links between issuers reported in the trustee data and FIGIs based on overlapping holdings across deal-months. For each FIGI, we only consider trustee reported holdings that mature within 1 day of the FIGI's reported maturity date. For each candidate issuer name we count the number of deal-month observations in which both data sources report a non-zero holding amount. We establish a link between the FIGI and issuer name with the largest overlap if reported quantities from the deal-month reports match in at least 20% of holding reports (with a threshold of $100). For each deal-month, we establish a match among remaining un-matched loans if reported quantities, maturity dates, and coupons are all exact matches.[1]

[1]Note, in some instances multiple FIGIs issued by the same issuer are reported separately in the Bloomberg data but aggregated at the issuer level in the trustee reports. Thus, we consider all possible combinations of FIGIs for a given coupon-maturity date when attempting to establish a link based on aggregated quantities.

B. Cashflow Modeling & Estimating Break-even Default Rates

S&P's CLO rating philosophy is based on the estimation of two values for each given tranche: Scenario Default Rate (SDR) and Break-even Default Rate (BDR). The estimation of SDR is relatively pedestrian, amounting to the value-at-risk of the collateral pool's loss distribution, based on Gaussian Copula Monte Carlo simulations. Disclosed within- and across-industry asset correlations, rating-implied default probabilities, and rating-specific VaR thresholds from S&P methodological reports make the replication of SDRs relatively straightforward.

In contrast, the BDR for a tranche stems from a proprietary cash-flow model. While S&P's methodological reports do not disclose information needed for an exact replication, they do report implementation details needed to approximate BDR values to a first-order. We now describe our implementation of a cashflow model based on S&P's methodological disclosures which is designed to generate tranche-specific BDR values while capturing the different credit enhancements present in a given CLO.

We begin with relevant information on tranche and collateral pool characteristics. For each tranche, this includes the current par value, class information (e.g., Class A2), and coupon rate information. Tranches are typically floating rate notes, with a credit spread and index specified, but in some instances are structured as fixed rate notes. Turning to the underlying collateral, relevant information consists of the pool's current par value, credit spread, weighted-average maturity, and weighted-average recovery rate. These details on tranche and collateral pool characteristics allow a cash-flow model to evaluate the benefit of the following credit enhancements: over-collateralization (extent to which collateral par value exceeds tranche par value), excess spread (extent to which the collateral's coupon rate exceeds the w.a. coupon rate of tranches), and recovery proceeds (recouped value from defaulted collateral used to purchase replacement assets).

Turning to deal level characteristics, our cash-flow model incorporates cash-flow diver-

sion mechanisms (e.g., over-collateralization (OC) tests) unique to each CLO. These tests continually monitor key ratios, diverting interest and principle payments to senior tranches if a ratio falls below a pre-specified threshold ("trigger"). Moreover, a CLO may (and often does) contain multiple class-specific tests (e.g., a *Class A/B OC Test* and a *Class C OC Test*). The OC ratio for a given test is computed by dividing the par value of the collateral pool by the par value of all tranches for a given class and all classes more senior. For instance, the denominator of the *Class C OC Test* is equal to the sum of par values for tranches in the A, B, and C classes. Finally, our model includes senior and junior management fees paid to the collateral manager.

With these features in mind, we now describe our modeling of the projected cash-flows received by each tranche. These projections are a function of the expected collateral defaults, which we describe below. We model cash realizations in discrete time, where each period represents 3 months. We assume that all collateral and tranches receive quarterly interest payments.

In each period, we begin by realizing any defaults specified as occurring during the quarter. Defaulted collateral does not earn interest in the current quarter, but instead is assumed to be liquidated at the weighted-average recovery rate with proceeds placed into the cash principle account. Next, we compute the quarterly interest proceeds from the remaining assets in the collateral pool. From these proceeds we deduct the senior management fee (assumed to be 15bp per year)[2] If interest proceeds cannot fully satisfy the senior management fee, the remaining liability is added to the deferred management fees owed, all interest owed to note holders is added to the respective principle amounts, and we continue to the next period.

Next, we account for interest payments due to each tranche. Interest payments are paid out to tranches sequentially based on seniority. However, after making interest payments to

[2]We do not systematic data on senior and junior management fees. However, hand checking a random set of available CLO prospectus indicate that the majority of deals have senior and junior management fees of 15bp and 35bp, respectively.

the most junior tranche in a class we check for the existence of a corresponding OC test. If a test exists, we confirm that the threshold has not be triggered before continuing to more subordinate tranches. In instances where a test is failed, the remaining collateral interest proceeds and cash principle account are used to pay down the principle on tranches based on seniority until either: a) the test is passed or b) collateral interest and cash principle accounts are exhausted. For example, the Class C OC test would be performed after making a coupon payment to the most junior Class C note, but before continuing down the tranche structure. Any unsatisfied interest payments are added to the respective principle amounts. Finally, a junior management fee of 35bp (per annum) is paid using interest and cash proceeds from defaulted securities. Following these payments, remaining interest proceeds are distributed to the equity tranche while all remaining funds in the cash principle account are reinvested into replacement collateral, increasing the par value of the collateral pool. If the current period is less than the weighted-average maturity of the collateral pool, we continue to the next period. Otherwise, we distribute the proceeds from all performing collateral to pay down the principle of the note holders, again based on tranche seniority.[3]

The result of this process is a series of cash flow payments, and possibly a remaining unpaid principle balance for each tranche. Of course, these cash flow projections are a function of the assumed series of collateral defaults and a recovery rate. To determine the break-even default rate for a given tranche, nine potential default timing scenarios are considered. For instance, one scenario spreads the total defaults evenly over the initial four-year period. In another scenario, the relative rate of defaults are assumed to be 50%, 25%, and 25% in years 1-3, respectively. For example, suppose the overall default rate of the collateral pool is 20%. In the latter timing scenario, this would correspond to default rates of 10%, 5%, and 5% in the first three years, with no defaults in the remaining years. Moreover, variations of each timing scenario are considered where the pattern is delayed by

[3]In doing so, we are assuming that all collateral matures at the same time. While Standard and Poor's (2019a) notes that multiple amortization schedules are considered, we are unable to find any details disclosed regarding the specific maturity schedules assumed.

between one and three years.[4] Finally, S&P applies a rating-contingent stress to the recovery rate assumed for the collateral pool. Intuitively, a haircut is applied to the weighted-average recovery rate of the pool for higher rated tranches.[5] Of note, Standard and Poor's (2019c) also considers multiple scenarios (e.g., "up curve", "down curve", etc.) for the interest rate path of the index which the floating rate coupons reference. However, the methodological disclosure does not specifiy details on the construction of these scenarios. To this end, we use the current index rate as of February 2020, and assume it stays constant over the period.

For each tranche and assumed default timing pattern (given a recovery rate), we solve for the minimum collateral default rate such that the tranche is not fully paid down by the final maturity date of the collateral pool. Thus, the result is a series of collateral default rates (given different default timing scenarios) for which a tranche is unable to be made whole. From this set of collateral default rates, the BDR is calculated based on a rating-specific percentile from the distribution.[6] To arrive at a tranche's predicted rating, we solve for the greatest possible rating which generates a BDR (which is itself a function of the rating given the rating-contingent percentiles and recovery rate stress) that is greater than the (rating-contingent) SDR.

One thing of note, while we have data on tranche characteristics (par value, coupon spreads, and class designations), pool characteristics (par value, w.a. spreads), and coverage thresholds, we do not have systematic information on collateral weighted-average recovery rates. However, we make note of two important factors. First, without incorporating deal-specific recovery rates our cash-flow model is still able to produce a AAA BDR estimate that achieves a correlation of 0.66 when compared to the AAA BDR reported in trustee reports for deals in our sample. Second, this recovery rate parameter provides a means by which we can calibrate our model to the observed level of cushion present prior to COVID. Specifically, we solve for the CLO-specific recovery rate such that our model-predicted cushion between

[4] Standard and Poor's (2016) report the different default pattern scenarios.
[5] Standard and Poor's (2016) makes note of the assumed recovery rate haircuts. From these values we interpolate other possible relative values using a cubic spline.
[6] Standard and Poor's (2016) reports the percentile across rating categories.

