Astrea IV Pte. Ltd.

New Issue

Inside This Report

Transaction Overview 1
Key Rating Factors.............................1
Structure Overview.............................3
Portfolio Overview 3
Structural Protections and Security.....7
Cash Flow Scenario Analysis 13
Ratings Sensitivity to Account Investments......................................16
The Manager....................................17
The Fund Administrator and Transaction Administrator 18
Security and Bankruptcy Remoteness 19
The Model 20
Surveillance of the Transaction.........20
Rating Sensitivity..............................21
Appendix A: Terms of the Bonds 22

Related Criteria

Closed-End Funds and Market Value Structures Rating Criteria (July 2017)

Structured Finance and Covered Bonds Counterparty Rating Criteria (May 2017)

Structured Finance and Covered Bonds Counterparty Rating Criteria: Derivative Addendum (May 2018)

Exposure Draft: Structured Finance and Covered Bonds Counterparty Rating Criteria (May 2018)

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Capital Structure

Class	Rating	Amount (Mil.)	Currency	Final Maturity	Approx.% of NAV	Approx. NAV OC (%)
A-1	Asf	242	SGD	June 2028	16.5	64.4
A-2	Asf	210	USD	June 2028	19.1	64.4
B	BBBsf	110	USD	June 2028	10.0	54.4

Source: Fitch Ratings

Fitch Ratings rates the Class A-1, Class A-2 and Class B bonds issued by Astrea IV Pte. Ltd. (Astrea IV) as shown in the table above. Ratings are not a recommendation to buy, sell or hold any security. The offering circular and other materials should be reviewed prior to any purchase.

Transaction Overview

Astrea IV is a collateralised fund obligation transaction sponsored by Astrea Capital IV Pte. Ltd. (Astrea Capital) backed by interests in a diversified pool of 36 private equity funds, with approximately USD1.1 billion net asset value (NAV) of funded commitments and USD168 million of unfunded capital commitments.

The underlying funds will distribute cash as they exit investments and will make capital calls when they require additional cash to invest. Cash flows generated by the funds will be used to pay off the bonds, as well as interest and other expenses.

Key Rating Factors

NAV Overcollateralisation (OC): The rated bonds will make up approximately 46% of the NAV at issuance, providing a sufficient level of OC at the indicated rating levels as per Fitch's rating criteria. The OC provides the bonds with a cushion in case private equity distributions are realised at lower levels than expected. Loan-to-value (LTV) tests will trap cash to cap leverage at a constant threshold during the transaction's life.

Structural Protection: Key structural protections include a Capital Call Facility to fund capital calls in the event of a cash shortfall, a Liquidity Facility to bridge liquidity gaps to cover interest and expenses, a reserve account for the Class A-1 and Class A-2 bonds, currency hedges to pay interest and principal of Class A-1 in Singapore dollars and hedge euro exposure, and long final maturities on the bonds to allow the structure time to weather a down market.

Diversified Portfolio: Astrea IV's portfolio of private equity interests is well diversified, which mitigates the market cyclicality and idiosyncratic factors that drive private equity fund performance. The portfolio comprises 36 funds of various vintages, managed by 27 general partners (GP), with 596 underlying investments across different sectors and regions.

Ability to Withstand Stress: Fitch measured the ability of the structure to withstand weak performance in its underlying funds in combination with adverse market cycles. The Class A-1 and Class A-2 bonds are rated 'Asf', in line with their ability to withstand fourth quartile level performance in the underlying funds, and the Class B bonds are 'BBBsf', in line with their ability to withstand third quartile level performance in the underlying funds.

Under Fitch's projections, the Class A bonds can be paid off before their maturity date in all stress scenarios Fitch ran applying the fourth quartile stress, and the class B bonds can be paid off before their maturity date in all stress scenarios Fitch ran applying the third quartile stress.

Counterparty Exposure: Certain structural features of the transaction involve significant reliance on counterparties, such as the capital call facility provider, liquidity facility provider, bank account providers and hedge counterparties, and the rating on the bonds could be negatively affected in the event of a key counterparty downgrade. Fitch believes this risk is mitigated by counterparty replacement provisions in the transaction documents that align with Fitch's criteria.

Ratings Linked to Reserve Investments: The funds in the Reserves Accounts will be invested in eligible securities or bank deposits, as specified in transaction documentation. As these investments can have long-dated maturities and will have a material impact on the performance of the rated bonds, the ratings of the Astrea IV bonds will be capped at and linked to the ratings of investments in the Reserves Accounts. At launch, these investments will be rated higher than the ratings of the senior bonds, which does not affect the bond ratings at launch.

Capabilities of the Manager: The manager (Azalea Investment Management Pte. Ltd., an indirect subsidiary of Temasek) has the capability and resources required to manage this transaction. While Azalea has a short track record as an independent entity, its management team has extensive experience and institutional knowledge in the private equity industry, and it draws on and benefits from its connection with Temasek.

Alignment of Interests: The sponsor's (Astrea Capital, which is owned by Azalea and ultimately Temasek) and bondholders' interests are strongly aligned, as the sponsor is expected to hold the entire equity stake (approximately 54% of NAV) in Astrea IV.

In addition, the sponsor's motivation for launching the transaction has a non-financial aspect, as Azalea wishes to contribute to the development of investment products in Singapore based on private equity funds. Astrea IV is the fourth in a series of similar transactions launched by the sponsor and its affiliates, with the previous transactions launched in 2006, 2014 and 2016.

Related Research

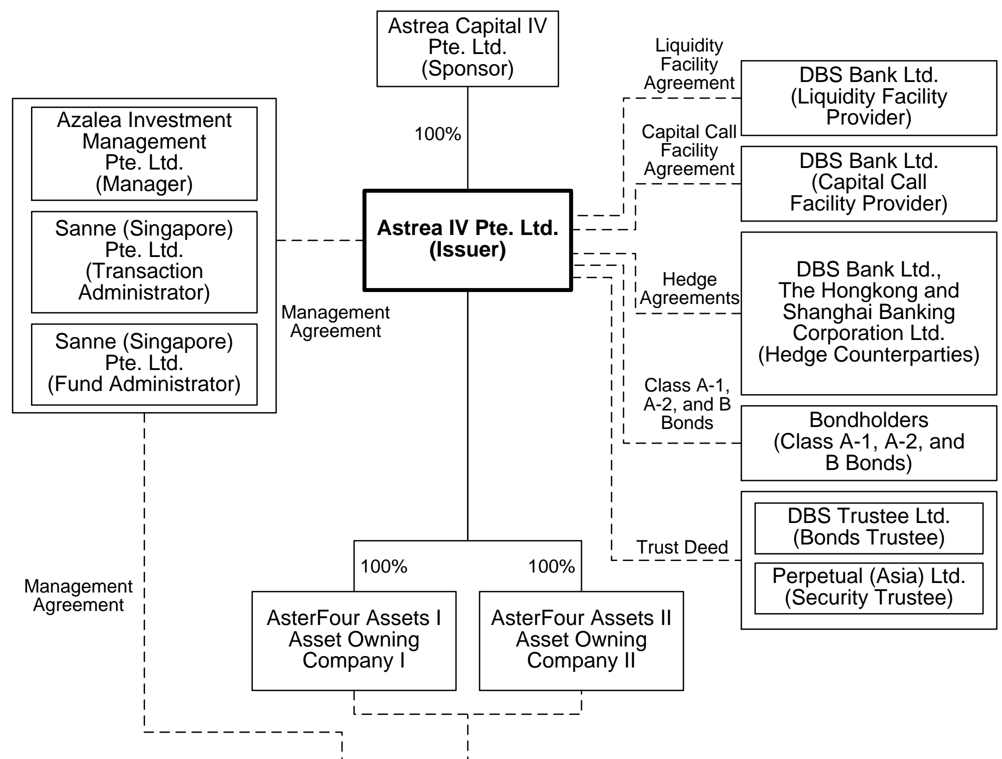
Private Equity CFOs Restart Post-Crisis (A Niche Asset Class Emerges from Dormancy) (April 2017)

Structure Overview

The issuer will be Astrea IV Pte. Ltd., a special-purpose entity that will be sole shareholder of two asset-owning companies (AOCs). The issuer's capitalisation will also include Class A-1, Class A-2, and Class B bonds. The net cash received by the issuer via the issuance of the bonds will be used by the AOCs to repay a certain portion of existing loans from the sponsor, Astrea Capital, which were incurred in connection with the AOCs' acquisition of the fund investments. Astrea Capital will be the sole shareholder of the issuer at launch.

The AOCs will hold the fund investments as limited partners (LPs) for each of the underlying interests. They will transfer cash distributions from the fund investments to the issuer, who will apply the distributions semi-annually in accordance with the Priority of Payments. No additional funds are permitted to be purchased and funds may only be sold under certain restrictions as described below, ensuring the portfolio is fixed through the course of the transaction. AsterFour Assets I Pte. Ltd. will hold 22 fund investments and AsterFour Assets II Pte. Ltd. will hold 14 fund investments. The structure of the AOCs and allocations of specific private equity funds to each AOC are for tax reporting purposes.

