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Private Debt Quarterly

Downside & Shortfall Risk
Modified Value at Risk (MVaR)
Covid-19 Quarterly Returns

Q2 / 2021

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Private Debt Quarterly

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Dear investor,

In our previous reports, we focused on the continuous growth of private debt as an alternative asset class as well as on the return of private debt closed end funds, as proxied by the internal rate of return (IRR) or the Kaplan & Schoar (2005) public market equivalent (PME). The result in a nutshell: private debt funds appear to be highly attractive investments in both return dimensions. But does this attractive return come at high risk? In this quarterly report, we shall focus on this question, employing three risk measures relevant to the professional investor. First, we show the **modified value at risk (MVaR)** of private debt funds as VaR has emerged as one of the most popular tools in risk and portfolio management. Second, we focus on a "safety first" risk measure and calculate the risk of falling short of a certain target return, called **shortfall risk (SR)**. We calculate and present those risk measures for the cross-section of private debt funds, for well-defined PD investment strategies (direct lending, mezzanine, distressed debt, special situations and venture debt) and compare them to an investment grade, a high yield and an equity portfolio. This measure is particularly important for portfolio managers that need to match assets to liabilities. Moreover, we provide market data comparing private debt fund returns during and after the **COVID-19 crisis** to verify our statistical findings.

We use timed cash flows accruing to limited partners (LP) from our cash flow database and calculate quarterly net asset values (NAVs) for a sample length of ten years, that is, we consider NAVs over an observation period of 40 quarters. We employ an investment grade (IG) bond market portfolio proxied by the Bloomberg Barclays US Corporate Bond Total Return Index Baa (LCB-1TRUU) and a high yield (HY) bond market portfolio proxied by the Bloomberg Barclays High Yield Index (LF98TRUU) to compare fund returns and our risk measures to those of traded bond market portfolios. Moreover, we compare private debt fund returns with an equity portfolio as proxied by the S&P500 Index.

Modified Value at Risk (MVaR)

What is the extent of potential losses a private debt fund investor may expect over an investment period of ten years and with a probability of 99%? Our first risk analysis focuses on this question. We use the modified value at risk (MVaR) measured at the 1% confidence level, thus considering the skewness and kurtosis of our return data.

Figure 1 shows the expected return in percent on the vertical and the modified VaR (MVaR) on the horizontal axis. Private debt fund portfolios are marked in blue, indexed market portfolios in red color. Calculated with historical quarterly returns over a period of ten years, all but distressed debt funds provide a MVaR that is lower than an investment grade (IG) portfolio. While an investment in IG bonds bears a low MVaR of approximately -4.8%, private debt fund portfolios display substantially lower MVaR (mezzanine debt: -1.7%; direct lending: -2.5%) or lower MVaR (special situations: -4.5%; venture debt: -4.8%). Simultaneously, these strategies deliver a performance that is comparable (special situations) or superior to an IG portfolio (mezzanine debt, direct lending, venture debt). From an IG benchmark perspective and for an investor that is indifferent to asset liquidity, private debt funds thus appear to provide an attractive IG fixed income replacement. The same can be said for the HY oriented investor: private debt fund expected returns are comparable or superior to the HY bond portfolio, while MVaR is considerably lower. Interestingly, three private debt strategies render a return that is nearly comparable to an equity portfolio. Mezzanine debt, venture debt and direct lending portfolios render a 7.4%, 6.9% and 6.7% expected return, which compares to the S&P500 equities portfolio with an expected return of 8.0%, the latter however bearing a considerably higher MVaR in the amount of -14.9%.

1. Downside Risk of Private Debt Funds (MVaR, SR)

Figure 1. Private Debt Fund Expected Return, E(R), and modified Value at Risk (MVaR)