BDR and SDR matches the reported BDR - SDR cushion from the CLO's February 2020 trustee report.[7] Finally, in instances where the trustee reports for an S&P rated deal do not disclose BDR and SDR values, we randomly draw a value from the distribution of CLOs with reported cushions.

[7]As trustee reports do not report BDR values for non-AAA tranches, we calibrate our model such that the average relative BDR/SDR cushion from our model matches the reported values for the AAA tranche.

C. SDR Sensitivity across Ratings

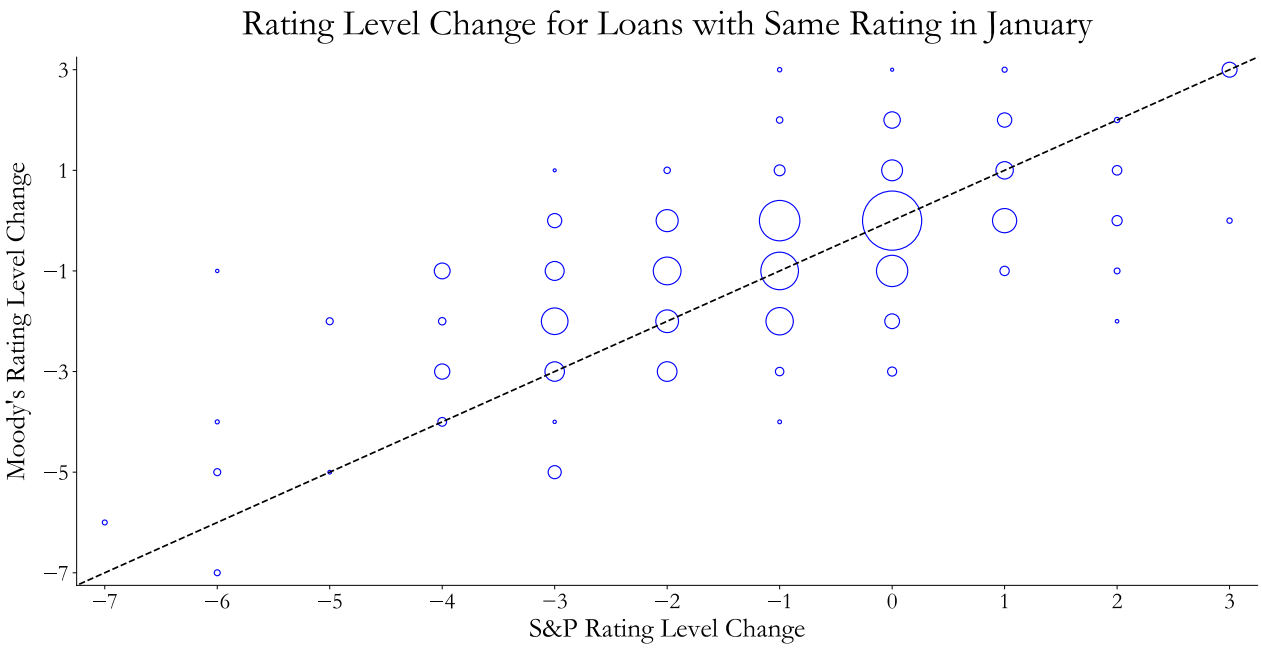
This subsection describes the approach used to estimate the effects of collateral risk changes on rating-contingent SDRs. For each deal-month, we begin with the relevant collateral pool information needed to compute an SDR (credit rating, maturity date, S&P industry, etc.). We then simulate a deterioration in collateral by introducing rating downgrades in a subset of the collateral loans. Specifically, for each obligor we induce a one-notch downgrade with probability p. Using the resulting collateral pool and corresponding simulated downgrades, we estimate the set of rating-contingent SDRs from a Gaussian Copula with 1M draws of collateral defaults. In addition, we compute the relative change in collateral quality by computing the ratio of the par-weighted default probability of the collateral pool when including the simulated downgrades relative to the par-weighted default probability without simulated downgrades. We repeat the process 50 times, for 50 unique values of p that range from 0.02 to 0.5. The result is 50 sets of rating-contingent SDRs and 50 realizations of collateral deterioration that range in severity.

D. Permutation Tests for Difference in Realized and Predicted Rating Actions

This subsection describes the permutation test used to evaluate the statistical signficance in Figure 8. For each initial rating category, we begin by computing the average notch change in credit ratings based on Moody's guidance and realized rating actions, and take the difference between the two means. We treat a negative credit watch as a one-notch downgrade and an upgrade as no change. To account for correlation within a CLO we only consider the most junior tranche within a CLO-initial credit rating. Next, for each initial rating we estimate the distribution of the difference in means under the null that realized rating actions do not differ from Moody's guidance. To do this, we randomly reassign observations across the two groups without replacement, and compute the difference in means. We repeat this process 10,000 times to generate a distribution under the null of no difference. Figure IA.7 reports the distributions across initial credit ratings, aggregated to the coarse level. From this counter-factual distribution we compute the mean and standard deviation. Finally, we estimate the test-statistic reported in Figure 8 as the difference in the true difference in means observed in the data minus the mean from the counterfactual distribution, scaled by the standard deviation of the counter-factual distribution.

E. Supplemental Figures and Tables

Panel A.



Panel B.

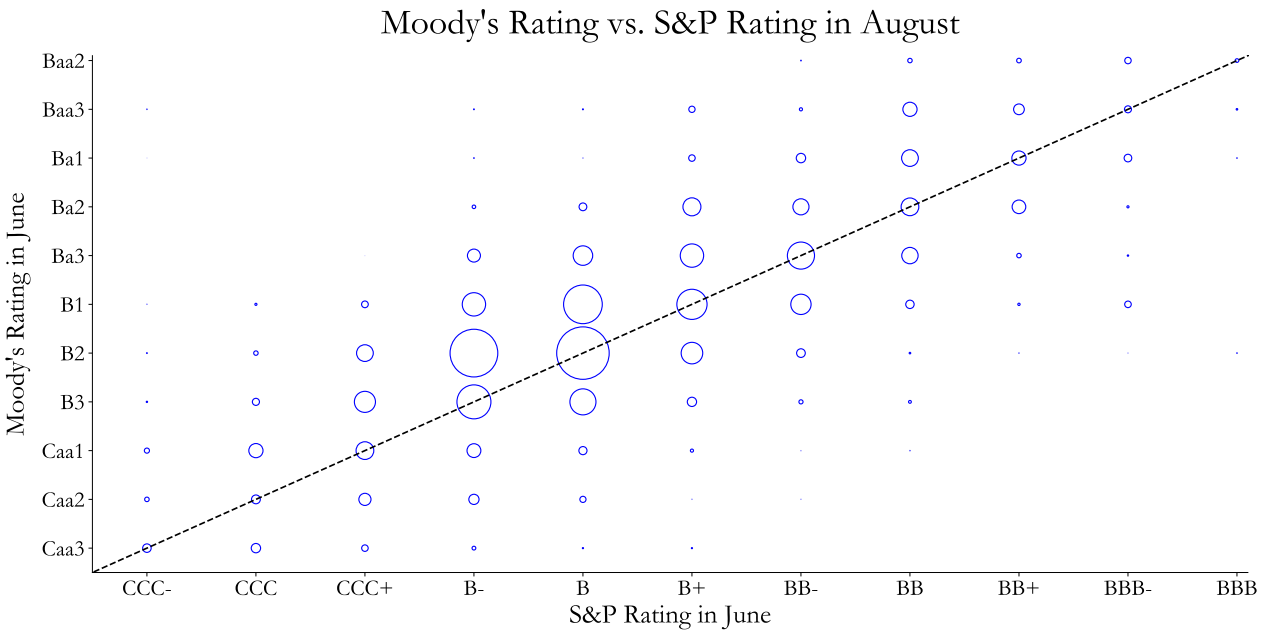


Figure IA.1
Ratings Actions on Collateral by S&P and Moody's

This figure compares the rating actions taken (Panel A) and final ratings (Panel B) by S&P and Moody's on collateral credit ratings. For Panel A, only loans that had equivalent ratings in January 2020 are considered. Panel B is restricted to loans with ratings from both S&P and Moody's in August 2020. Each circle's area is proportional to the par-weighted share that received a given action as of August 2020. The dashed line in Panel A and B is the 45° line.