Structure Diagram



Source: Fitch Ratings, Transaction documents

Portfolio Overview

The portfolio is well diversified across a number of metrics, which will mitigate some of the risk from the uncertain nature of private equity cash flows. Accordingly, Fitch has not applied haircuts to the portfolio for concentration risk in its rating analysis.

Funds with a buyout strategy comprise 86% of the portfolio, funds with a growth equity strategy comprise 12%, with the remaining exposure in a private debt fund. The buyout emphasis mitigates the risk of uncertain cash flow distributions, as buyout mandates are typically invested in mature companies compared with growth equity investments, which typically involve companies that are profitable, but still maturing.

Geographically, the portfolio is U.S.-centric, with US-based funds accounting for 63% of the NAV while the remaining exposure is in Asia and Europe.

Many of the 27 GPs are large and established, but a number manage less money or have a shorter track record than the more established ones. However, the risk of GPs with a shorter track record or more limited resources is mitigated by their limited exposure in the portfolio. The portfolio is diversified by GP, with the three largest representing 11%, 8%, and 7% of the portfolio.

Astrea IV Portfolio

No.	Funds	Vintage	Geography	Strategy	Commit-ment (USDm)	NAV (USDm)	% of NAV	Undrawn capital commit-ments (USDm)	Total exposure (USDm)	% of total expo-sure
1	A8 - B (Feeder) L.P.	2012	Europe	Buyout	26.0	28.9	2.6	3.6	32.5	2.6
2	Apollo Overseas Partners (Delaware 892) VI, L.P.	2006	U.S.	Buyout	100.0	22.4	2.0	4.2	26.6	2.1
3	Apollo Overseas Partners VIII, L.P.	2013	U.S.	Buyout	30.0	26.5	2.4	8.3	34.8	2.7
4	Bain Capital Fund XI, L.P.	2014	U.S.	Buyout	30.0	27.6	2.5	8.0	35.6	2.8
5	Blackstone Capital Partners V L.P. and BCP V-S L.P.	2006	U.S.	Buyout	133.6	15.3	1.4	6.7	22.0	1.7
6	Blackstone Capital Partners VI, L.P.	2011	U.S.	Buyout	100.0	101.2	9.2	14.4	115.6	9.1
7	Carlyle Partners VI, L.P.	2013	U.S.	Buyout	30.0	29.7	2.7	3.5	33.2	2.6
8	Clayton, Dubilier & Rice Fund IX, L.P.	2013	U.S.	Buyout	30.0	21.8	2.0	7.2	29.0	2.3
9	Crestview Partners (TE), L.P.	2005	U.S.	Buyout	40.0	5.5	0.5	0.4	5.9	0.5
10	Crestview Partners II, L.P.	2008	U.S.	Buyout	50.0	42.2	3.8	9.3	51.5	4.1
11	CVC Capital Partners VI (B) L.P.	2014	Europe	Buyout	24.6	21.2	1.9	3.2	24.4	1.9
12	DBAG Fund VI (Guernsey) L.P.	2013	Europe	Buyout	24.6	20.7	1.9	3.3	24.0	1.9
13	EQT Mid Market (No.1) Feeder Limited Partnership	2013	Europe	Buyout	36.9	34.6	3.2	5.1	39.7	3.1
14	Hahn & Company I L.P.	2011	Asia	Buyout	37.0	39.2	3.6	1.1	40.3	3.2
15	Industri Kapital 2007 Limited Partnership IV	2007	Europe	Buyout	92.2	1.7	0.2	3.2	4.9	0.4
16	IK VII No.2 Limited Partnership	2012	Europe	Buyout	72.6	65.2	5.9	3.5	68.7	5.4
17	KKR Asian Fund II TE Blocker L.P.	2013	Asia	Buyout	25.0	27.8	2.5	3.6	31.4	2.5
18	KKR 2006 Fund L.P.	2006	U.S.	Buyout	25.2	4.3	0.4	0.4	4.7	0.4
19	KKR North America Fund XI L.P.	2012	U.S.	Buyout	30.0	41.1	3.7	3.2	44.3	3.5
20	Littlejohn Fund V, L.P.	2014	U.S.	Buyout	20.0	17.1	1.6	5.8	22.9	1.8
21	MatlinPatterson Global Opportunities Partners III L.P.	2007	U.S.	Buyout	100.0	49.1	4.5	2.4	51.5	4.1
22	Onex Partners IV LP	2014	U.S.	Buyout	20.0	14.5	1.3	5.0	19.5	1.5
23	PAG Asia I LP	2011	Asia	Buyout	79.0	75.5	6.9	7.8	83.3	6.6
24	Permira V L.P.1	2014	Europe	Buyout	33.2	37.1	3.4	5.4	42.5	3.4
25	Silver Lake Partners III, L.P.	2007	U.S.	Buyout	35.0	16.1	1.5	3.7	19.8	1.6
26	Silver Lake Partners IV, L.P.	2013	U.S.	Buyout	65.0	71.3	6.5	10.2	81.5	6.4
27	Tailwind Capital Partners (Cayman), L.P.	2007	U.S.	Buyout	25.0	10.2	0.9	2.6	12.8	1.0
28	TPG Partners IV, L.P.	2003	U.S.	Buyout	30.0	2.7	0.3	0.1	2.8	0.2
29	TPG Partners V, L.P.	2006	U.S.	Buyout	175.0	41.6	3.8	11.4	53.0	4.2
30	TPG Partners VI, L.P.	2008	U.S.	Buyout	35.0	17.0	1.5	1.8	18.8	1.5
31	Vista Equity Partners Fund V-A, L.P.	2014	U.S.	Buyout	15.0	17.0	1.5	3.1	20.1	1.6
32	FountainVest China Growth Fund, L.P.	2008	Asia	Growth equity	31.0	29.8	2.7	4.5	34.3	2.7
33	Raine Partners I LP	2010	U.S.	Growth equity	10.0	13.4	1.3	0.4	13.8	1.1
34	Trustbridge Partners II, L.P.	2007	Asia	Growth equity	27.0	26.5	2.4	1.3	27.8	2.2
35	Warburg Pincus Private Equity XI-B, L.P.	2012	U.S.	Growth equity	75.0	65.3	5.9	2.2	67.5	5.3
36	Offshore Mezzanine Partners II, L.P.	2012	U.S.	Private debt	40.0	17.3	1.6	8.2	25.5	2.0
Total – Astrea IV Portfolio		**2011**			**1,752.9**	**1,098.4**	**100.0**	**168.1**	**1,266.5**	**100.0**

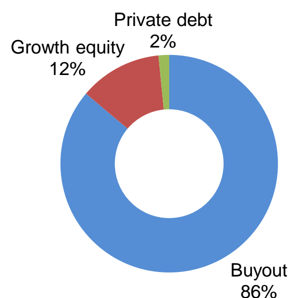
Source: Transaction documents, Fitch Ratings. As of 31 March 2018

Approximately 52% of Astrea IV's NAV falls in the top two performance quartiles based on data from Preqin Ltd. Six funds, consisting of approximately 16% of the portfolio's NAV, are in the bottom quartile of returns, which was reflected in Fitch's projections of performance.

Fitch believes the Astrea IV portfolio is well diversified across a range of holdings. The underlying company investments are spread across 596 companies. The largest holding accounts for approximately 2.6% of NAV.

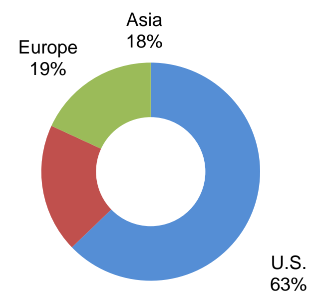
In addition to the diversification characteristics mentioned above, the funds are mature with low unfunded capital commitments, a weighted average vintage of 2011 and a weighted average investee company investment holding period of approximately 4.3 years, as shown below.

Portfolio NAV by Fund Strategy



Source: Transaction documents. As of 31 March 2018

Portfolio NAV by Geography



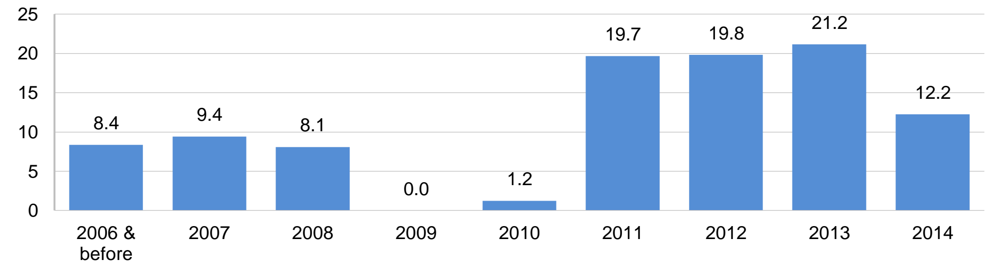
Source: Transaction documents. As of 31 March 2018

Underlying Investment Sector Breakdown

	(%)
Software and services	17.4
Healthcare equipment and services	6.8
Energy	6.7
Diversified financials	6.4
Consumer durables and apparel	6.1
Retailing	5.3
Technology hardware and equipment	5.2
Materials	4.8
Capital goods	4.3
Commercial and professional services	4.2
Consumer services	4.1
Media	3.9
Pharmaceuticals, biotechnology and life sciences	3.9
Food, beverage and tobacco	3.6
Transportation	3.4
Banks	2.5
Real estate	2.5
Telecommunication services	2.0
Automobiles and components	1.9
Utilities	1.7
Insurance	1.3
Food and staples retailing	1.0
Household and personal products	0.7
Semiconductors and semiconductor equipment	0.3