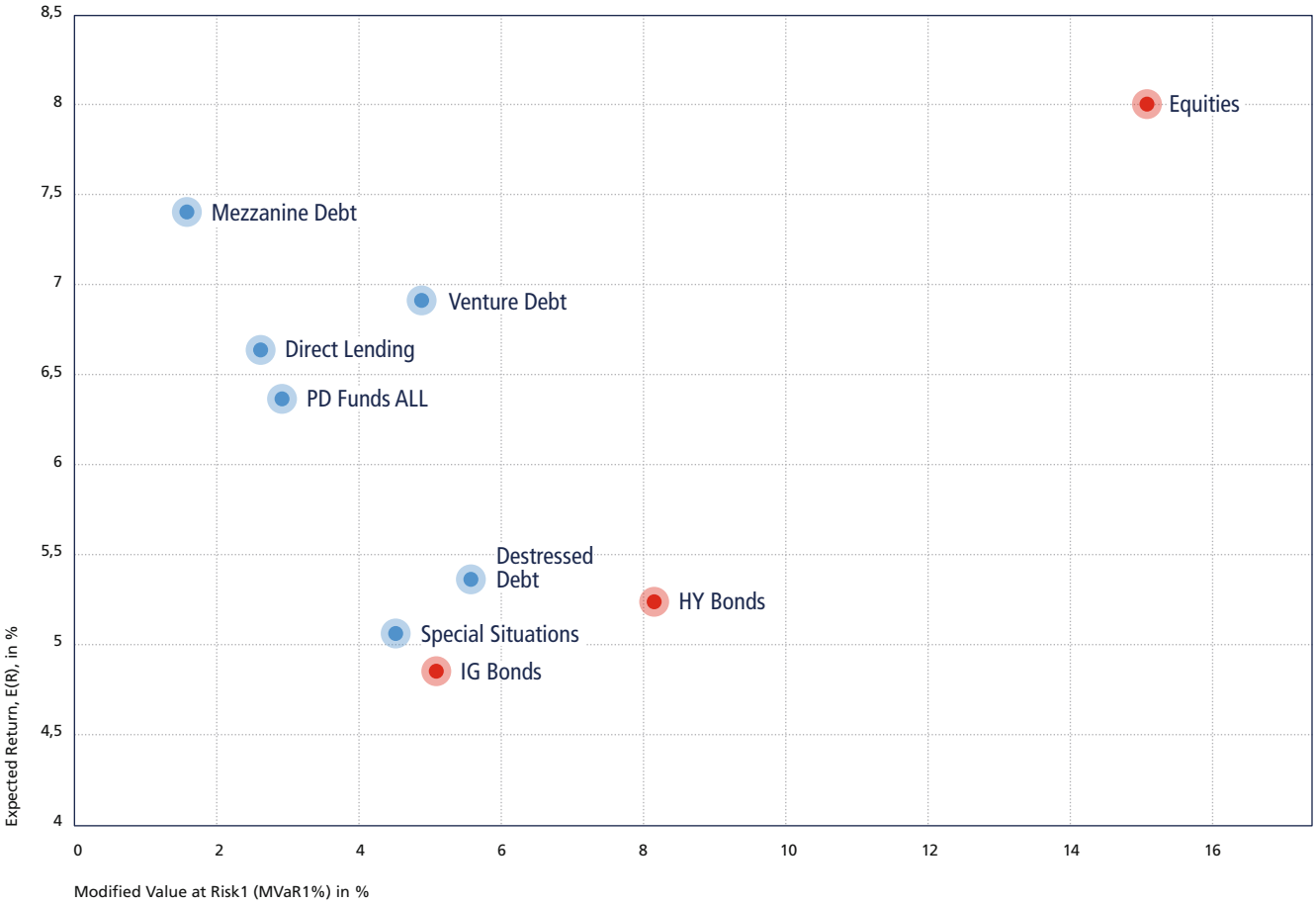

Figure 1: Source: Remaco Research. Private debt fund modified value at risk (MVaR) based on quarterly returns compared to an IG-, HY- and equity market portfolio. Quarterly returns (Rt) equal [(NAVt + CFt) / NAVt-1]- 1, where NAVt is the quarterly reported net asset value of a fund, CFt is the net quarterly cash flow of a fund at quarter t, the latter consisting of contributions from and distributions to limited partners (LPs), and NAVt-1 is the NAV of the preceding quarter. The IG bond market benchmark proxied by the quarterly returns of the Bloomberg Barclays US Corporate Bond Total Return Index Baa (LCB1TRUU). The HY bond market benchmark is proxied by the quarterly returns of the Bloomberg Barclays High Yield Index (LF98TRUU) and the S&P500 Index is used to proxy an equity portfolio. We use the Cornish-Fisher (1938) expansion to account for skewness and kurtosis of quarterly returns when calculating MVaR. A confidence level of 1% applies.