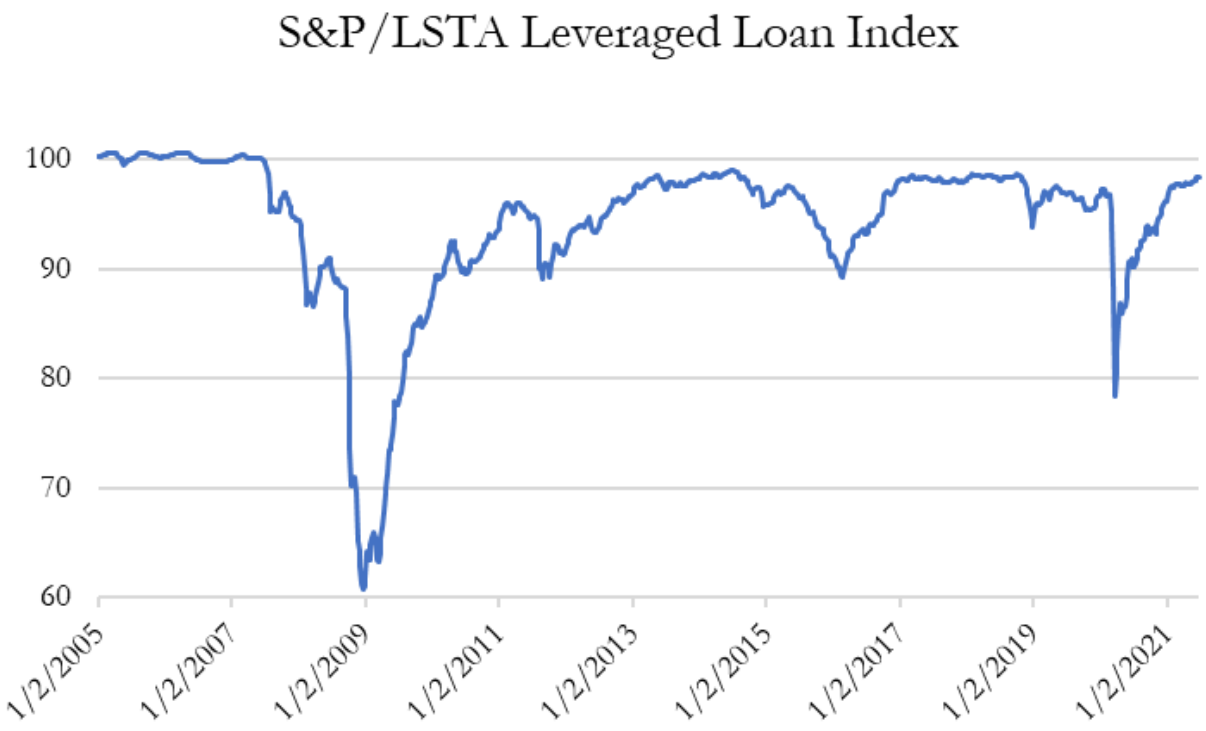


Figure IA.2
Loan Price Index during Financial Crisis
This figure presents the weekly prices of the S&P/LSTA Leveraged Loan Index (LLI) from January 2005 through June 2021. This index is based on the average bid price of U.S. domiciled leveraged loans. According to S&P's Global Leveraged Loan Index methodology, eligible loans for inclusion must be senior secured, and must have a minimum initial term of one year, minimum initial spread of LIBOR/EURIBOR + 125 basis points, minimum original funding amount of $50M, and "have been bought by an institutional investor partnered with LCD, and must currently be in their portfolio." Source: www.SPGlobal.com

Panel A.

Together with the set of modelling assumptions above, Moody's conducted additional sensitivity analysis, which was an important component in determining the provisional ratings assigned to the rated notes. This sensitivity analysis includes increased default probability relative to the base case. Below is a summary of the impact of an increase in default probability (expressed in terms of WARF level) on each of the rated notes (shown in terms of the number of notch difference versus the current model output, whereby a negative difference corresponds to higher expected losses), holding all other factors equal.

Percentage Change in WARF: WARF + 15% (to 3243 from 2820)

Ratings Impact in Rating Notches:

Class X Senior Secured Floating Rate Notes: 0

Class A-1-R Senior Secured Floating Rate Notes: -1

Class A-2-R Senior Secured Fixed Rate Notes: -1

Class B-R Senior Secured Fixed Rate Notes: -2

Class C-R Mezzanine Secured Deferrable Floating Rate Notes: -2

Class D-R Mezzanine Secured Deferrable Floating Rate Notes: -1

Class E-R Mezzanine Secured Deferrable Floating Rate Notes: -1

Class F-R Mezzanine Secured Deferrable Floating Rate Notes: -2

Panel B.

Below is a summary of the impact of an increase in default probability (expressed in terms of WARF level) on the Rated Notes (shown in terms of the number of notch difference versus the current model output, whereby a negative difference corresponds to higher expected losses), assuming that all other factors are held equal:

Percentage Change in WARF -- increase of 15% (from 2750 to 3163)

Rating Impact in Rating Notches

Class A-1A Notes: -1

Class A-1B Notes:-1

Class A-2 Notes:-2

Class B Notes: -2

Class C Notes: -1

Class D Notes: 0

Figure IA.3
Screenshots of Moody's Investor Press Releases

This figure provides screenshots of two Moody's investor press releases regarding expected rating actions on tranches when they are faced with varying levels of WARF increase. Panel A shows the rating actions on the tranches of Dryden 32 Euro CLO 2014 B.V. Panel B shows the same for Carlyle US CLO 2017-1.

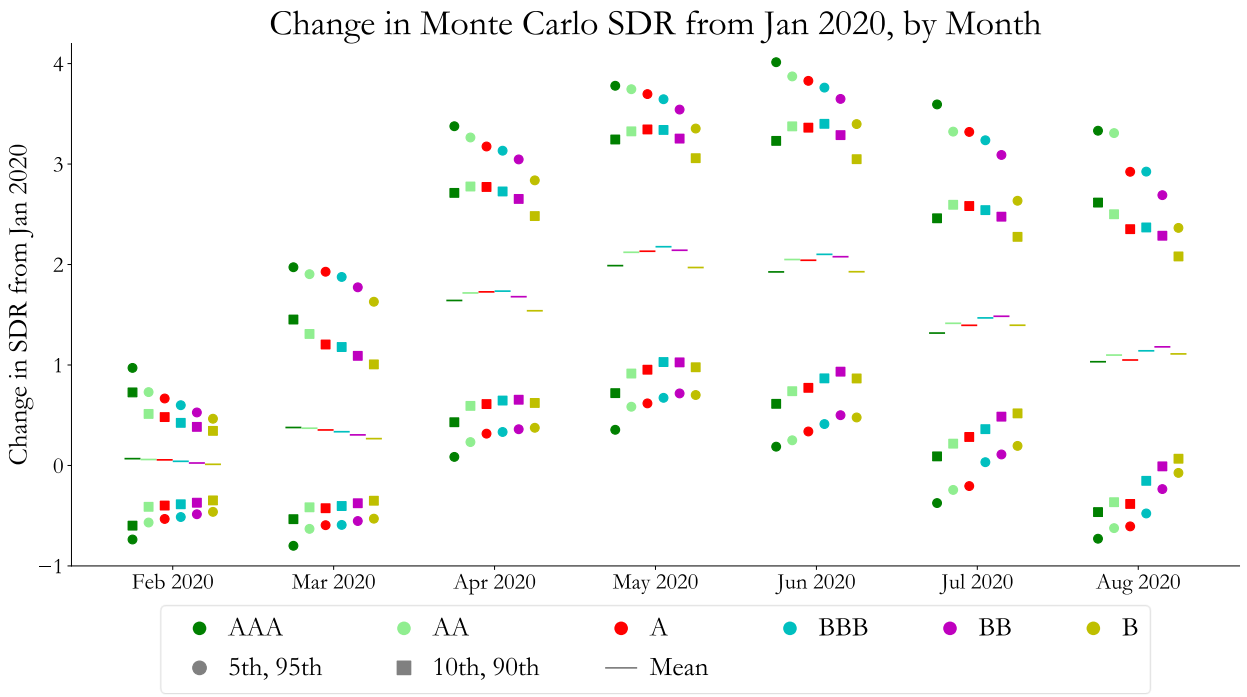


Figure IA.4
Change in SDR During 2020
This figure reports the change in S&P's collateral risk metric, SDR, over time. The panel estimates the SDR for each rating class using Monte Carlo simulations based on S&P's methodology. These simulations are based on the implied default probability using S&P's credit ratings measured at a given reporting date. Reported is the distribution of the change in SDR for each CLO-class relative to its corresponding value in January 2020.