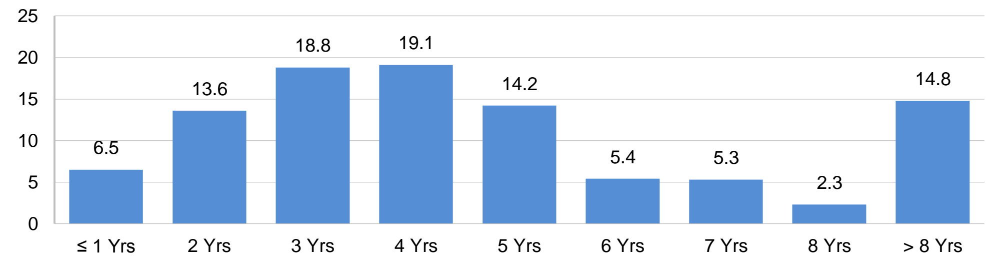
Source: Transaction documents. As of 31 December 2017

Portfolio NAV by Vintage Year
(% NAV)



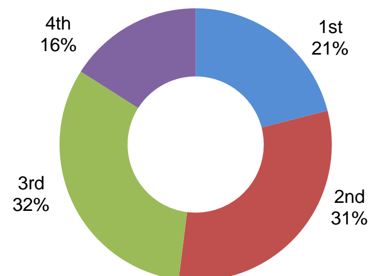
Source: Transaction documents. As of 31 March 2018

Portfolio NAV by Investment Holding Period
(% of NAV)



Source: Transaction documents. As of 31 December 2017

Fund Quartile % of NAV



Source: Preqin

Structural Protections and Security

Given the uncertain nature of private equity fund distributions and the reliance on market valuations, the transaction includes structural protections to allow the rated bonds to weather negative market cycles and depressed valuations when private equity distributions may be low. The Class A-1 and Class A-2 bonds both have a scheduled call date of five years, but these bonds as well as the Class B bonds have long legal maturities of 10 years, which should be sufficient to weather a market downturn. Fitch's ratings address the timely repayment of the bonds at their legal final maturities, rather than repayment at the earlier scheduled call dates. The Reserves Accounts for repayment of Class A bonds will retain cash distributions for the repayment of the Class A bonds until the scheduled call date or the Class A Reserve Accounts Cap is met. The structure also has a Capital Call Facility sized to the amount of unfunded commitments to the underlying funds and a Liquidity Facility to cover operating expenses and interest on the bonds. These features help mitigate the cyclicality of private equity funds that Fitch considered in its analysis.

Reserve Account

The USD181 million (US dollar equivalent of SGD242 million) principal amount of the Class A-1 bonds and the USD210 million Class A-2 bonds are to be reserved over their expected call dates and funded as provided in the Priority of Payments. Payments to the reserve account will be made on semi-annual Distribution Dates to provide sufficient funds to fully repay both the Class A-1 bonds and the Class A-2 bonds at year five, as per the table below. Additionally, Clause 14 of the Priority of Payments allows for additional payments to the Reserves Accounts when the performance threshold is met.

Reserve Account

Distribution date	Total Class A-1 & A-2 reserve amount (USDm)
December 2018	40
June 2019	40
December 2019	40
June 2020	40
December 2020	40
June 2021	39
December 2021	39
June 2022	39
December 2022	39
June 2023	39
Total (USD)	395

Source: Transaction documents

If available cash on any Distribution Date is insufficient to satisfy the Reserve Amount, the unpaid balance carries forward to subsequent Distribution Dates until paid through the Priority of Payments. Amounts transferred to the Reserve Account are capped (the Reserves Accounts Caps) at USD395 million, which is the combined principal amount of the Class A-1 and A-2 bonds.

If, at end-of-year (EOY) five on the Scheduled Call Date of the Class A-1 and Class A-2 bonds, the total balance of the Reserves Accounts and Reserves Custody Account is at least equal to the principal of the Class A-1 bonds and there is no balance drawn on the Liquidity Facility then the Class A-1 bonds will be fully redeemed. If the total balance is equal to the aggregate principal of the Class A-1 bonds and Class A-2 bonds and no balance is drawn on the Liquidity Facility then the Class A-2 bonds will also be redeemed.

Scheduled Call Date Scenarios

Balance of reserves account at the scheduled call date	Class A-1 bonds status	Class A-2 bonds status
Less than the principal amount of the Class A-1 bonds	Not redeemed	Not redeemed
Greater than or equal to the principal of the Class A-1 bonds but less than the aggregate principal amount of the Class A-1 and A-2 bonds	Redeemed	Not redeemed
Greater than or equal to the aggregate principal amount of the Class A-1 and A-2 bonds	Redeemed	Redeemed

Source: Transaction documents. Assumes there is no balance drawn on the liquidity facility

The issuer may not partially redeem either the Class A-1 or Class A-2 bonds. If the Reserves Accounts were partially funded at or following the Scheduled Call Date additional funds would be diverted to the Reserves Accounts in accordance with Clause 8(ii) at each distribution date. If the balance of the Reserves Accounts is sufficient to redeem the Class A-1 bonds and/or Class A-2 bonds as described above at a subsequent distribution date, the specific class of bonds would be redeemed in full at that distribution date.

In a default scenario, the Class A-1 and Class A-2 bonds have equal claim on monies in the Reserves Accounts. Outside of a default scenario, under expected case scenarios the Class A-1 and Class A-2 bonds are likely to be called and paid off at the same time, but under more stressful conditions the Class A-1 bonds may be called and paid off before the Class A-2

bonds. Fitch believes these dynamics support assigning the same rating to the Class A-1 and Class A-2 bonds, and not differentiating between the ratings.

Liquidity Facility

The Liquidity Facility is a senior standby multi-currency liquidity facility established with DBS Bank Ltd. (DBS; AA−/F1+) to fund the issuer's and AOCs' taxes, administrative expenses, management fees, hedging-related payments and interest payments on the Class A-1, Class A-2 and Class B bonds in the event of a cash flow shortfall. The Liquidity Facility fully matures upon the earlier of EOY 10 or the date on which all classes of bonds are fully redeemed (Termination Date). The facility steps down in accordance with the table below:

Liquidity Facility

Step-down provision	Amount (USDm)
Years 1-3 of the transaction	100.0
Years 4-5 of the transaction	80.0
Year 6 of the transaction through the termination date	15.0

Source: Transaction documents

Interest on the amount drawn is paid at a rate of the relevant London Interbank Offering Rate (LIBOR) plus 2.0%. There is an annual 70 basis point (bp) commitment fee on the undrawn portion.

Per clause 4 of the Priority of Payments in Appendix A, any cash in the Operating Account on any Distribution Date will be used to pay the Liquidity Facility, up to the lesser of the outstanding loan balance or the full amount of cash in the Operating Account. Any loan amount outstanding after this payment is repayable on the next Distribution Date if there is sufficient cash in the Operating Account. In any event, the full amount of the loan balance must be repaid by the Termination Date.

DBS can cancel the commitment or declare the outstanding amount due and payable if there is an event of default under the Liquidity Facility agreement. Such events include non-payment of loan principal or interest when due, insolvency or non-payment of any debt of the issuer and any event of default under the bonds.

The liquidity facility provider will be replaced if the liquidity provider's rating falls below the lower of 'BBB+' and 'F2' or the then prevailing rating of the most senior class of bonds (Liquidity Facility Provider Minimum Rating Requirement), provided the replacement would not cause a downgrade to the then prevailing rating of the most senior class of bonds. The documents provide that the issuer and lender make "commercially reasonable" efforts to effect the replacement within 30 days.

Fitch's *Structured Finance and Covered Bonds Counterparty Rating Criteria* serves as the operative criteria report for analysing Astrea IV's counterparties. The criteria states that a direct support counterparty, such as a liquidity provider, would be expected to have a long-term rating of 'BBB' or a minimum short-term Issuer Default Rating of 'F2', without the need to post collateral, to support structured finance note ratings at the level of 'A', which is the rating on the Class A-1 and Class A-2 bonds. If in the future, the Liquidity Facility provider is downgraded below these levels and is not replaced, and the Liquidity Facility is determined at that time to be material to the ratings, the rating of the senior-most bonds outstanding at that time could potentially be capped at the then current rating of the Liquidity Facility provider.

Capital Call Facility

The Capital Call Facility is a standby multi-currency liquidity facility established with DBS to fund any capital calls that are in excess of the available cash in the Operating Accounts (Shortfall Amounts) and for payments under Clause 11(ii) and Clause 11(iii) of the Priority of Payments. The Capital Call Facility fully matures upon the earlier of EOY 10 or the date on

which all classes of bonds are fully redeemed (Termination Date). The facility will initially be sized to the amount of the aggregate of all Undrawn Capital Commitments of the issuer as of the most recent month end. The facility will step down on a monthly basis starting after the Issue Date. The step down will resize the facility to the sum of the aggregate of all Undrawn Capital Commitments as of each date and the total loan outstanding on the Capital Call Facility as of each date.