Following our approach reflected in our **Remaco 7Factor-Framework,** we typically calculate MVaR for investment strategies chosen by the investor. We also analyze tail risk and evaluate the expected losses for the worst 1% of returns. The use of **expected shortfall (ES)** rather than MVaR has been recently advocated by regulators and is used widely in the financial industry. We therefore provide ES metrics to gauge for the potential size of a loss that exceeds the MVaR.

Remaco 7Factor-Framework

Remaco 7Factor-Framework

The **Remaco 7Factor-Framework** provides our clients with the opportunity to make informed PD asset manager (GP) selection decisions. We help our clients to successfully invest in private debt funds using our 7F-Framework, which provides quantitative decision support data based on the analysis of (1) IRR, (2) PME, (3) alpha, (4) VaR & ES, (5) active risk, (6) Covariance and (7) ESG risk.

1 **Internal Rate of Return (IRR)** We verify fund IRRs on a quarterly basis as this measure is widely used by practitioners. The input to our calculation is cash flow data representing investments from LPs (contributions) and paybacks to LPs (distributions). For funds that are not liquidated, we treat the last net asset value (NAV) as market value. IRR is an **absolute measure of performance**, not allowing to benchmark market performance.

2 **Public Market Equivalent (PME)** We calculate PME based on Kaplan and Schoar (2005), used as the state-of-the-art measure of fund level performance and viewed as a market-adjusted multiple of invested capital. This widely accepted **relative measure of performance** adjusts for the market return or the risk spanned by the benchmark index (assuming $\beta = 1$). We use timed cash flows over the lifetime of a fund to provide PME analysis.

3 **PD fund alpha (α)** We identify market risk (β), using the capital asset pricing (CAPM) framework. We approximate the return on the market portfolio using various indices (two for bond markets (IG and HY) and one for the equity market, i.e. the S&P500) and estimate the intercept of OLS regressions, returning **alpha (α) or risk-adjusted performance.** By calculating fund α, we allow β to be larger or smaller than 1, substantially enlarging our understanding of PD fund returns and responding to the systematic limitation given by the "fixed- β- approach" in the PME- calculation.

4 **Downside risk analysis (VaR, ES and MaxDD)** We provide additional insights related to the downside risk, one of the most important features to analyze investment risk and asset pricing. We use a value at risk (VaR)-, expected shortfall (ES)- and maximum drawdown (MaxDD) - analysis to proxy for PD fund risk, employing quarterly PD fund returns. This allows investors to be better informed about the downside risk of PD fund assets, for example during downmarkets and in view of potential secondary market transactions.

5 **Tracking error (active risk)** PD funds are often seen as fixed income replacement. When a fixed income portfolio manager's benchmark is a bond market index, risk is frequently not measured in terms of variance or standard deviation of portfolio returns, but rather by the standard deviation of the return of a portfolio relative to the return of the benchmark index. Our data provides valuable information on this measure, allowing to monitor tracking error or **active risk.**

6 **Covariance (Cov)** We use quarterly mean (expected) returns, their variance and covariance, to construct an efficient portfolio and assess a PD fund **portfolio's effective risk** in a Markowitz sense, both at the fund level or PD fund strategy level. This significantly improves the investors risk assessment when PD fund assets are combined to create a portfolio. Risk is measured in terms of portfolio variance, which in turn depends on the covariance of the returns between each pair of PD funds comprising the portfolio.

7 **ESG Risk Analysis** We analyze ESG transparency both at the GP and PD fund level and assess ESG materiality at the portfolio level based on Sustainability Accounting Standards Board (SASB) risk measures. If requested, we check on a variety of complementary ESG frameworks, such as for example the Principles for Responsible Investment (PRI) when analyzing funds for investment.

Safety First Portfolio: Managing Shortfall Risk

An investor's liabilities vary from institution to institution and are often a key factor in a portfolio manager's selection of asset classes to include in a portfolio. For investors bound to liability driven strategies, such as life insurance companies or pensions funds, private debt may offer interesting return characteristics. Knowing the risk of falling short of a certain minimum return is instrumental to a portfolio manager matching assets and liabilites. In our next analysis, we are therefore interested in the question how big the risk of falling short of a 3.0% return might be. We calculate single strategy "Roy-Portfolios" following the methodology proposed by Roy (1952). Rather than focusing on minimum variance (such as in a typical Markowitz approach), we are interested to learn something about the risk of falling short of a certain minimum return. **Figure 2** presents the results of our analysis:

Figure 2 shows the risk to fall short of a 3.0% required minimum return when investing in private debt strategies (mezzanine debt, direct lending, venture debt, distressed debt and special situations) as compared to an equity strategy and two bond strategies proxied by the traded indices mentioned above. All debt strategies beat the traded portfolios in terms of shortfall risk, with mezzanine debt and direct lending offering highly attractive (very low) shortfall risks significantly below 5.0%. This shortfall risk compares to the indexed market portfolios, which have a shortfall risk in the amount of 16.7%, 20.3% and 22.3% when considering equities, IG bonds and HY bonds respectively. Even venture debt, distressed debt and special situations strategies provide shortfall risks well below those of the traded portfolios.

Figure 2: Safety First: Private Debt Fund Shortfall Risk (SR) at a 3% Target Return

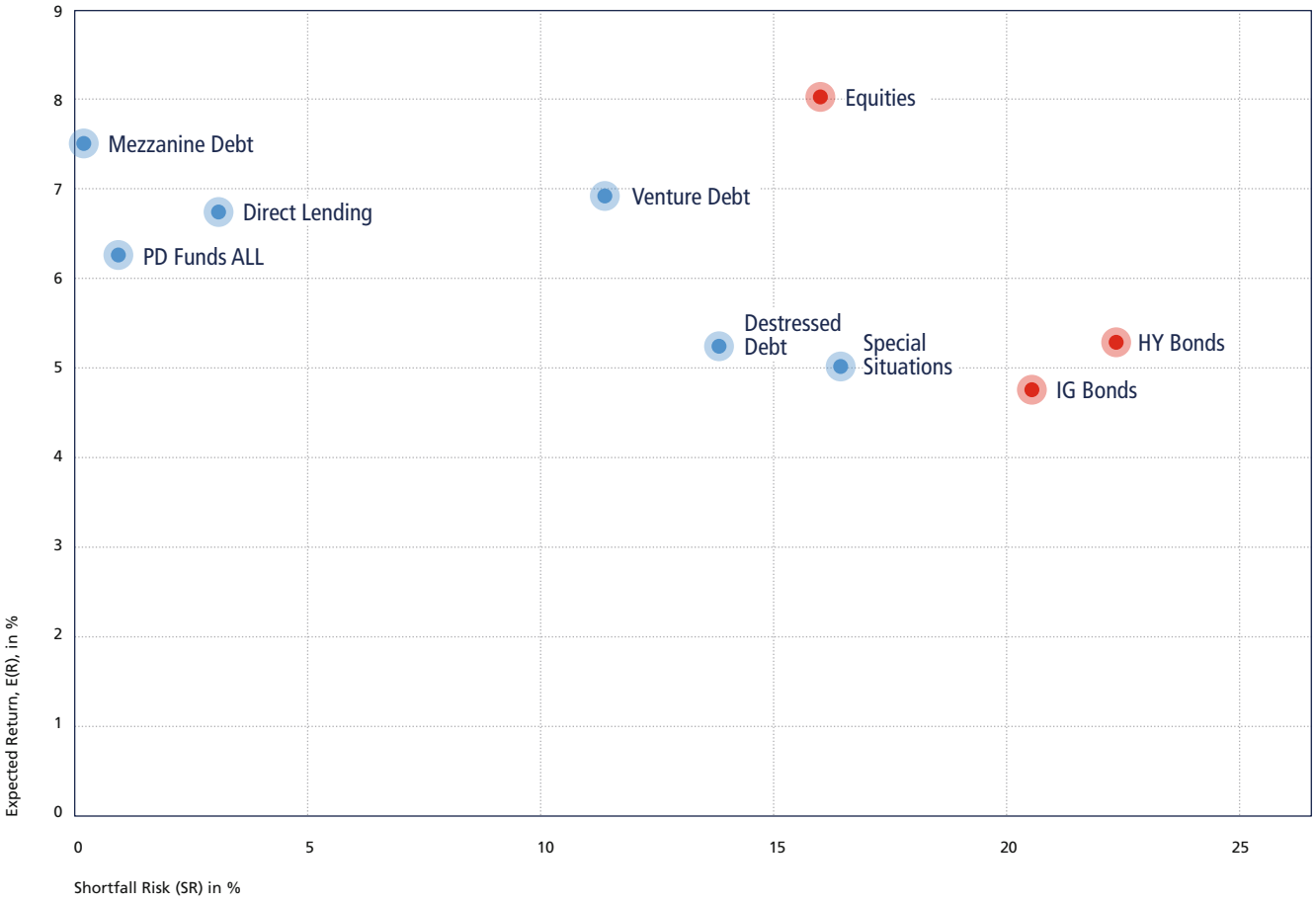

Figure 2: Source: Remaco Research. Private debt fund shortfall risk as in Roy (1952). Shortfall risk is calculated based on quarterly returns (Rt) equal $[(NAV_t + CF_t) / NAV_{t-1}]- 1$, where NAV is the quarterly reported net asset value of a fund, CF is the net quarterly cash flow of a fund at quarter t, the latter consisting of contributions from and distributions to limited partners (LPs), and NAV_{t-1} is the NAV of the preceding quarter. Shortfall risk is calculated as $(E(R_p) – R^*) / \sigma$, where $E(R_p)$ is the