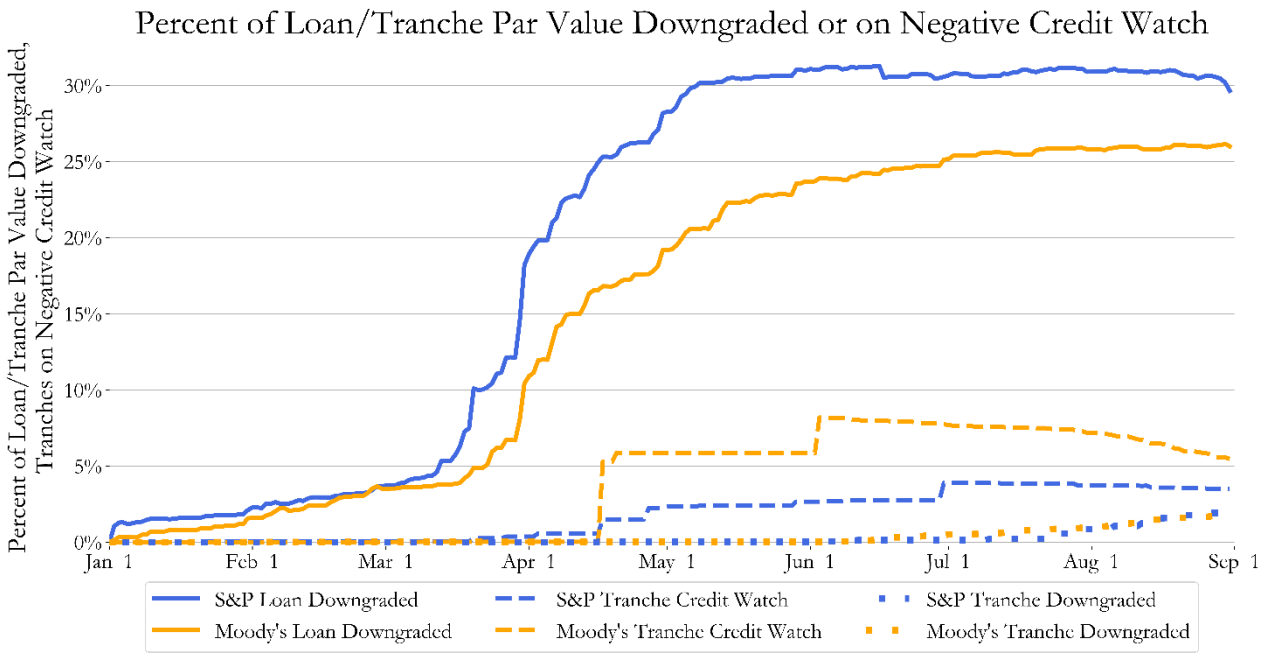


Figure IA.5
Ratings Actions on Collateral and Tranches by S&P and Moody's Over Time
This figure displays the rating actions taken by S&P and Moody's on underlying collateral and CLO tranches over time. Rating downgrades are based on changes from the loan/tranche's January 2020 rating and par-weighted using January 2020 holdings data. The orange lines represent actions by Moody's and the blue lines by S&P. The figure reports the par-weighted percentage of collateral downgraded (solid lines), tranches downgraded (dotted lines), and tranches downgraded or put on negative credit watch (dashed lines).

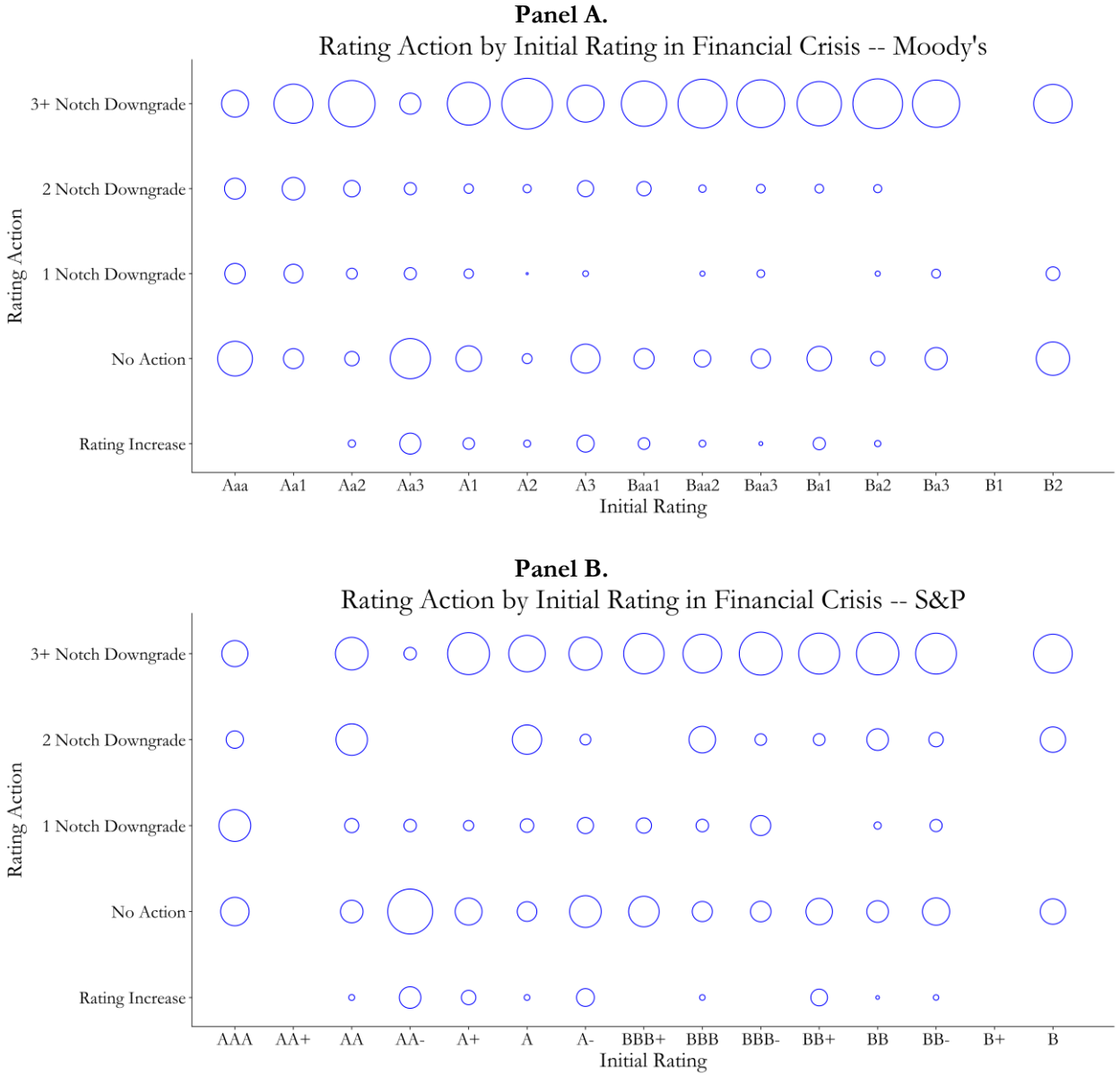


Figure IA.6
Tranche Downgrades from the Financial Crisis
This figure displays the realized rating actions across tranches for CLOs issued prior to the financial crisis ("CLO 1.0"). Each panel reports the relative change in credit ratings from issuance to June 2010 by initial credit rating. Panel A reports the results for Moody's rating actions, while Panel B reports the results for S&P. For each initial credit rating, the area of a blue hollow circle is proportional to the percent of tranches that received a particular action.