Interest on the amount drawn is paid at a rate of the relevant London Interbank Offering Rate (LIBOR) plus 2.25%. There is an annual 70bp commitment fee on the undrawn portion.

Per Clauses 11(ii) – 11(iv) of the Priority of Payments in Appendix A, any funds remaining after Clauses 1 – 11(i) of the Priority of Payments will be used to pay commitment fees, interest expenses and any other payables, and principal repayment on the Capital Call Facility. Any loan amount outstanding after this payment is repayable on the next Distribution Date if there is sufficient cash in the Operating Account. In any event, the full amount of the loan balance must be repaid by the Termination Date.

DBS can cancel the commitment or declare the outstanding amount due and payable if there is an event of default under the Capital Call Facility agreement. Such events include non-payment of loan principal or interest when due, insolvency or non-payment of any debt of the issuer and any event of default under the bonds.

The Capital Call Facility provider will be replaced if the provider's rating falls below the lower of 'BBB+' and 'F2' or the then prevailing rating of the most senior class of bonds (Capital Call Facility Minimum Rating Requirement), provided the replacement would not cause a downgrade to the then prevailing rating of the most senior class of bonds. The documents provide that the issuer and lender make "commercially reasonable" efforts to effect the replacement within 30 days.

Fitch's *Structured Finance and Covered Bonds Counterparty Rating Criteria* serves as the operative criteria report for this ratings analysis. The criteria states that a direct support counterparty bank would be expected to have a long-term rating of 'BBB' or a minimum short-term Issuer Default Rating of 'F2', without the need to post collateral, to support structured finance note ratings at the level of 'A', which is the rating on the Class A-1 and Class A-2 bonds. If in the future, the Capital Call Facility provider is downgraded below these levels and is not replaced, and the Capital Call Facility is determined at that time to be material to the ratings, the rating of the senior-most bonds outstanding at that time could potentially be capped at the then current rating of the Capital Call Facility provider.

Maximum LTV Ratio

The Priority of Payments provides for the deleveraging of the issuer on any Distribution Date at which LTV exceeds 50% (Maximum LTV Ratio). The purpose of this feature is to deleverage the structure to protect bondholders from the risk of portfolio valuation declines or the risk of cash flow exiting the structure too quickly and rendering the portfolio too small to provide sufficient distributions to support the bonds.

LTV is calculated as the outstanding balance of the Liquidity Facility, Capital Call Facility, and the bonds (net of the Class A-1 and Class A-2 Reserves Accounts balance and any principal repayments on the Class B bonds) divided by the total portfolio NAV. If LTV exceeds the Maximum LTV Ratio, 100% of cash flow remaining after payment of amounts due under clauses 1 through 9 of the Priority of Payments in Appendix A will be paid to the Reserves Accounts in accordance with Clause 10. If the Class A-1 and Class A-2 Reserves Accounts Cap has been met, the cash flows will be applied to principal repayment of the Class B bonds until the Maximum LTV Ratio is no longer exceeded. Payments to the Reserves Accounts under the Maximum LTV Ratio are subject to the Reserves Accounts Caps.

Hedging

Full principal on the Class A-1 bonds and semi-annual interest is payable in Singapore dollars, unlike the other bond classes, which are payable in US dollars. The fund investments are denominated in US dollars and euros, creating a currency mismatch between Astrea IV's assets and liabilities. The issuer will employ hedge agreements to mitigate the risk that volatility in foreign exchange rates may negatively affect the cash flows needed to fund the required payments under the bonds.

Fitch notes clause 13 of the priority of payments is a “flip clause”, which places any termination payments due to a hedge counterparty that is in default in a junior position in the transaction's priority of payments. The purpose of this provision is to mitigate the potential impact caused by the default or non-performance of the counterparty. In case the issuer does not pay a hedge counterparty, the transaction documents include a “non-petition” clause that prevents the counterparty from causing the issuer to file for bankruptcy.

Class A-1 Bonds – Principal Amounts

To mitigate the Class A-1 bonds' foreign currency (FX) mismatch risk, the issuer has entered into a series of forward contracts to buy Singapore dollars and sell US dollars to hedge 100% of the principal amount of the Class A-1 bonds.

The issuer will take delivery of the SGD242 million to fully repay the Class A-1 bonds across a series of fixed forwards that will be settled before the scheduled call date. If, for any forward contract, the Reserves Account is funded with less than the amount required to settle the forward contract, the issuer will settle the forward for the amount of US dollars that has been accumulated. For the underfunded US dollar amount, the issuer has the discretion to roll-over the hedge by entering into a six-month or longer FX forward transaction with the counterparty. The forward transaction will result in cash flows to the issuer based on the difference between the initial forward transaction versus the spot rate of the new forward. There would be a net cash inflow if the US dollar has depreciated and a net cash outflow if the US dollar has appreciated since closing.

At the discretion of the issuer, if at year 5.5 the Reserves Accounts are still not fully funded, the roll-over process would be repeated with another six-month FX forward for the underfunded USD amount. The FX forward would expire at the next Distribution Date and at the issuer's discretion, the process would repeat until Class A-1 bonds are fully repaid.

If the Reserves Account is funded with less than the USD amounts required to settle the hedge, the issuer will be required to make a payment to the counterparty to settle the hedge if the US dollar appreciated against the Singapore dollar compared to the forward rate. However, this situation is unlikely because even under the adverse scenarios Fitch modeled, Fitch's analysis indicates there will be sufficient funds in the Reserve Account to fully settle the hedge for the Class A-1 bonds.

Class A-1 Bonds – Interest Amounts

At closing, the issuer will enter into ten separate forward contracts in amounts to fully match the ten semi-annual interest payments on the Class A-1 bonds with either of the hedge counterparties.

If the Reserves Accounts are underfunded at the scheduled call date of the Class A-1 bonds, the issuer may enter into a six-month forward contract for the interest payment due at year 5.5. If at year 5.5 the Reserves Accounts are still not fully funded, it will be at the discretion of the issuer to enter into a new six-month forward contract for the interest payment due at the next Distribution Date and, at the issuer's discretion, continue the process until the Class A-1 bonds are fully repaid.

Euro NAV Hedge

FX risk in the portfolio is manageable, as the bulk of fund investments provide distributions in USD. Of the 36 funds in the portfolio, six funds, totaling about USD181 million of NAV (16% of total NAV), call capital and make distributions in euros. To mitigate FX risk posed by the euro-denominated funds (compared to the US dollar and Singapore dollar denominated bonds), the issuer has entered into a series of fixed forward contracts (with fixed forward rates and fixed forward dates), ranging in tenor from six months to five years, to hedge approximately 50% of the initial euro NAV, subject to change before closing. The tenors and notional amounts of euro hedges are set to match the projected euro NAV distributions and are subject to change until closing.

As the timing and amounts of distributions from private equity funds are uncertain, fully hedging the FX exposure is impossible. Not hedging at all would leave Astrea IV vulnerable to significant FX exposure, but attempting to hedge 100% of NAV could still leave the structure over-hedged and exposed to FX risk if distributions come in lower than projected and the FX moves against the structure when it needs to settle the forwards. Hedging a sufficient portion of the NAV, and providing the manager flexibility to hedge further over time if deemed necessary is a prudent approach, in Fitch's opinion.

Any underperformance in the euro-denominated funds would create an additional foreign exchange risk, as the structure is required to deliver Euros for each foreign exchange hedge as they become due. As discussed later in this report in "Euro Hedge Stresses", Fitch conducted stress scenarios to model the sensitivity of the structure to underperformance in European funds and to adverse moves in USD/EUR exchange rates and the rated bonds passed at their assigned rating levels.

Hedge Counterparties

Hedge counterparties are DBS and The Hongkong and Shanghai Banking Corporation Limited (AA−/F1+), with whom the issuer has set up separate international Swaps and Derivatives Association Master Agreements. The hedge counterparty will be replaced if the counterparty's rating falls below the lower of 'BBB+' and 'F2' or the then prevailing rating of the most senior class of bonds (Hedge Counterparty Minimum Rating Requirement), provided the replacement would not cause a downgrade to the then prevailing rating of the most senior class of bonds. The documents provide that the issuer and lender make "commercially reasonable" efforts to effect the replacement within 30 days.

Although Fitch currently rates the hedge counterparties well above the minimum direct support criteria guidelines, if a downgrade below these levels were to occur and the replacement of the counterparty materially extends beyond the 30-day window, Fitch would review the circumstances at that time to determine if a rating action, which could potentially include capping the rating of the senior-most bonds then outstanding at the then current rating of the downgraded hedge counterparty, would be warranted.

Euro NAV Hedge

No.	Forward tenor	Euro hedge amount (EURm)
1	0.5 year	7
2	1 year	7
3	1.5 year	9
4	2 year	14
5	2.5 year	14
6	3 year	14
7	3.5 year	8
8	4 year	6
9	4.5 year	4
10	5 year	1

Source: Transaction documents

Disposal Option

Astrea IV has the ability to sell stakes in the underlying private equity fund interests at the manager's discretion ("Disposal Option"), with certain restrictions. The manager may exercise the Disposal Option multiple times; however the aggregate NAV of underlying funds that can be sold prior to the full redemption of all bonds may not be greater than 10% of the aggregate initial NAV. Proceeds from the sale or disposal of any underlying fund interests will be received in the Collection Accounts and then swept into the Operating Accounts.