average historical return estimated from a 10 year sample, R* is the minimum target return or threshold return and σ is the standard deviation of the analyzed investment strategy. We measure the distance between E(R) and threshold, expressed in standard deviations, and calculate the probability of shortfall using a standard normal distribution. The IG bond market benchmark is proxied by the quarterly returns of the Bloomberg Barclays US Corporate Bond Total Return Index Baa (LCB1TRUU). The HY bond market benchmark is proxied by the quarterly returns of the Bloomberg Barclays High Yield Index (LF98TRUU) and the S&P500 index is used to proxy an equity portfolio.

Private Debt and the COVID-19 Crisis

Our final analysis in this report is related to the question how private debt fund strategies' quarterly returns behaved throughout the COVID-19 pandemic. Using quarterly returns, **Figure 3** shows the results of our analysis:

Unsurprisingly, the equity portfolio (red dotted line) as proxied by the S&P 500 shows the largest downturn during the crisis. At the end of the first quarter of 2020, it still showed substantial losses as compared to previous levels. Indexed to the end of September 2019 (= 100), it gained approximately 8.5% in the last quarter of 2019 and thereafter dropped to a net loss in the first quarter of 2020 in the amount of -20%. Compared to the end of 2019 level, the drops for the high yield (HY) and investment grade (IG) portfolios were -12.7% and -7.1%.