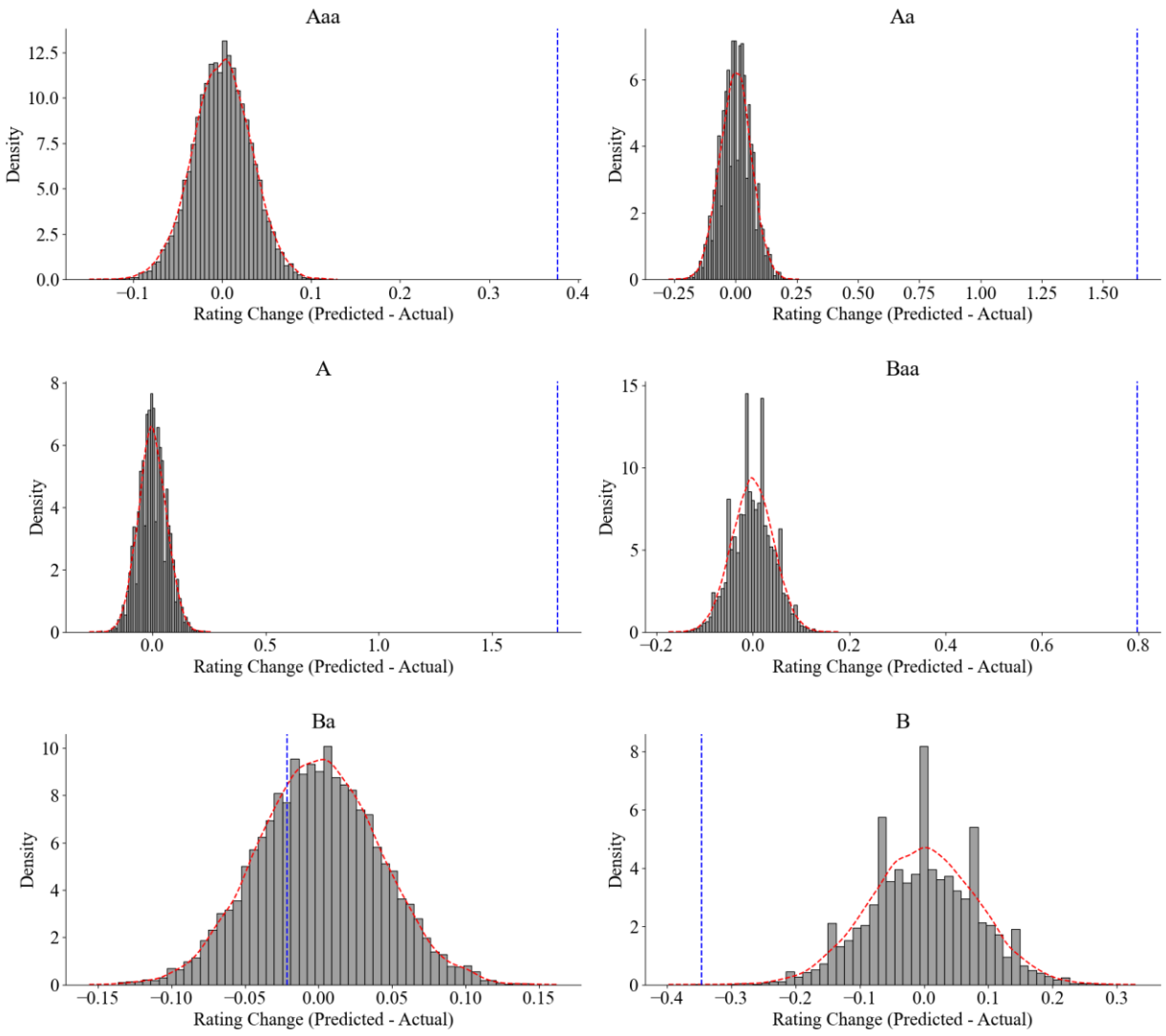


Figure IA.7
Permutation Test for Differences in Moody's Expected and Actual Rating Actions
This figure reports the distribution of rating changes ('Actual') versus Moody's guidance ('Predicted') generated from a permutation test where observations are randomly reassigned across the two groups without replacement. Reported is the histogram of the resulting difference in mean rating change based on 10,000 draws. The blue vertical dashed line reports the true difference in mean rating changes observed in the data. The process is performed separately for each initial rating category (reported in the figure titles), aggregated to the coarse rating level for illustrative ease and small number of observations in some fine credit ratings.

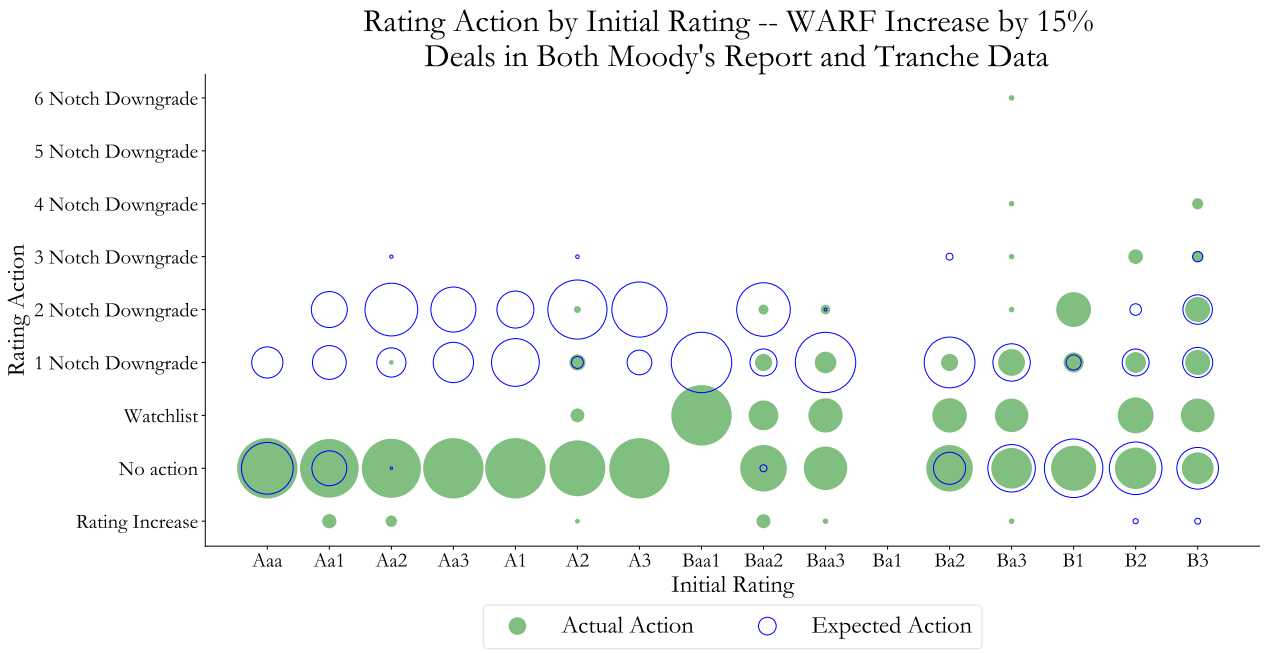


Figure IA.8
Moody's Expected and Actual Rating Actions for CLO Tranches in the Same Deals
This figure displays the expected rating actions based on Moody's projections and realized rating actions for a set of CLOs experiencing a significant increase in collateral risk. Blue hollow circles denote projected rating actions following a 15% increase in WARF. Green solid circles report the realized rating actions for CLOs that a) experience at least a 15% increase in WARF, and b) are present in the press release data. Each circle's area is proportional to its par-weighted share for a given initial rating. The increase in WARF is based on WARF reported in trustee reports in January versus August 2020.

