Lincoln Senior Debt Index

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Introduction

The Lincoln Senior Debt Index ("Lincoln SDI") measures the changes in the total return of illiquid senior debt facilities issued primarily to sponsored (i.e., private equity owned) companies in the United States. The total return of loans in the index is decomposed into two parts: income return and capital gain return. In addition, the Lincoln SDI captures a multitude of descriptive statistics, including yield and spread, of the underlying loans and issuers. While the private debt industry continues to grow, there remains little visibility into the returns and characteristics of the senior debt securities in middle market capital structures. Lincoln International's ("Lincoln") Valuations & Opinions Group ("VOG") compiles the Lincoln SDI based on the population of companies' fair valued every quarter.

VOG collaborated with Professor Pietro Veronesi of University of Chicago Booth School of Business to create the index. The Lincoln SDI is first of its kind, drawing from valuations performed for public business development companies ("BDCs"), private BDCs, and other private credit funds. Thus, the Lincoln SDI will be unique in that it will be based on illiquid – and private - loans issued to portfolio companies in the opaque senior direct lending market, in which limited public data is available outside of SEC filings issued by public BDCs. Furthermore, the Lincoln SDI is the only direct lending index to provide total return, price, spread and loan-to-value data. Lastly, as the underlying data for the Lincoln SDI is from Lincoln's quarterly portfolio valuations, quarterly results will become available prior to the completion of the filing of public BDCs quarterly and annual financial statements, allowing managers to timely benchmark their portfolios against the index.

Source of Data

On a quarterly basis, VOG completes portfolio valuations for over 2,400 portfolio companies from a wide assortment of private equity investors and non-bank lenders. Most of these companies are highly levered with debt financing provided via the direct lending market and in many instances, Lincoln estimates the fair value of at least one senior debt security in the portfolio companies' capital structures.

In assessing the data, VOG relies on commonly accepted valuation methodologies and each valuation analysis is unique and conforms to fair value accounting principles. The analyses are then vetted by auditors, fund managers and their board of directors, as well as other regulators. Upon concluding each quarterly valuation cycle, VOG aggregates the underlying financial performance and enterprise value data for analysis.

Sample Size and Criteria

Every quarter, VOG begins the private debt valuation process by estimating the fair value of private debt securities primarily via an income approach (for performing loans whereby the lender does not exhibit effective control of the portfolio company). The income approach estimates the fair value of the private debt securities by modeling out the contractual cash flows of the securities and discounting the cash flows with a market participant discount rate based on both market interest rate and credit specific factors. In instances of either control or distress, a current value method is often employed whereby the estimated enterprise value of the portfolio company is allocated to the various securities in a portfolio company's capital structure based on their contractual seniority.

The next step is to exclude loans to: (a) non-operating companies such as passive real estate or specialty finance companies; (b) early stage venture businesses, and, (c) companies in financial distress.

The Lincoln SDI is designed as a: (a) performing loan index meaning that all loans with a fair value less than 80% of par and with a yield-to-maturity ("YTM") greater than 25% in the preceding quarter are excluded; and, (b) loan valued in two consecutive quarters by Lincoln

The Lincoln SDI is a fair value weighted index constructed such that no individual security can represent more than 2% of the overall index in a given quarter (weighted based on the aggregate fair values of the securities in the index).

The final step is to construct the index based on those companies meeting the above criteria (i.e., the index constituents). Given the large number of loans valued on a quarterly basis, confidentiality of all company-specific information is maintained.

Lincoln has created three indices by loan facility classification in the Lincoln SDI: all senior loans, consisting of unitranche, first lien, and second lien loans, senior loans including first lien and unitranche loans, and second lien loans.

Index Calculation

The index is measured on a total return – price basis (as measured via Lincoln's estimated fair value for the security). The index's total return consists of 1) income return (i.e., accrued interest for 3 months plus), 2) quarter over quarter unrealized gain/loss. The loan interest rate is calculated as the prior quarter end 3-month LIBOR (or LIBOR floor if applicable) plus the current spread relevant to each loan.

The index is computed as follows:

1. Compute returns for individual securities

$$R^i(t,t+1) = \frac{FV^i(t+1) \times Pr^i(t+1) - FV^i(t) \times Pr^i(t) + C^i(t) \times Pr^i(t)}{FV^i(t) \times Pr^i(t)}$$

   where

   $FV^i(t)$ = Lincoln Fair Value of loan i in quarter t

   $FV^i(t+1)$ = Lincoln Fair Value of loan i in quarter $t+1$

   $Pr^i(t)$ = Principal of the loan i on quarter t

   $C^i(t)$ = Coupon of loan i at time t

2. Next, the weights of each loan are computed.

$$w^i(t) = \frac{FV^i(t) \times Pr^i(t)}{\sum_{j=1}^{n(t)} FV^j(t) \times Pr^j(t)}$$

3. The weights are capped at 2% (based on their respective fair value). This is accomplished by increasing all other weights proportionally over their value weights.