At each Distribution Date, if net cash proceeds have been received from exercising the Disposal Option, any cash proceeds from the Disposal Option remaining after Clauses 1 – 6 of the waterfall will be applied in accordance with Clause 7. Clause 7 dictates that any proceeds from the Disposal Option will be applied to the Reserves Accounts of the Class A-1 and Class A-2 bonds. If the bonds are fully reserved, the Disposal Option proceeds will be applied to principal repayment of the Class B bonds. Fitch views the disposal option as a positive, as it may allow the manager to realise some of the outstanding NAV if organic distributions from that NAV come in lower or slower than needed to pay Astrea IV's liabilities.

Cash Flow Scenario Analysis

As described in the criteria *Rating Closed-End Funds and Market Value Structures*, in rating PE CFOs, Fitch reviews the structure's projected performance and distributions over different market cycles to assess whether cash flows are sufficient to pay off the rated obligations based on the transaction's structural features.

The performance scenarios for Astrea IV were constructed based on historical data that matched some specific characteristics of Astrea IV's portfolio, primarily the types of funds (buyout, growth equity, or credit) and the age of the funds. For example, about 20% of Astrea IV's portfolio comprises 2013 private equity buyout funds, which are approximately five-year old funds as of the launch of Astrea IV. As a result, Fitch reviewed how five-year old buyout funds performed over different economic cycles. These scenarios correspond to previous economic cycles observed over 10-year intervals, to match the legal final maturity of the Astrea IV rated bonds. For example, in one scenario we have reviewed how a portfolio similar to Astrea IV's current profile would have performed during the 10-year period between 2000 and 2010, which in the charts below we refer to as the start-year 2000 scenario (labelled "2000"). The key data points in the analysis are (1) how much capital the underlying funds called, (2) how much capital the underlying funds distributed and (3) what was the NAV appreciation or depreciation that was driving distributions.

In addition, Fitch stressed the resilience of the structure to potential underperformance in Astrea IV's underlying funds. While Astrea IV's portfolio comprises funds of a relatively even mix of performance as measured by quartiles assigned by third-party data providers, in some of the scenarios Fitch ran, all of the funds' performance was assumed to have deteriorated to 3rd quartile or 4th quartile levels, which negatively affected their projected distributions and other performance measures. In measuring the results of the scenarios, Fitch focused on certain metrics, primarily the ability to make timely interest and principal payment with respect to the legal final maturities of the rated bonds, as well as total cash flow coverage of the rated bonds, total cash flow as a percentage of the transaction NAV, cash flow coverage of fees and expenses, and how various structural protections drove performance of the transaction (LTV triggers, reserve account, Liquidity and Capital Call Facilities and so on).

Results

The 'Asf' rating of the Class A-1 and Class A-2 bonds is supported by the fact that under all fourth quartile performance projections Fitch ran the Class A-1 and Class A-2 bonds made all timely interest and principal payments with respect to their legal final maturity of 10 years. In all cases, the Class A-1 bonds were called on the scheduled call date (fifth year) with the ratios of distributed cash coverage to the Class A-1 principal amount varying between 1.9x and 2.9x in

the different scenarios. The Class A-2 bonds were called by the scheduled call date in 11 out of 17 scenarios and distribution coverage ratios varied between 1.4x and 2.0x. The Class A-2 bonds were called in year six under the most punitive scenario.

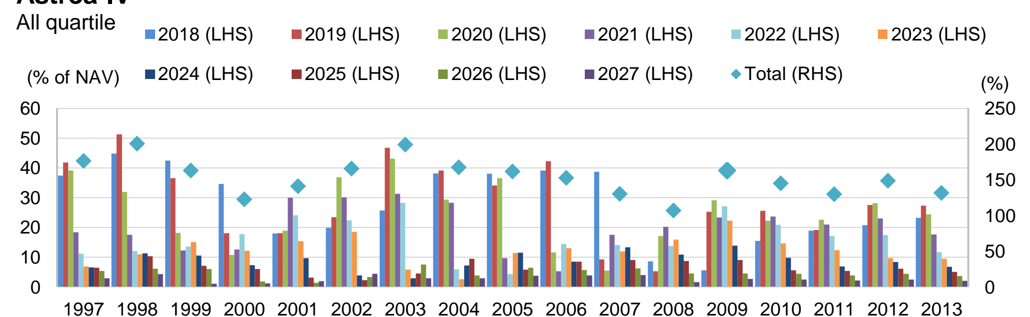
The 'BBBsf' rating of the B bonds is supported by the fact that under all third quartile performance projections Fitch ran the B bonds made all timely interest and principal payments with respect to the legal maturity of the B bonds of 10 years. The principal payback period for the Class B bonds varied between five and seven years. Cash flow coverage varied between 1.8x and 2.5x for the B bonds.

Generally, the more negative scenarios for the B bonds are those where the 10-year life of the deal starts with a strong market cycle, but turns negative midway. For example, in the start year 2003 scenario the portfolio is projected to generate very strong distributions in the first five years of the transaction, but then enters the 2008 financial crisis and generates much weaker performance for the next five years. In this scenario, while over the life of the deal total cash distributions are high, in the first five years the scheduled reserve payments are made for the Class A-1 and Class A-2 bonds, but much of the strong distributions flow out of the structure to the equity holders.

Since the B bonds do not start being repaid until the Class A bonds are repaid, at the earliest in year five, the B bonds do not benefit from the portfolio's strong distributions in the first five years, but only start receiving cash sweeps in the weak years 6-10. In very stressful scenarios, where the Class A-1 or Class A-2 bonds are called later than year five because the Reserves Accounts are not full, the B bonds will have even less time to be paid off via realised distributions. However, the disposal option discussed above is an additional positive qualitative factor to consider, which was not specifically modelled in the scenarios Fitch ran since it is at the discretion of the manager. By exercising the disposal option the manager may accelerate realisation of the NAV on the secondary market, although likely at a steep discount in a stressed market.

% NAV Distributed Per Launch Year Scenario Over Projected 10-Year Life of Astrea IV

All quartile



Source: Fitch Ratings

Euro Hedge Stresses

Given the portfolio's exposure to European funds that distribute NAV in euros, Fitch considered the impact of potential foreign exchange fluctuation on the structure. As outlined in Fitch's *Rating Closed-End Funds and Market Value Structures Criteria*, in a few of the most adverse scenarios, we ran some stresses where we fully discounted the portion of NAV from euro-denominated funds that was not hedged. These results were not materially different from the base case scenario due to the relatively small euro NAV exposure in the portfolio. For example, assuming fourth quartile performance, the Class A-1 Bonds were called on the scheduled call date in all scenarios with cash flow coverage ratios varying between 1.7x and 2.6x, compared to the base case of 1.9x and 2.9x. The Class A-2 Bonds were called in year seven in the most punitive scenario with cash flow coverage ratios varying between 1.2x and 1.8x, compared to the base case of 1.4x and 2.0x. Finally, assuming third quartile performance, the Class B Bonds were called in year 7.5 in the most punitive scenario with cash flow coverage ratios varying between 1.6x and 2.3x, compared to the base case of 1.8x and 2.5x.

In addition to the stresses noted above, which we view as unlikely, for informational purposes we also ran some FX stress scenarios based on what we view as more reasonable stress assumptions for FX moves. In these assumptions about USD/EUR moves, Fitch considered the risk of adverse foreign exchange fluctuation along with the uncertainty in timing fund distributions, and their effect on the structure's ability to timely repay the bonds as outlined in 'Fitch's Foreign-Currency Stress Assumptions for Residual Foreign-Exchange Exposures in Covered Bonds and Structured Finance' criteria. These stresses were applied to evaluate scenarios where the euro appreciates and depreciates against the US dollar, as the structure is required to deliver euros at the maturity of each hedge as described in the section above on hedging. The euro-denominated distributions were adjusted at each payment date in accordance with the scheduled hedge amount to evaluate the impact on the portfolio's total fund distributions under all quartile, third quartile and fourth quartile fund performance scenarios.

Using fourth quartile fund performance projections, the worst performance was observed in the launch year of 2013 and the scenario where the euro depreciates against the US dollar. Under this scenario the Class A-1 bonds made all timely interest and principal payments with respect to their scheduled call date with cash flow coverage of 1.7x, compared to the no FX stress cash flow coverage of 1.9x. The payback period on the Class A-2 bonds was extended to year 7.5 and the cash flow coverage was 1.2x, compared to the no FX stress where the payback period was six years with cash flow coverage of 1.4x.

Under the third quartile fund performance projections, the worst performance was observed in the launch year of 2004 and the scenario where the euro depreciates against the US dollar. The Class A-1 and Class A-2 bonds made all timely interest and principal payments with respect to their scheduled call date with cash flow coverage of 3.6x and 2.4x, respectively, compared to the no FX stress where cash flow coverage was 3.9x and 2.7x, respectively. The Class B bonds payback period was extended to year 7.5 and the cash flow coverage was 2.1x, compared to the no FX stress, where the payback period was seven years and the cash flow coverage was 2.3x. In all cases, the performance metrics were in line for each of the bonds' ratings.