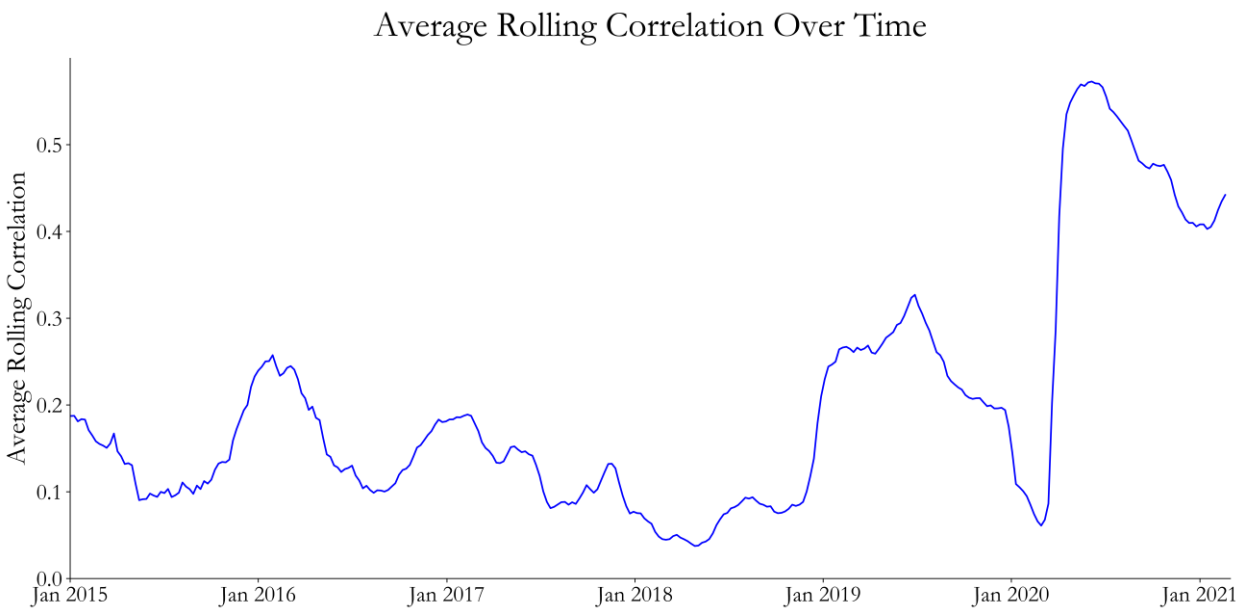


Figure IA.9
Rolling Pairwise Asset Correlation over Time
This figure reports the change in average loan (asset) correlation across CLOs over time. The figure reports the par-weighted average pair-wise correlation in Bloomberg loan valuations on a rolling 52-week basis, with par values measured as of January 2020.

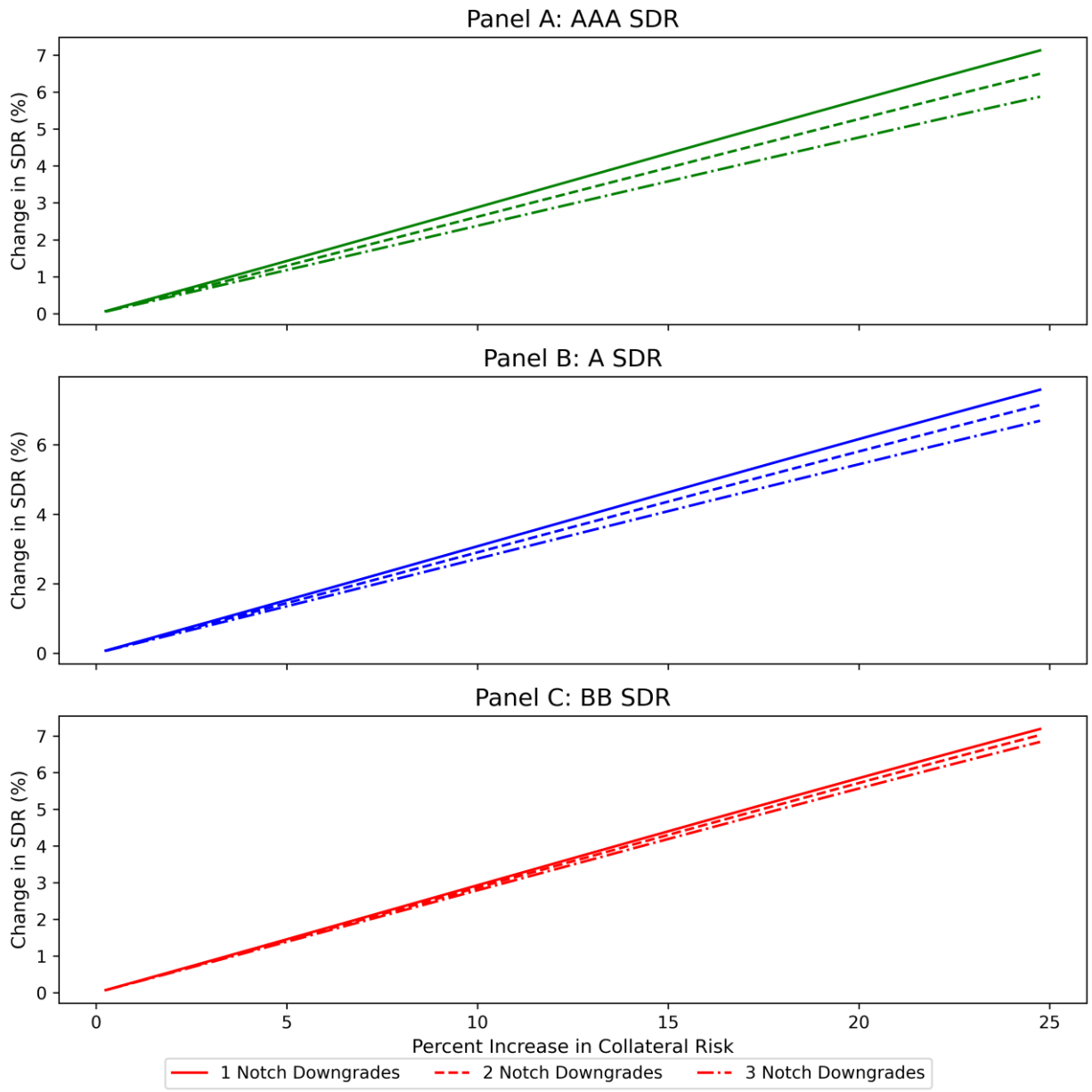


Figure IA.10
Downgrade Clustering and Change in SDR across Seniority Levels

This figure reports the effect of rating downgrade clustering on the change in S&P's collateral risk metric, SDR, across various credit ratings (AAA, A, and BB). Starting with February 2020 holdings data, for each CLO we perform 50 simulations where we simulate downgrades randomly across the collateral pool, varying the downgrade probability across simulations to achieve an increase in the weighted-average default probability of between 1% and 25%. For each draw of simulated credit ratings, we then estimate the full set of rating-contingent SDRs. Finally, we estimate a cubic polynomial for the relationship between the increase in the weighted-average default probability (x-axis) and each rating-contingent SDR. Each panel reports the fitted value for the change in SDR relative to the corresponding SDR without any simulated downgrades. In each panel, we report the estimated increase in SDR when simulated rating actions result in a one-notch downgrade (solid line), two-notch downgrade (dashed line), and three-notch downgrade (dashed-and-dotted line).