4. The portfolio return is computed as:

$$R(t,t+1) = \sum_{i=1}^{n(t)} w^i(t) \times R^i(t,t+1)$$

   where $n(t)$ denotes the number of securities available at time t.

5. The **Total Return** index is

$$Idx(t+1) = Idx(t) \times (1 + R(t, t+1))$$

where $Idx(0) = 100$

6. The total return can then be decomposed into **Income Return** and **Capital Gain Return**

$$R_{Income}(t, t+1) = \sum_{i=1}^{n(t)} w^i(t) \times R^i_{Income}(t, t+1)$$

$$R_{CG}(t, t+1) = \sum_{i=1}^{n(t)} w^i(t) \times R^i_{CG}(t, t+1)$$

where

$$R^i_{Income}(t, t+1) = \frac{C^i(t)}{FV^i(t)}$$

and

$$R^i_{CG}(t, t+1) = \frac{FV^i(t+1) \times Pr^i(t+1) - FV^i(t) \times Pr^i(t)}{FV^i(t) \times Pr^i(t)}$$

7. From the Income Return and the Capital Gain Return, two sub-indices can be calculated

   a. The Income Return Index:

   $$Idx_{Income}(t+1) = Idx_{Income}(t) \times (1 + R_{Income}(t, t+1))$$

   b. The Capital Gain Index

   $$Idx_{CG}(t+1) = Idx_{CG}(t) \times (1 + R_{CG}(t, t+1))$$

where $Idx_{Income}(0) = 100$

where $Idx_{CG}(0) = 100$

Academic Advisor

Professor Pietro Veronesi is a Senior Advisor to Lincoln's Valuations and Opinions Group. He is the Chicago Board of Trade Professor of Finance at the University of Chicago, Booth School of Business. He is also a research associate of the National Bureau of Economic Research and a research fellow of the Center for Economic and Policy Research. Additionally, he is a former director of the American Finance Association and co-editor of the Review of Financial Studies. He conducts research that focuses on asset pricing, stock and bond valuation under uncertainty, bubbles and crashes, return predictability and stochastic volatility. His work has appeared in numerous publications, including the *Journal of Political Economy, American Economic Review, Quarterly Journal of Economics, Journal of Finance, Journal of Financial Economics, and Review of Financial Studies*. He is the recipient of several awards, including the 2015 AQR Insight award, the 2012 and 2003 Smith Breeden prizes from the *Journal of Finance*; the 2008 WFA award; the 2006 Barclays Global Investors Prize from the EFA; the 2006 Fama/DFA prizes from the Journal of Financial Economics; and the 1999 Barclays Global Investors/Michael Brennan First Prize from the *Review of Financial Studies*.

Professor Veronesi teaches both masters- and PhD-level courses. He is the recipient of the 2009 McKinsey Award for Excellence in Teaching.

His undergraduate work was in economics at Bocconi University where he received a laurea *magna cum laude* with honor in 1992. He earned a master's degree with distinction in 1993 from the London School of Economics. He joined the Chicago Booth faculty upon obtaining his PhD in Economics from Harvard University in 1997.

About Lincoln International

Lincoln International is a trusted investment banking advisor to business owners and senior executives of leading private equity firms and public and privately held companies around the world. Our advisory services include mergers and acquisitions, debt advisory, growth equity and restructuring for the mid-market. We also provide valuations and fairness opinions and joint ventures advisory services. As one tightly integrated team of more than 600 professionals across 16 countries, we offer an unobstructed perspective, backed by superb execution and a deep commitment to client success. With extensive industry knowledge and relationships, timely market intelligence and strategic insights, we forge deep, productive client relationships that endure for decades. Connect with us to learn more at www.lincolninternational.com.

VOG is a leading independent valuation advisor to managers of illiquid assets and lenders to alternative assets funds. VOG specializes in in the valuation of illiquid debt, equity and derivative securities. Additionally, they provide independent fairness, solvency and other transaction opinions for a variety of corporate transactions for both public and private companies.

VOG is widely recognized for leveraging Lincoln International's "real world" transaction experience from its M&A and debt advisory practices to assist its clients in the determination of fair value. Lincoln International's highly skilled professionals have extensive experience in determining and supporting fair value measurements for traditional and complex securities.

Important Disclosure

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