Valuations

Private equity fund valuations are made available quarterly on an unaudited basis and annually on an audited basis. GPs apply various valuation methods (discounted cash flow analysis, multiple analysis and so on) to the underlying holdings of the fund, usually incorporating the trailing 12 months' financial performance of each asset. Valuations are made as of a certain date and are reported to the LPs a few months following the valuation reference date. Valuation methods can vary from fund to fund, as managers have discretion on the applied techniques. However, these valuations are generally prepared in accordance with International Financial Reporting Standards or generally accepted accounting principles in the US or elsewhere.

The initial valuation of Astrea IV was based on the audited NAV of the funds as of 31 March 2018 which were based on the most recent available financial statements of the underlying interests at the time of audit. The NAV valuations for each fund were adjusted for any capital calls or distributions made between the time of valuation and 31 March 2018 and audited. A risk exists that a market downturn occurs between the valuation dates of each underlying fund and the launch of Astrea IV, which would adversely affect the LTV of the structure.

Going forward, valuations will be made at each Distribution Reference Date based on the most recent audited or unaudited NAVs provided by the underlying GPs. These are reported by the GPs quarterly, typically with a 45-60 day delay. The valuations will be based on the most recent valuations provided by each GP and adjusted for any distributions (subtracted from NAV) or capital calls (added to NAV) made between the reference date of the GP's valuation and the Distribution Reference Date of Astrea IV's bonds.

Fitch reviewed a sample of both the audited valuations of the LP interest and the unaudited valuations of the underlying companies in the funds and has found them to be reasonable. When reviewing the valuations Fitch focused on the range of metrics applied to the underlying companies such as the discount rate applied for discounted cash flow analyses and the multiples applied for multiples based valuations. These figures were compared across funds and also to publicly valued companies.

Fitch reviewed data outliers in both the valuations of the LP interests and the valuations of the underlying companies. These valuations were reviewed for reasonableness using available resources including financial statements, company websites, and investor letters. The valuation methodologies for the identified companies were determined to be reasonable.

Ratings Sensitivity to Account Investments

The funds in the Reserves Accounts may be placed in security instruments or bank deposits in accordance with the Eligible Investments and Eligible Deposits definitions contained in the Astrea IV Master Definitions and Interpretation Schedule (MDIS). The transaction documentation permits these investments to mature as late as the scheduled call date, which significantly exceeds the maturity levels contemplated in Fitch's counterparty criteria as it relates to eligible investments. Owing to the significant long-dated exposure bondholders may have to investment counterparties, the ratings of the Astrea IV bonds will be capped at the ratings of investments in the Reserves Accounts, or the ratings allowed for investments in the Reserves Accounts by the transaction documentation, whichever is lower. Therefore, if a security in the Reserves Accounts is downgraded in the future below the ratings of the Class A bonds, the ratings of the bonds may also be downgraded, based on the materiality of the exposure.

The transaction documents specify that investments in securities require a rating of at least 'AA−' by Fitch. Bank deposits are required to be invested with banks rated at least 'AA−' by Fitch for amounts covering the Class A-1 bonds principal, while for amounts above the principal of the A-1 bonds the banks have to be rated at least 'A+' by Fitch. As noted above, the documents permit these investments to mature at the scheduled call date, or if the call date is

missed, mature by the next distribution date. In the case of deposits, a downgrade below the minimum levels require the account bank to be replaced within 30 days by a bank meeting the transaction documents' minimum rating requirements.

Since these ratings on the investments are higher than the ratings of the senior bonds, capping and linking the ratings of the Astrea IV bonds to the investments does not affect the senior bond assigned ratings at launch. However, absent mitigants, in the event of a future downgrade to an investment or deposit institution, Fitch criteria would call for the rating on the Astrea IV bonds to be capped at the downgraded rating of the investment or institution, if the exposure is deemed material.

Parties to the Transaction

Counterparty	Function	Fitch Rating
DBS Bank Ltd.	A-1 Bond/Euro NAV hedge counter party and Accounts Bank	AA−/F1+
The Hong Kong and Shanghai Banking Corporation Limited	A-1 Bond/Euro NAV hedge counter party	AA−/F1+
DBS Trustee Limited	Bonds trustee	NR
Perpetual (Asia) Limited	Security trustee	NR

Source: Transaction documents

The Manager

Fitch considers Azalea Investment Management (the Manager) suitably qualified, competent and capable of executing its transaction functions as the investment manager of Astrea IV. The Manager is located in Singapore and is a Private Equity specialist. It was set up in 2016, and is a wholly owned subsidiary of Azalea Asset Management and ultimately Temasek Holdings Private Limited.

While the Manager has a short track record as an independent entity, Azalea's management team has extensive experience and institutional knowledge in the private equity sector, and it draws on and benefits from its connection with Temasek. Temasek and its affiliates have been investing in private equity funds for over two decades and remain active in this space. Additionally, Temasek and its affiliates have successfully launched three prior Astrea vehicles as described in the section "Previous Astrea Vehicles". However, Temasek and its affiliates are not providing financial support to the bonds or the transaction.

Azalea's responsibilities as the manager include monitoring private equity fund performance, administering key fund matters, monitoring the performance of the transaction administrator and fund administrator, supervising the administration of assets and bonds, operation of the Liquidity Facility, Capital Call Facility, and cash flows in accordance with the Priority of Payments, managing investor relations and reporting to stakeholders, cash management, hedging of non-USD assets and obligations and supervising the affairs of the issuer and AOCs.

Either the issuer or the two AOCs can terminate the services of Azalea as manager for a termination event as specified in the management agreement, such as breach of duty or bankruptcy. Absent the occurrence of a specific termination event, either the issuer or the two AOCs can terminate the manager with 90 days written notice. Upon any termination of Azalea from the role of manager, the issuer and AOCs will use commercially reasonable efforts to appoint a substitute manager who agrees to perform the requisite duties and whose appointment would not result in a downgrade to the then prevailing rating of the most senior class of bonds. Upon receipt of termination notice, the manager will use commercially reasonable efforts to assist the issuer and AOCs in the appointment of a substitute.

Alternatively, Azalea may choose to resign from the role of manager by providing 90 days written notice, however the resignation will not be effective until a replacement that will not result in a downgrade to the then prevailing rating of the most senior class of bonds is found. In

the event the AOCs do not appoint a substitute within 90 days of the resignation date, Azalea may select as substitute an entity willing to perform the requisite duties and whose selection will not result in a downgrade of the then prevailing rating of the most senior class of bonds. Fitch believes these terms provide a sufficient procedural framework to find a suitable manager in the unlikely event it should become necessary.

Fullerton Fund Management Company Ltd. (Fullerton) acted as the manager of Astrea III. For Astrea IV, Fullerton will be advising the Manager on managing the cash and foreign exchange hedges of Astrea IV. Fullerton is licensed under the Securities and Futures Act and regulated by the Monetary Authority of Singapore (MAS). Fullerton has been regulated by the MAS since 2004 and holds a Capital Markets Services License issued by the MAS for carrying on business in fund management with all types of investors. As of 31 January 2018, Fullerton had total assets under management of SGD17.9 billion.

The Fund Administrator and Transaction Administrator

Sanne (Singapore) Pte. Ltd. will act as both the fund administrator and transaction administrator. Fitch determined Sanne (Singapore) Pte. Ltd. has the capability to satisfactorily fulfil the requirements of these roles and believes Azalea provides an effective level of oversight.

Sanne (Singapore) Pte. Ltd. is part of the Sanne Group, a global provider of alternative fund and corporate administration services, with offices across the Americas, EMEA and Asia-Pacific and Mauritius. Sanne has in excess of GBP200 billion of assets under administration, globally employs in excess of 1,200 people (including 200 dedicated to servicing PE investment vehicles) and provides administrative services to over 500 structures and funds.

Responsibilities of the fund administrator include reviewing capital calls received from GPs and arranging for payment, reviewing distribution notices received from GPs and monitoring the receipt of monies, maintaining the fund investments repository and information database for the manager's reference, and preparing all necessary reports for the AOCs, including for tax and administrative purposes.

Responsibilities of the transaction administrator include administrative services on behalf of the manager and issuer to facilitate payments in accordance with the waterfall and making calculations regarding the Maximum LTV Ratio.

The fund administrator and the transaction administrator will be subject to termination, resignation and replacement provision similar to those of Azalea as manager, as outlined above.

Alignment of Interests

Fitch observes an alignment of interests in this transaction between the sponsor and bondholders given the sponsor's equity commitment in the transaction. The sponsor, Astrea Capital, will be the sole owner of the equity tranche upon launch of the transaction, and Astrea Capital intends to maintain its equity position. As the owner of the equity, the sponsor will bear any losses of the structure prior to bondholders, providing for the alignment of interests.

Previous Astrea Vehicles

Astrea IV is the fourth series of the Astrea platform and the second PE CFO to be launched by Azalea. Azalea currently holds equity interests in Astrea I, Astrea II, Astrea III and Astrea IV.