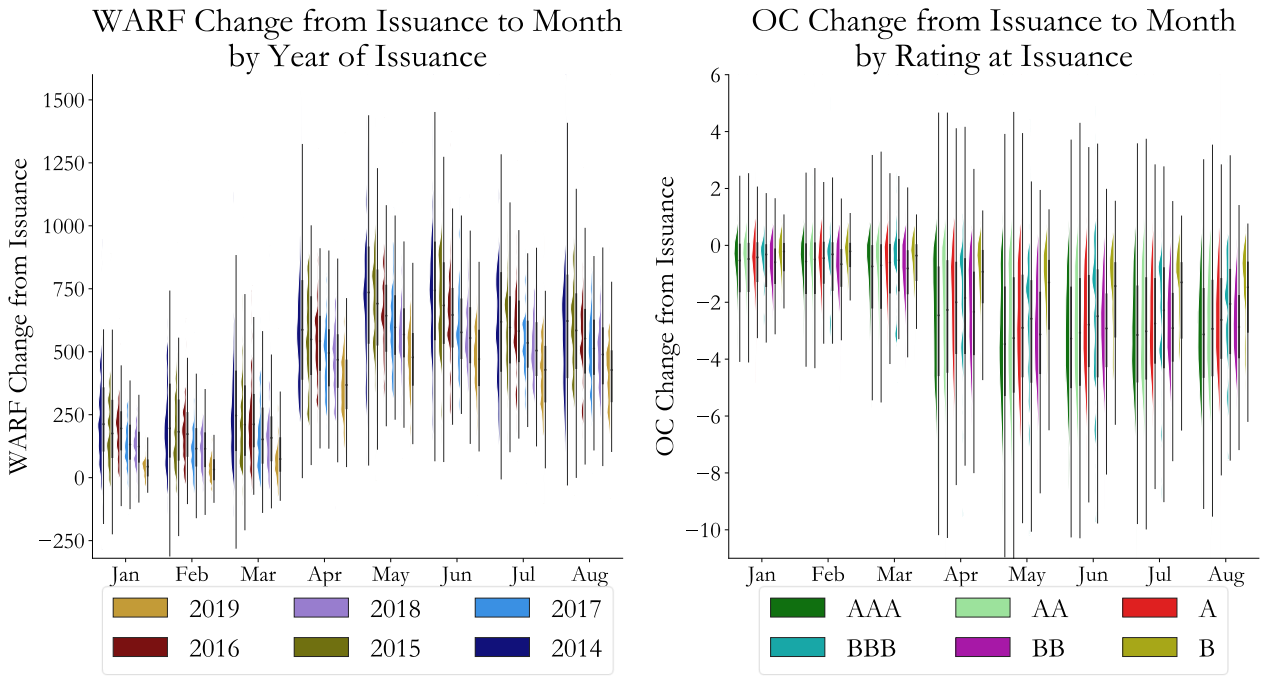


Figure IA.11
WARF and OC Before and During the COVID-19 Crisis
This figure displays the change in weighted average rating factor (WARF) and overcollateralization (OC) over time. The change in WARF is reported by vintage and the change in OC is reported by initial tranche rating. The figure reports the distribution of the change in values across CLOs, where the difference for each CLO is taken relative to the corresponding value in January 2020.

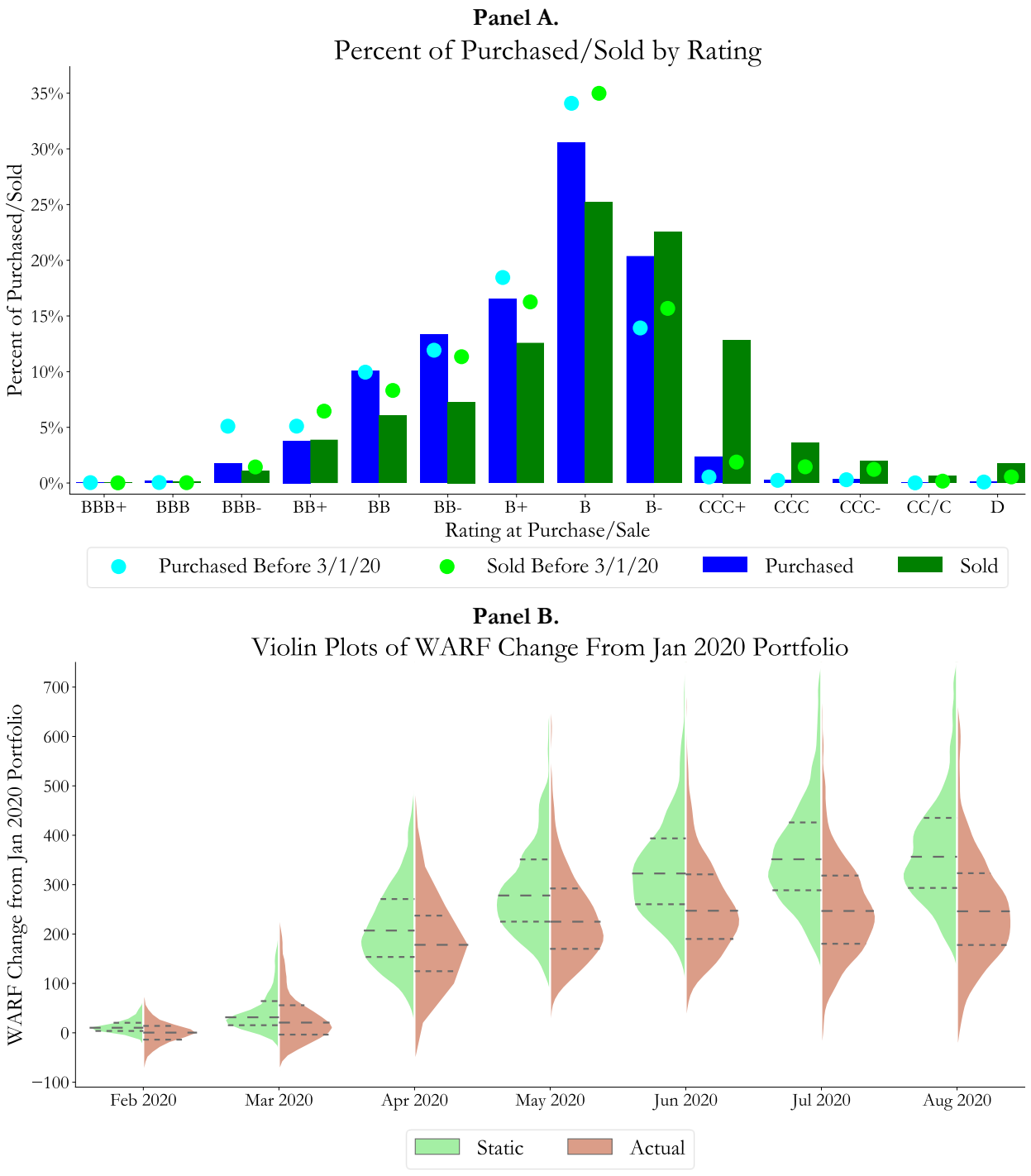


Figure IA.12
Ratings of Loans Purchased and Sold During COVID-19 Crisis
This figure displays the rating distribution of the loans being sold and purchased (Panel A) by CLOs during the COVID-19 crisis and a comparison of collateral risk for active versus static portfolios (Panel B). Ratings from S&P are used for this figure. For Panel A, blue bars represent purchases, and green bars represent sales. The static portfolio corresponds to WARF at a point in time for the collateral pool as measured in January 2020.

Table IA.1
Collateral Performance, Collateral Correlation/Diversification and Tranche Rating Actions

Panel A: Pct. Rated Tranche Downgrades/Watchlist								
	Moody's				S&P			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Change WARF (%)	0.218***	0.219***	0.365***	0.103	0.294***	0.293***	0.455***	0.272***
	(2.88)	(2.91)	(4.35)	(1.25)	(6.15)	(6.11)	(7.57)	(5.11)
Change Asset Correlation		-0.951				-2.758		
		(-0.23)				(-0.65)		
Change Rating Dispersion			-5.237***				-5.847***	
			(-3.74)				(-4.49)	
Change % CCC Collateral				26.495				5.533
				(1.26)				(0.95)
ln(Deal Size)	-0.278	-0.315	-0.601	-0.441	-0.572	-0.693	-0.638	-0.616
	(-0.28)	(-0.30)	(-0.58)	(-0.43)	(-0.48)	(-0.58)	(-0.55)	(-0.51)
ln(# Tranches)	2.267	2.329	2.730**	2.520*	-1.807	-1.823	-0.894	-1.571
	(1.71)	(1.68)	(2.15)	(1.90)	(-1.03)	(-1.05)	(-0.56)	(-0.91)
Deal % AAA	-0.070	-0.069	-0.020	-0.062	-0.126***	-0.127***	-0.089**	-0.121***
	(-0.79)	(-0.79)	(-0.22)	(-0.67)	(-3.00)	(-2.98)	(-2.52)	(-2.94)
Deal % Equity	-0.260***	-0.261***	-0.275***	-0.265***	-0.138***	-0.140***	-0.140***	-0.143***
	(-4.59)	(-4.59)	(-4.88)	(-4.77)	(-4.71)	(-4.67)	(-4.93)	(-4.63)
ln(Underwriter Activity)	-0.421	-0.420	-0.398	-0.406	-0.683	-0.666	-0.639	-0.691
	(-1.19)	(-1.19)	(-1.13)	(-1.10)	(-1.61)	(-1.55)	(-1.61)	(-1.62)
ln(Coll. Man. Activity)	0.003	-0.001	0.019	-0.029	-0.274	-0.254	-0.187	-0.280
	(0.01)	(-0.00)	(0.06)	(-0.09)	(-1.30)	(-1.14)	(-0.87)	(-1.35)
Vintage FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	782	782	782	782	406	406	406	406
R^2	0.124	0.124	0.142	0.128	0.337	0.337	0.379	0.338