Figure 3: Covid-19 Private Debt Fund vs. Benchmark Returns

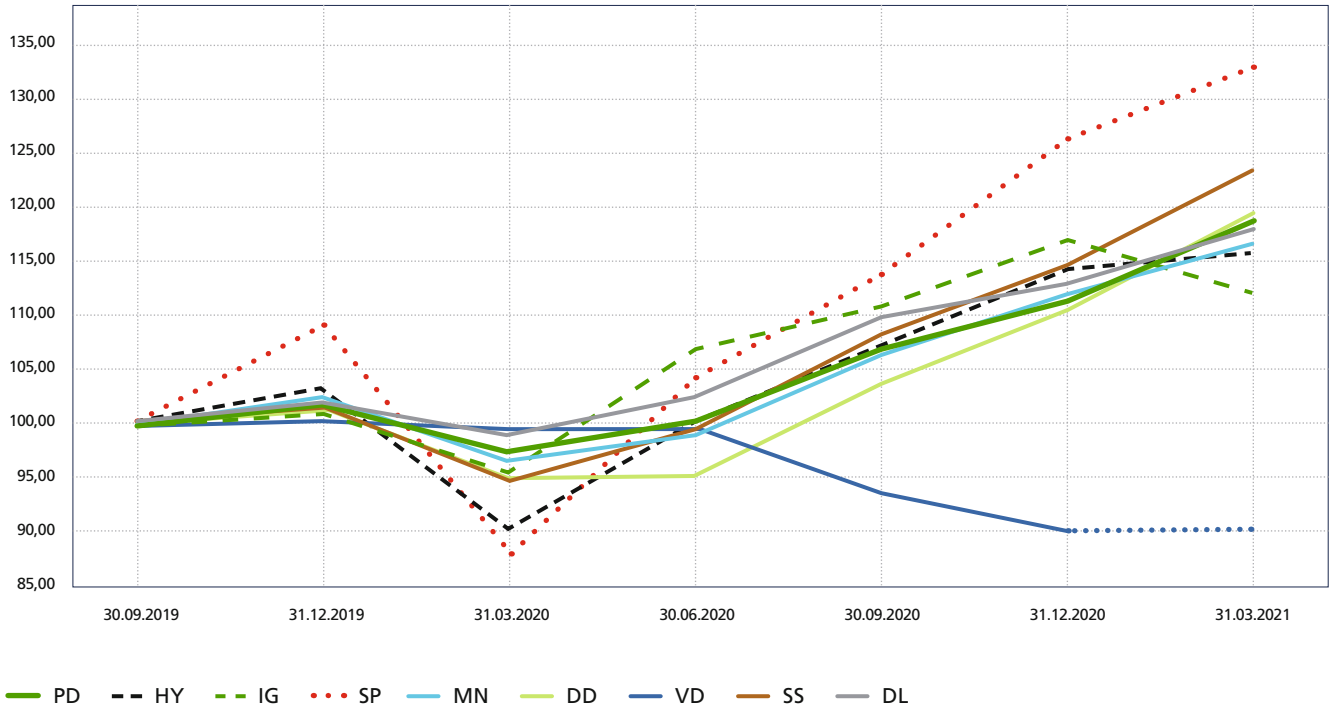

Figure 3: Source: Remaco Research. Quarterly returns of private debt fund strategies compared to an investment-grade (IG), high yield (HY) or equity portfolio (SP) using the strategies and traded indices mentioned above. Cross-section of all private debt portfolios (PD) Mezzanine (MN), Distressed Debt (DD), Venture Debt (VD), Special Situations (SS) as well as Direct Lending (DL).

We compare these numbers to the cross-section of PD funds (-4.8%), mezzanine debt (-3.4%), distressed debt (-6.7%), venture debt (-0.9%), special situations debt (-6.9%) and direct lending (-2.0%) and conclude that that all returns to private debt fund strategies were less negative than those of the traded benchmarks. The rebound in the following quarters was impressive for all strategies, with the exception of venture debt funds (blue line), which appeared to exhibit trouble in reaching pre-crisis valuation levels.

Our observations are important in various dimensions. First, private debt funds appear to be marked to market in a timely and accurate way. We observe no significant time delay in respect to the devaluation (revaluation) of reported net asset values during (after) the COVID-19 induced market downturn. Investors holding private debt assets available-for-sale or in their trading account can thus expect reasonable NAV reports, even in turbulent market conditions. Second, the quarterly returns observed for the COVID-19 period confirm our MVaR and SR analyses provided above. While MVaR and SR are calculated from a long sample (10 years of quarterly returns), turbulent market conditions and thus a short-term perspective appear not to alter our previous findings, namely that debt fund strategies offer an attractive risk-/return profile for the professional investor. Third, we advocate that any investor considering an investment in private debt funds should use return data in order to assess fund specific risks, such as MVaR, ES or SR, thereby adhering to widely accepted portfolio management principles.

We hope this report finds your appreciation and remain open for any questions you might have. Do not hesitate to contact us directly and engage in a personal or digital meeting to discuss topics related to PD fund selection.

Sincerely yours,

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Prof. Dr. Heinz Zimmermann
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Remaco is an independent investment advisor and 100% subsidiary company of Remaco Asset Management AG. The latter is a Swiss securities firm, founded 1947, regulated by the Swiss Financial Market Supervisory Authority (FINMA). We provide independent investment advisory services to institutional and professional investors, with a special focus on private debt. We are centered around approximately 30 professionals providing PD market analysis and research, investment proposals, due diligence services as well as monitoring and reporting services. Together with our international expert access (Nexia) and our academic activity (TiPD) we consider ourselves one of the knowledge leaders in Europe with respect to private debt investing.

Nexia International

We are member of Nexia International, the 9th largest accounting and consulting network globally with 258 independent tax, audit and advisory firms employing 3,442 partners and 34,000 employees, acitive in 122 countries and 727 offices globally.

Tilburg University

We are an institutional partner of Tilburg Institute for Private Debt (TiPD), an open platform to promote research, education and networking, in the field of private debt. The institute is managed by Pascal Böni, CEO of Remaco. TiPD was founded by the departments of finance and accountancy of Tilburg School of Economics and Management, according to the Shanghai Ranking of World Universities the worldwide #6 in business administration and #26 in finance. In Europe, it ranks #2 in business administration and #3 in finance.

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