Astrea I was launched in 2006 and was intended to be the first transaction of a series of products based on portfolios of diversified private equity funds. The underlying portfolio consisted of 46 private equity interests sourced from Temasek entities, with an adjusted NAV at launch of USD534 million. Two classes of notes were issued with senior notes totalling 35% of the transaction and subordinated notes totalling 25% of the transaction. An additional two

classes of unrated subordinated instruments were issued totalling 18% and 22% of the transaction. Astrea I's rated notes performed throughout their life, including the global financial crisis, and were fully repaid ahead of maturity in 2011. A Temasek entity was the largest investor in the two classes of Astrea I's subordinated instruments. Fitch did not rate the Astrea I transaction.

Astrea II was launched in 2014 and broadened the investor base of the Astrea platform to institutional investors, including sovereign wealth funds, pension funds, insurance and endowment funds. The underlying portfolio consisted of 36 private equity interests sourced from Temasek entities with a NAV at launch of USD1.1 billion. No debt was issued by the structure, as all investors purchased portions of the equity of the structure. Similar to the other Astrea transactions, a Temasek entity was the single largest investor in the transaction.

Astrea III was launched in 2016 with an underlying portfolio of 34 private equity interests, the majority of which were sourced from Temasek entities with a NAV at launch of USD1.1 billion. Fitch rated the Class A-1, A-2 and B notes of the transaction.

The evolution of the Astrea platform displays the commitment of Azalea to develop an investment platform based on diversified portfolios of private equity funds. Fitch views this commitment positively in terms of the alignment of interests between the sponsor and bondholders.

Key Changes from Astrea III

Azalea continues to evolve its Astrea platform, and has made a number of key changes to the structure between Astrea III and Astrea IV, as discussed below.

One such structural difference between Astrea IV and Astrea III is Astrea IV's fixed Maximum LTV Ratio of 50%. Astrea III featured a step-down Maximum LTV Ratio which started at 45% and declined throughout the life of the transaction, which forced earlier deleveraging in modelled stress scenarios and required more NAV to support the rated bonds in the transaction's later years compared to Astrea IV. Astrea IV also features larger rated debt tranches than Astrea III, accounting for 46% of Astrea IV's NAV versus 39% of NAV for Astrea III. These changes make Astrea IV somewhat less resilient to extreme stress than Astrea III, although both transactions meet Fitch's stress requirements for Astrea III's Astrea IV's assigned ratings, in both cases 'Asf' for the Class A-1 and Class A-2 notes/bonds, and 'BBBsf' for the Class B notes/bonds at launch.

Astrea IV features the Disposal Option which allows the manager to sell underlying private equity fund interests for the benefit of the bondholders. The Disposal Option provides an additional source of cash to pay obligations. Astrea III did not feature a Disposal Option and was not permitted to sell any underlying investments. As noted above, Fitch views this addition as a positive contingency option.

There are also differences between the Astrea III and Astrea IV reserve mechanisms for the Class A bonds. Astrea III featured a cash sweep to fully reserve the A-1 notes prior to any distributions to the equity and the Class A-2 notes were reserved over a straight line basis to their scheduled call date at each distribution date. Astrea III allowed for distributions to the equity under the condition that the Class A-1 notes were fully reserved and the Class A-2 notes' scheduled reserves have been met. The A-1 notes issued by Astrea III had a scheduled call date of three years, compared to a five-year scheduled call date in Astrea IV. Fitch does not consider these changes to be material.

Security and Bankruptcy Remoteness

The bonds, Liquidity Facility, Capital Call Facility and the hedge counterparties are secured by:

1. a first fixed charge by the issuer over its shares in the AOCs and the dividends in respect of those shares
2. a first fixed charge by the issuer over its bank accounts and custody accounts
3. an assignment of the issuer's rights under the shareholder loan agreements between the issuer and the AOCs respectively
4. a first floating charge by the issuer and sponsor of their respective undertaking and all their assets
5. a first fixed charge by the sponsor over its shares in the issuer and the dividends in respect of those shares and any present or future bank accounts
6. an assignment of the sponsor's rights under the sponsor shareholder loan agreement between the sponsor and the issuer.

Based on legal opinions provided by the issuer's legal counsel, Fitch assumes the issuer is bankruptcy remote, that its assets cannot be consolidated with those of the sponsor or those of the AOCs and that the transfer of the fund investments under the purchase agreements would be characterised as a sale of rights over the fund investments and would not be regarded as property of the seller in the event of the seller's insolvency.

The Model

Fitch performed the cash flow analysis of the structure using a model to forecast hypothetical portfolio cash flows using historic private equity data. Private equity data was sourced from a third-party data provider and covered all quartiles of funds with vintages ranging from 1990 to 2016. The dataset encompassed buyout, growth and credit private equity funds to parallel the underlying breakdown of the Astrea IV portfolio. The major data points driving the analysis include historic capital calls, historic distributions and historic NAV appreciation and depreciation. The historic data within each dataset was extrapolated to simulate the average historical cash flow of a representative private equity fund. The historical cash flows were built up, as described in the Cash Flow Scenario Analysis section of this report, to forecast the cash flows of Astrea IV's portfolio of private equity holdings.

The model applied the cash flows, as described above, to the Astrea IV Priority of Payments (see Appendix A for the Priority of Payments) to simulate the performance of the transaction.

Additionally, the model was modified to allow hypothetical launch dates for the transaction to forecast performance if Astrea IV was launched during various market cycles. This analysis used historic observed cash flows where available and applied these to the underlying portfolio based on the private equity fund age and strategy profile of Astrea IV's holdings. This model provided the ability to run the analyses described in the Cash Flow Scenario Analysis section of this report. For example, if the transaction was launched in 2005 and 10% of the NAV was two-year old buyout funds at that time, the model would apply the observed historic performance for two-year old buyout funds in 2005 to 10% of the portfolio. This is then replicated for the remaining 90% of the portfolio NAV for the observed performance of each age and strategy in 2005. The analysis then applies the same methodology to the remaining life of the transaction for where there is historic performance data available. If there is no data available for a certain age in a certain year, the model defaults to applying the average historic performance for that age and strategy across vintages.

Surveillance of the Transaction

Fitch relied on a high level of information into the underlying funds for this analysis and will continue to do so for the ongoing surveillance of Astrea IV. Fitch will also receive monthly and semi-annual reporting from the issuer on an ongoing basis throughout the life of the transaction. Monthly reporting will detail any cash flows for the period (distributions, capital calls

and so on), balances of assets and liabilities, mark-to-market updates on foreign exchange hedges and investments held in the reserve account. Semi-annual reporting will coincide with the Distribution Dates of the bonds and will detail the cash flows of underlying funds within Astrea IV, periodic and cumulative payments made at each level of the structure's waterfall, balances of assets and liabilities of the structure, LTV calculations, mark-to-market updates on foreign exchange hedges, updated valuation data for Astrea IV's private equity holdings as well as a portfolio update. The semi-annual portfolio update will include cash flow performance of the funds as well as updated breakdowns of the portfolio by region, vintage year, sector and so on.

Rating Sensitivity

Private equity transactions have many inherent risks, including the uncertainty of the amount and timing of income distributions, illiquid nature of investments, leverage, and subjective nature of NAV calculations.

The assigned ratings of the bonds may be subject to downgrade as a result of the portfolio structure's sensitivity to the potential variability of key assumptions. One key model assumption is the distribution of cash flows, which are uncertain and therefore may come in lower than model projections, creating a risk that the funds will not generate enough overall cash to repay bondholders.

The ratings are sensitive to the financial health of the transaction's counterparties. A ratings downgrade of a counterparty may be linked to and materially affect the ratings of the bonds, given the reliance of the issuer on counterparties to provide functions, including currency hedging and acting as a bank account provider. There is an especially strong link between the ratings of the bonds and the credit quality of investments made with reserve account funds.

The ratings are also sensitive to significant depreciation of the euro vs the US dollar, which will affect absolute returns and the US dollar value of distributions. Payments on the currency hedges that are larger than anticipated may leave fewer funds available to pay interest on the bonds, fund the reserves account and meet capital calls; leading to increased reliance on the Liquidity and Capital Call Facilities.