This table repeats the specifications from Table 3 when including additional control variables. The dependent variable is the percentage of rated tranches downgraded or put on credit watch (Panel A), and the percentage of rated tranches downgraded (Panel B). Observations are at the deal level. All tranche ratings are measured as of August 1st, 2020. *Change WARF* is the percent change in the weighted-average rating factor of a collateral pool from January to August 2020. *Deal Size* is the aggregate par value of all tranches in a CLO, while # *Tranches* is the total number of tranches. *Deal % AAA Tranche* is the par percent comprised of AAA-rated tranches, with a similar construction for *Deal % Equity Tranche*. *Underwriter Activity* is set equal to the total par value of tranches issued by an underwriter in 2018 and 2019, with $1 added to the sum. *Coll. Man. Activity* is constructed in a similar fashion by collateral manager. All remaining variables are defined in Table 3. *t*-statistics (in parentheses) are heteroscedasticity-robust and clustered at the issue-quarter level. ***p <0.01, **p <0.05, *p <0.1.

Panel B: Pct. Rated Tranche Downgrades								
	Moody's				S&P			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Change WARF (%)	0.083**	0.082**	0.114**	0.074	0.135**	0.135**	0.189**	0.103**
	(2.45)	(2.40)	(2.64)	(1.45)	(2.35)	(2.35)	(2.41)	(2.16)
Change Asset Correlation		1.984				1.447		
		(0.65)				(0.63)		
Change Rating Dispersion			-1.110				-1.967*	
			(-1.49)				(-1.85)	
Change % CCC Collateral				2.262				7.957
				(0.25)				(1.70)
ln(Deal Size)	-0.875	-0.798	-0.943	-0.889	-0.153	-0.089	-0.175	-0.216
	(-1.27)	(-1.17)	(-1.36)	(-1.33)	(-0.18)	(-0.10)	(-0.21)	(-0.25)
ln(# Tranches)	2.665***	2.536**	2.763***	2.686***	-0.022	-0.014	0.285	0.318
	(2.97)	(2.63)	(3.17)	(3.09)	(-0.02)	(-0.01)	(0.33)	(0.37)
Deal % AAA	0.044	0.043	0.054*	0.044	-0.064*	-0.064*	-0.052*	-0.058*
	(1.55)	(1.57)	(1.99)	(1.59)	(-2.05)	(-2.06)	(-1.79)	(-1.80)
Deal % Equity	0.010	0.011	0.007	0.010	-0.013	-0.012	-0.014	-0.020
	(0.60)	(0.64)	(0.38)	(0.57)	(-0.98)	(-0.95)	(-1.21)	(-1.50)
ln(Underwriter Activity)	-0.037	-0.039	-0.033	-0.036	0.138	0.129	0.153	0.127
	(-0.24)	(-0.25)	(-0.21)	(-0.23)	(1.17)	(1.01)	(1.25)	(1.08)
ln(Coll. Man. Activity)	0.138	0.148	0.142	0.136	-0.196	-0.207	-0.167	-0.205
	(0.49)	(0.53)	(0.51)	(0.48)	(-1.00)	(-1.06)	(-0.84)	(-1.08)
Vintage FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	782	782	782	782	406	406	406	406
R^2	0.052	0.052	0.055	0.052	0.111	0.111	0.124	0.118

Table IA.2
Collateral Trade Yields

	(1)	(2)	(3)
1(Purchase) × 1(January)	-0.663***	-0.643***	
	(-22.23)	(-20.98)	
1(Purchase) × 1(February)	-0.435***	-0.458***	0.116***
	(-14.24)	(-15.49)	(3.79)
1(Purchase) × 1(March)	-1.415***	-1.429***	-0.747***
	(-20.32)	(-24.13)	(-12.78)
1(Purchase) × 1(April)	-1.228***	-1.241***	-0.548***
	(-11.43)	(-11.34)	(-5.95)
1(Purchase) × 1(May)	-0.496***	-0.552***	0.048
	(-7.65)	(-9.06)	(0.81)
1(Purchase) × 1(June)	0.129***	0.068	0.707***
	(2.78)	(1.40)	(12.81)
1(Purchase) × 1(July)	0.322***	0.268***	0.980***
	(6.45)	(5.15)	(15.40)
1(Purchase) × 1(August)	0.157***	0.167***	0.811***
	(2.91)	(2.64)	(7.58)
Rating-Month FE	M, S&P	M, S&P	M, S&P
Deal-Month FE		Yes	Yes
Deal-Direction FE			Yes
Observations	424,639	424,396	424,389
R^2	0.476	0.533	0.545

This table reports the results of OLS regressions. The dependent variable is the yield-to-maturity for collateral trades, where the unit of observation is at the trade level. Yields are computed using the current trade date, maturity date and coupon yield, assuming coupons are paid out quarterly. YTM is computed using the listed trade price. *1(Purchase)* takes a value of one for trades that are purchases. *Deal-Direction FE* denotes an interaction of a CLO fixed effect and an indicator variable for the direction of the trade (buy vs. sell). *Rating-Month FE* denotes an interaction of trade-month indicators and a vector of indicators for the ordinal ratings of either S&P (SP) or Moody's (M). All remaining variables are defined in Table 5. *t*-statistics (in parentheses) are heteroscedasticity-robust and clustered at the CLO deal level. ***p <0.01, **p <0.05, *p <0.1.

Table IA.3
Possible Fed Intervention and Tranche Downgrade Sensitivity

Panel A: Pct. Rated Tranche Downgrades/Watchlist				
	Moody's		S&P	
	(1)	(2)	(3)	(4)
Change WARF (%)	0.211***	0.224***	0.344***	0.292***
	(3.25)	(3.07)	(3.91)	(5.86)
x Repo Share (%)	0.026		0.334	
	(0.06)		(0.71)	
x Fund Share (%)		-0.001		0.000
		(-1.22)		(0.01)
Repo Share (%)	4.133		4.486	
	(0.81)		(0.88)	
Fund Share (%)		0.013		0.003
		(1.62)		(0.06)
Controls	Yes	Yes	Yes	Yes
Observations	782	782	406	406
R^2	0.128	0.128	0.165	0.341

This table reports the results of OLS regressions. The dependent variable is the percentage of rated tranches downgraded or put on credit watch (Panel A), and the percentage of rated tranches downgraded (Panel B). Observations are at the deal level. All tranche ratings are measured as of August 1st, 2020. *Change WARF* is the percent change in the weighted-average rating factor of a collateral pool from January to August 2020. *Repo Share* is the deal-level average share of tranche par reported as collateral in repo filings from February 2019 to January 2020. *Fund Share* is the deal-level average share of tranche par being held by bond funds from February 2019 to January 2020. *Controls* denotes the inclusion of all control variables considered in Table IA.1. *t*-statistics (in parentheses) are heteroscedasticity-robust and clustered at the issue-quarter level. ***p <0.01, **p <0.05, *p <0.1.

Panel B: Pct. Rated Tranche Downgrades				
	Moody's		S&P	
	(1)	(2)	(3)	(4)
Change WARF (%)	0.093**	0.086**	0.110	0.119*
	(2.28)	(2.80)	(1.71)	(1.92)
x Repo Share (%)	-0.347		0.460	
	(-1.60)		(0.78)	
x Fund Share (%)		-0.000		0.003
		(-0.49)		(0.80)
Repo Share (%)	4.358		-5.719	
	(1.33)		(-0.81)	
Fund Share (%)		0.008*		-0.031
		(1.74)		(-0.72)
Controls	Yes	Yes	Yes	Yes
Observations	782	782	406	406
R^2	0.055	0.072	0.120	0.127