Appendix A: Terms of the Bonds

The Priority of Payments

Unless and until an Enforcement Event occurs, the payments to be made on each Distribution Date from the Available Cash Flow (defined below) of the Issuer as of the Distribution Reference Date relating to such Distribution Date shall be made in the following order of priority:

1. Payment of Taxes (if any) of the Issuer and the Asset-Owning Companies and Expenses (other than those provided for in the other clauses of the Priority of Payments below) up to an aggregate cap of USD0.75 million per Distribution Period (which will be proportionately adjusted for a Distribution Period that is longer or shorter than six months, "Clause 1 Cap") as determined in accordance with the proviso below
2. Payment of any amounts due and payable to the Hedge Counterparties, other than amounts payable under Clause 13 below
3. Manager fees
4. Payment for the following uses relating to the Liquidity Facility in the following order:
   - (i) Liquidity Facility commitment fees;
   - (ii) Liquidity Facility interest expense and any other payables; and
   - (iii) Liquidity Facility principal repayment
5. Class A-1 Bonds and Class A-2 Bonds interest expense on a pari passu and pro rata basis (if applicable, in the proportion based on the Class A-1 Bonds and Class A-2 Bonds original principal amounts)
6. Class B Bonds interest expense
7. If net cash proceeds are received from sale or disposal of Fund Investments pursuant to the exercise of the Disposal Option, payment of 100% of cash flow remaining after Clauses 1 through 6 to the Reserves Accounts (or, if the Reserves Accounts Cap has been met (regardless of whether the Class A-1 Bonds or the Class A-2 Bonds have been redeemed), to the principal repayment of the Class B Bonds) until the amount so paid under this Clause 7 is equal to (but not exceeding) the total amount of net cash proceeds so received
8. Payment to the Reserves Accounts for the following uses in the following order:
   - (i) Payment for the amount of any losses realised on investments held in the Reserves Custody Account until such losses have been recouped
   - (ii) Payment for the Unpaid Reserve Amount applicable to such Distribution Date (as described above in "Key Structural Features"); and
   - (iii) Payment for the Reserve Amount applicable to such Distribution Date (as described above in "Key Structural Features")
9. Upon and after full redemption of all Class A Bonds, payment of 90% of cash flow remaining after Clauses 1 through 8 to the principal repayment of the Class B Bonds
10. If the Maximum LTV Ratio has been exceeded, payment of 100% of cash flow remaining after Clauses 1 through 9 to the Reserves Accounts (or, if the Reserves Accounts Cap has been met (regardless of whether the Class A-1 Bonds or the Class A-2 Bonds have been redeemed), to the principal repayment of the Class B Bonds) until the Maximum LTV Ratio is no longer exceeded

11. Payment for the following uses relating to Capital Calls in the following order:

    (i) Payment to fund Capital Calls on the Fund Investments;

    (ii) Capital Call Facility commitment fees;

    (iii) Capital Call Facility interest expense and any other payables; and

    (iv) Capital Call Facility principal repayment

12. Administrative expenses in excess of the Clause 1 Cap and any other expenses

13. Payment of any hedge unwind costs under the Hedge Agreements due to an event of default with respect to which the Hedge Counterparty is the Defaulting Party or a Termination Event with respect to which the Hedge Counterparty is the Affected Party (as such terms are defined in the Hedge Agreements)

14. *Payment for the following uses in the following order: Prior to the Performance Threshold being met on any Distribution Date falling on or before the Scheduled Call Date*

    (i) payment of 100% of the cash flow remaining after application of Clause 1 through Clause 13 of the Priority of Payments to the Sponsor until the Performance Threshold is met.

    If the Performance Threshold has been met on a Distribution Date falling on or before the Scheduled Call Date, the following order shall apply to cash flow remaining after application of Clause 14(i) on that Distribution Date as well as to cash flow available under Clause 14 on each subsequent Distribution Date up to and including the Distribution Date falling on the Scheduled Call Date.

    (ii) payment to the Bonus Redemption Premium Reserves Accounts until the aggregate amount so paid under this Clause 14(ii) is equal to 0.5% of the principal amount of the Class A-1 Bonds as of the Issue Date;

    (iii) payment to the Sponsor and the Reserves Accounts in equal proportions until the Reserves Accounts Cap has been reached; and

    (iv) after the Reserves Accounts Cap has been reached, payment of 100% of the cash flow remaining after application of Clause 1 through Clause 13 of the Priority of Payments to the Sponsor

    On each Distribution Date falling after the Scheduled Call Date.

    (v) payment of 100% of the cash flow remaining after application of Clause 1 through Clause 13 of the Priority of Payments to the Sponsor,

provided always (i) that for any taxes or administrative expenses of any of the Issuer and the Asset-Owning Companies due on any date that is not a Distribution Date, such taxes or expenses will be paid from the total cash balance in the Operating Accounts when due and the amount of such payments will, on the next Distribution Date, be included in the calculation of payments made under Clause 1 above (including without limitation for the purpose of determining whether the Clause 1 Cap has been reached); (ii) that for any Capital Call due on any date that is not a Distribution Date, such Capital Call will be paid from the total cash balance in the Operating Accounts when due; (iii) that for any interest or principal repayment due on any loan made under the Liquidity Facility Agreement (each a "LF Loan") or any loan made under the Capital Call Facility Agreement (each a "Capital Call Loan") on a date that is not a Distribution Date, such interest or principal repayment will be paid from the total cash balance in the Operating Accounts when due; and (iv) that for any payment due on any Swap Transaction under Clause 2 above on any date that is not a Distribution Date, such payment will be paid from the total cash balance in the Operating Accounts.

In relation to each Distribution Reference Date, the "Available Cash Flow" is defined as the total cash balance in the Operating Accounts as of such Distribution Reference Date less the Retained Amount (defined below). For the avoidance of doubt, the total cash balance in the Operating Accounts includes, without limitation:

(i) any amounts transferred from the Collection Accounts;

(ii) interest income and realised gains received from the Reserves Accounts and the Reserves Custody Account;

(iii) the proceeds of any LF Loans or any Capital Call Loans;

(iv) the proceeds of any Equity Investments; and

(v) the transfer of the residual balance from the Settlement Accounts (after the Bond Proceeds have been used for repaying a certain portion of the Sponsor Shareholder Loans incurred in connection with the acquisition of Fund Investments and payment of fees and expenses incurred in connection with the issue and offering of the Bonds).

On each Distribution Reference Date, the Transaction Administrator will calculate the Available Cash Flow of the Issuer based on information available to it as of such Distribution Reference Date and by applying such rounding convention as it may decide would be appropriate in making such calculation.

On each Distribution Reference Date, the Manager may retain an amount, as it may decide would be appropriate, not exceeding USD5 million in the Operating Accounts (the "Retained Amount") for the purpose of funding Capital Calls (whether known, expected or as a contingency), instead of such amount being available for payments on the Distribution Date relating to such Distribution Reference Date.

The Post-Default Priority of Payments

If an event of default has occurred and the Bonds have been accelerated (together, an "Enforcement Event"), all cash in the Collection Accounts will be swept to the Operating Accounts (via a daily cash flow sweep) and all available funds in the Operating Accounts, Reserves Accounts, Bonus Redemption Premium Reserves Accounts and Settlement Accounts (except for amounts that have been set aside for repaying a certain portion of the Sponsor Shareholder Loans incurred in connection with the acquisition of Fund Investments and payment of fees and expenses incurred in connection with the issue and offering of the Bonds) will be applied according to the following Post-Enforcement Priority of Payments:

1. Payment of amounts due under Clause 1 of the Priority of Payments. With regard to amounts due for payments of administrative expenses under Clause 1 of the Priority of Payments, only those amounts required for enforcement of the Security or the Bonds will be paid under this Clause 1. The amounts paid under this Clause 1 will be paid without regard to any caps
2. Payment of any amounts due and outstanding to the Hedge Counterparties, other than amounts payable under Clause 10 below
3. Payment for the following uses relating to the Liquidity Facility in the following order:

   (i) Liquidity Facility commitment fees;

   (ii) Liquidity Facility interest expense and any other payables; and

   (iii) Liquidity Facility principal repayment

4. Payment of accrued and unpaid interest on the Class A-1 Bonds and Class A-2 Bonds on a pari passu and pro rata basis (if applicable, in the proportion based on the Class A-1 Bonds and Class A-2 Bonds original principal amounts)

5. Repayment of outstanding principal amount (and, if applicable, premium) of the Class A-1 and Class A-2 Bonds on a pari passu and pro rata basis (if applicable, in the proportion based on the Class A-1 Bonds and Class A-2 Bonds original principal amounts)
6. Payment of accrued and unpaid interest on the Class B Bonds
7. Repayment of outstanding principal amount of the Class B Bonds
8. Payment of any unpaid administrative expenses or any other expenses not included in Clause 1 above
9. Payment for the following uses relating to Capital Calls in the following order:

   (i) Capital Calls on Fund Investments;

   (ii) Capital Call Facility commitment fees;

   (iii) Capital Call Facility interest expense and any other payables; and

   (iv) Capital Call Facility principal repayment

10. Payment of any hedge unwind costs under the Hedge Agreements due to an event of default with respect to which the Hedge Counterparty is the Defaulting Party or a Termination Event with respect to which the Hedge Counterparty is the Affected Party (as such terms are defined in the Hedge Agreements)
11. Payment to Sponsor

Events of Default Under the Bonds

At the bonds' trustee's discretion, or if requested by the holders of 25% of the bonds outstanding, certain events constitute an event of default of the bonds, causing them to become immediately due and payable. These events include:

(i) Issuer non-payment of principal, interest or premium under any Class of the bonds within 10 business days after becoming due and payable

(ii) Issuer non-payment of any debts with any creditor within 10 business days after becoming due, issuer insolvency or a moratorium in respect of any debts of the issuer

(iii) any corporate action, legal proceeding or other procedure or step taken in relation to the suspension of any debts of the issuer;

   a. a composition, compromise, assignment or arrangement with any creditor of the issuer generally; or the appointment of a liquidator, receiver, judicial manager, administrative receiver, administrator, compulsory manager or other similar officer in respect of the issuer or any of its assets,

(iv) any event defined as an event of default under the Liquidity Facility agreement occurs that is continuing.

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